Characteristics of Firms that Persistently

Meet or Beat Analysts' Forecasts

Tae Hee Choi

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KDI 국 제 정 책 대 학 원
SCHOOL OF PUBLIC POLICY AND MANAGEMENT

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Tae H. Choi[1]

KDI School of Public Policy and Management

Chungnyang, Dongdaemun

Seoul 130-868

Korea

82-2-3299-1221 (Phone)

82-2-3299-1240 (Fax)

E-mail: TChoi@kdischool.ac.kr

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Abstract

This study examines the effects of firms' tendency to meet or beat analysts' forecasts of earnings on (1) the earnings response coefficient (henceforth: ERC), (2) the firm specific risk characteristics, (3) the implied cost of capital (henceforth: r) and the efficiency of the market. I examine the relations between differences in ERCs as the number of consecutive times actual earnings are greater than or equal to the forecast increases. I also compare ERCs of firms that meet or beat the forecasts with those of firms that do not reach the forecasts. I find that the market rewards the firms that repeatedly meet or beat the analysts' earnings forecasts by providing higher ERCs. I also find that the market efficiently discounts a systematic portion of earnings surprise as a firm persistently meets or beats the analysts' earnings forecasts. The result indicates that the patterns of meeting or beating analysts' forecasts are strongly associated with various firm characteristics. In addition, the increasing pattern of the implied cost of capital indirectly indicates that the market efficiently interprets potentially managed earnings figures.

1   Introduction

The purpose of this study is to examine the effects of firms' tendency to meet or beat the analysts' forecasts of earnings on (1) the earnings response coefficient (henceforth: ERC), (2) the firm specific risk characteristics, (3) the implied cost of capital (henceforth: r) and the efficiency of the market. This study is motivated by anecdotal evidence that firms have a strong incentive to meet or beat analysts' forecasts. SEC chairman Levitt (1998) noted:

> I recently read of one major U.S. company that failed to meet its so-called "number" by one penny, and lost more than six percent of its stock value in one day.... This is the pattern earnings management creates: companies try to meet or beat Wall Street earnings projections in order to grow market capitalization and increase the value of stock options....

However, Charan and Colvin (2001) observed that only about 5% of the S&P 500 companies have successfully met or beaten Wall Street's consensus earnings forecast every quarter for the past five years. In February 2001, Cisco Systems missed the analysts' forecast by a penny for the first time in more than three years, and its market price tumbled 13% in the next two days. This is just one of many cases where the market price of stock fell significantly after a company missed analysts' forecasts by a few cents.

The extant literature investigates the motivation for managers to reduce negative earnings surprise. DeFond and Park (1997) show that managers are motivated to smooth income between periods to meet market expectations. They find that the managers of firms experiencing "poor" performance in the current period and expecting "good" performance in the next period utilize their discretionary accruals to increase current income.[1] Payne and Robb (2000) find that managers have an incentive to increase in-

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[1] Conversely, they use discretionary accruals to reduce current incomes when the firms are experiencing "good" performance in the current period.

come to "meet or beat" analysts' consensus forecasts when the dispersion of earnings forecasts is "low". The authors of these studies argue that the findings show managers' motivation to manipulate earnings to ensure that the market is not disappointed. Several papers document indirect evidence of earnings management. Burgstahler and Dichev (1997b) and Burgstahler (1997) report that the frequency of small positive earnings is unusually high while the frequency of small negative earnings is unusually low. Burgstahler and Eames (1999) and Brown (1999) find that zero and small positive earnings surprises have been common and small negative surprises have been unusually rare in recent years. Brown (1999) also reports that firms expecting positive earnings have significant incentive to meet or beat analysts' forecasts.[2] In addition, he finds that analysts' forecasts are pessimistically biased when firms report profits (85.3% of the sample). Burgstahler and Eames (1999) show that analysts' forecasts can also be managed downward. Their evidence shows that firms may meet or beat analysts' forecasts through forecast management.[3]

To date, the extant studies in the literature have investigated earnings management and/or forecast management. However, the characteristics of firms that repeatedly "meet or beat" analysts' forecasts and their association with the following market reactions have rarely been examined. Kasznik and McNichols (2001) examine whether firms achieve higher market prices by meeting analysts' forecasts. They find that annual market adjusted returns are higher for firms that meet analysts' forecasts than those for

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[2]Brown (1999) finds that the firms reporting losses are unconcerned about meeting or beating analysts' forecasts. Instead, they have a tendency to take a "big bath" and look forward to the possibility of future positive earnings and bonuses.

[3]Cohen (1991) discusses why and how managers engage in forecast management:
"Each quarter, after securities analysts estimate what the companies they follow will earn, the game begins. Chief financial officers or investor relations representatives traditionally "give guidance" to analysts, hinting whether the analysts should raise or lower their earnings projections so the analysts won't be embarrassed later... In a stock market that severely punishes disappointing earnings, companies have "an enormous incentive to keep expectations down," says Roger McNamee, the portfolio manager of the T. Rowe Price Science & Technology Fund. "If you do a little bit better than analysts expect, you get a lot of benefit. If you do a little bit worse, your stock price gets pounded.""

firms that miss the forecasts.[4] Lopez and Rees (2001) examine the earning response coefficients of firms that have beaten analysts' forecasts for five quarters including the current quarter. They find that the market rewards the firms that exceed the expectation by providing a higher earnings multiple after controlling for prior history of beating expectations.

It is extremely difficult to meet or beat analysts' forecasts repeatedly even though the managers want to do so.[5] Therefore, I postulate that the frequency of the firms' consecutively meeting and/or beating analysts' forecasts is greater than it would be if the frequency occurred by chance. That is, it is more likely that firms exhibiting repeated success in meeting or beating analysts' forecasts manage earnings or forecasts to avoid disappointing the market.[6]

First, this study will examine the properties of those firms that repeatedly meet or beat analysts' forecasts and the association of these properties with the security market. I investigate whether the market rewards firms that repeatedly meet or beat the analysts' forecasts. Easton and Zmijewski (1989) find that ERCs are a decreasing function of risk and an increasing function of earnings persistence.[7] Hence, the ERC is negatively correlated with a firm's systematic risk or the expected cost of capital. In other words, the higher the expected return, the lower the discounted value of future cash flows. Therefore, the differences in the ERCs of firms will capture the effects of the patterns of meeting or beating analysts' forecasts to these factors. I also investigate

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[4]They also investigate the market reward associated with repeatedly meeting analysts' forecasts for up to three years.

[5]Cohen (1991) noted the difficulty of meeting or beating analysts' forecasts for multiple periods: "But low-balling may not work forever. That's the conclusion that some analysts draw from the case of AST Research Inc. For more than five quarters, several analysts and money managers say, the Irvine, Calif., computer maker consistently led them to believe it would earn at least five cents a share less than the actual results. But for this year's first quarter, analysts lifted their projections, running far ahead of the company's 'guidance'."

[6]Barth, Elliott, and Finn (1999) found positive association between price-earnings multiples and increasing earnings patterns. They did not consider earnings management as a cause of the increasing earnings pattern since it is more difficult for managers to create the patterns of increasing earnings.

[7]See also Collins and Kothari (1989), Kormendi and Lipe (1987), etc.

whether the market penalizes a firm's first failure to meet the analysts' forecasts after a long series of meeting or beating the the expectation.

Second, I summarize the relation between the patterns of persistently meeting or beating the analysts' forecasts and the firm characteristics including various risk characteristics. Gebhardt, Lee, and Swaminathan (2000) examine firm characteristics that are systematically related to the estimate of cost-of-capital. They show that a firm's implied cost of capital is associated with its industry membership, book-to-market ratio, forecasted LTG, and the dispersion in analysts' earnings forecasts.

To investigate the market efficiency, I examine the relations between differences in the implied cost of capital computed by the reported accounting earnings as the number of consecutive quarters in which actual earnings are greater than or equal to the forecast increases. The intuition is that if the management used reported earnings to maintain the pattern of meeting or beating analysts' forecasts, the implied cost of capital will reveal an association between potentially managed earnings and stock prices.

With respect to the first issue, I find that ERCs are higher for the firms that are *ex post* capable of persistently meeting or beating the analysts' earnings forecasts. Contrary to my expectation, the earnings response coefficients are not significantly associated with the length of time of meeting or beating analysts' forecasts. However, Lopez and Rees (2001) provide evidence that the market adjusts analysts' forecasts on the basis of the historical tendency of meeting or beating analysts' forecasts.[8] Likewise, I find that earnings response coefficients are higher for firms that have the historical trend after controlling for the systematic portion of earnings surprise. In addition, I document that ERCs to the unsystematic portion of earnings surprise are increasing almost monotonically with the length of time of meeting or beating the expectations.

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[8]For example, CISCO Systems had beaten analysts' earnings estimates by exactly one penny for 13 quarters in a row until it finally missed the expectation. This systematic pattern could be recognized by an efficient market.

Next, I find strong association between the patterns of meeting or beating analysts' forecasts and the firm characteristics. Market capitalization, long-term growth, debt-to-book, average dollar volume for the previous year, average daily turnover for the previous year, standard deviation of daily return, and momentum are positively associated with the length of time of meeting or beating analysts' forecasts. On the other hand, dispersion of analysts' forecasts, debt-to-equity, book-to-price, and beta are negatively associated with the patterns.

Finally, the implied cost of capital increases as the firms persistently meet or beat the forecasts. That is, the longer the pattern of meeting or beating analysts' forecasts, the greater the implied cost of capital. This provides evidence that the market efficiently interprets potentially managed earnings.

The remainder of the paper is organized as follows. The next section describes the research design. Data and summary statistics are presented in Section 4. The result is examined in Section 5. Summary is provided in Section 6.

2   Research Design

2.1   Portfolio Formation

I provide ERCs, risk characteristics, and implied costs of capital for a portfolio of stocks based on the length of time of meeting or beating analysts' forecasts.

To determine whether those factors are associated with the pattern of meeting or beating analysts' forecasts, first I construct portfolios on the basis of the number of quarters for which earnings surprises (es_{jt}) are greater or equal to zero. If a firm meets or beats analysts' forecasts q consecutive quarters, the firm is assigned to portfolio P_q.[9]

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[9]For example, if a firm had met or beaten analysts' forecasts 7 consecutive quarters at the end of the fourth quarter in 1995, the observation is included in the portfolio P_7, even though the firm may or may not have met or beaten analysts' forecasts again in the next quarter. The argument behind this manner of construction is that *ex ante* the market did not know whether the firms included in the portfolio would meet or beat analysts' forecasts again or not in the next quarter.

These portfolios investigate whether the ERCs and other characteristics are associated with the length of time of meeting or beating analysts' forecasts.

Table 1: Portfolio Formation

	$q = 1$	2	3	4	5	6	7	8	9	10	**All**
$s = 1$	P_1^1										P^1
2	P_1^2	P_2^2									P^2
3	.	.	.								.
4	.	.	.	.							.
5	.	.	.	.	.						.
6	.	.	.	.	.	.					.
7	.	.	.	.	.	.	.				.
8	.	.	.	.	.	.	.	.			.
9	P_1^9	P_2^9	.	.	.	.	.	.	P_9^9		P^9
10	P_1^{10}	P_2^{10}	.	.	.	.	.	.	P_9^{10}	P_{10}^{10}	P^{10}
All	P_1	P_2	.	.	.	.	.	.	P_9	P_{10}	

The bottom row of Table 1 describes these firms. P_1 includes the observations of the first meeting or beating of analysts' forecasts, P_2 includes the observations of the second consecutive meeting or beating of analysts' forecasts, and so on. The observations of meeting or beating analysts' forecasts for more than 10 consecutive quarters are excluded from the sample to maintain enough observations in each portfolio for a statistical test.[10]

The last column of Table 1 shows *ex post* how many consecutive quarters firms have met or beaten analysts' forecasts. A firm is assigned to portfolio P^s if the firm has met or beaten analysts' forecasts "s" consecutive quarters overall.[11] The difference in factors among portfolios P^s will measure whether the firms meeting or beating analysts' forecasts for longer periods are fundamentally different in such characteristics as risk or

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[10]I also conducted the analysis up to 20 consecutive quarters. The result was qualitatively similar.

[11]For example, if a firm had met or beaten analysts' forecasts seven consecutive quarters at the end of the fourth quarter in 1995 and missed analysts' forecasts the next quarter, the observation is included in portfolio P^7.

growth from the other firms meeting or beating forecasts for shorter periods.

For each cell inside Table 1, P_q^s indicates the qth meeting or beating of a firm that has met or beaten analysts' forecasts "s" consecutive times over all.[12]

2.2 Earnings Response Coefficient

First I examine whether the market rewards firms that repeatedly meet or beat the analysts' forecasts by investigating the association between ERCs and the patterns of meeting or beating the expectation.

Consistent with prior studies, I hypothesize that the the ERCs are significantly associated with firm specific risk, growth, and/or persistence. If the market interprets persistently meeting or beating the expectations as a positive signal about firm specific risk, growth, and/or persistence, the ERCs will be significantly positively associated with the pattern.

I expect the pattern of meeting or beating analysts' forecasts to be negatively associated with a firm's systematic risk. That is, those firms may have lower uncertainty in future cash flows since they are more likely to meet or beat analysts' forecasts. If the pattern of persistently meeting or beating analysts' forecasts is a proxy inversely related to the uncertainty, the firms persistently meeting or beating forecasts will have a higher ERC.[13] Similarly, if expected dividends are a function of future earnings, the growth of future abnormal earnings will affect expected future earnings and revise the expectation for future earnings. Then, the ERC is positively correlated with the expected growth rate. If the market expects a higher growth rate for firms that consecutive meet or beat analysts' forecasts, the firms persistently meeting or beating forecasts will have higher expected growth rates and a higher ERC. Likewise, if future cash flows are a function of

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[12]In the example of P^7 described above, the firm had met or beaten forecasts 7 consecutive times at the end of the fourth quarter in 1995. The firm's 6th meeting or beating, i.e., the third quarter in 1995, is included in P_6^7.

[13]Similarly, Imhoff and Lobo (1992) found that firms with relatively less *ex ante* uncertainty in earnings have large earnings response coefficients.

future earnings, the persistence of current earnings surprise will affect expected future earnings and revise the expectation of future dividends. Then, the ERC is positively correlated with the persistence of earnings surprise. If meeting or beating analysts' forecasts is proxy to the persistence of earnings surprises, the firms persistently meeting or beating forecasts will have higher ERCs. In summary, if the pattern of meeting or beating analysts' forecasts is a proxy for these factors, the ERCs are a function of the pattern (i.e., ERC= $f(\overset{-}{\text{risk}}, \overset{+}{\text{growth}}, \overset{+}{\text{persistence}})$).

To estimate ERCs, the three-day market adjusted returns surrounding the earnings announcements are regressed on the earnings surprises. I calculate three-day raw and market adjusted returns around the quarterly earnings announcement date.[14] The market adjusted return is the cumulative return less the cumulative equally weighted market return over the three-day window. For each observation, the earnings variable is defined as actual earnings, eps_{jt}^a. Earnings surprise (es_{jt}) is measured as the actual earnings per share (eps_{jt}^a) less the most recent mean forecast (eps_{jt}^f) prior to the earnings announcement of the quarter from the I/B/E/S database.[15]

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[14]I use the short window event study approach to reduce the correlated omitted variables problem. In contrast, Kasznik and McNichols (2001) examine whether firms achieve higher market prices by meeting analysts' forecasts using annual market adjusted returns.

[15]The results are qualitatively similar when I/B/E/S median estimates are used.

Variable Definition

j = denotes firms;

t = denotes quarters;

eps_{jt}^a = actual earnings per share for quarter$_t$;

eps_{jt}^f = forecasted earnings per share for quarter$_t$;

P_{jt-1} = beginning-of-period price per share;

R_{jt} = raw return accumulated over the window surrounding the date of earnings release;

R_{mt} = equally-weighted market return accumulated over the window surrounding

the announcement date;

$CAR_{jt} = R_{jt} - R_{mt}$;

es_{jt} = earnings surprise = $\dfrac{eps_{jt}^a - eps_{jt}^f}{P_{jt-1}}$.

Regression 1:

The basic hypothesis of the first regression is that the difference in ERCs between partitions is driven by a different response to earnings news. Note that this regression equation tests whether the market revises its expectations based on how many times a firm meets or beats the expectation (i.e., the difference shown in the bottom row of Table 1). Non-negative earnings surprises are likely to persistently repeat for firms with a historical tendency to report non-negative earnings surprises. If meeting or beating analysts' forecasts is associated with a proxy of risk, the market may react more strongly to the same level of earnings surprise since the risk would decrease as the firms persistently meet or beat the market's expectation. Similarly, if meeting or beating analysts'forecasts is correlated with growth and/or persistence, the price response would be stronger for the firms persistently meeting or beating the expectation.

H1:   *The earnings response coefficients are greater for the firms that persistently*

meet or beat analysts' forecasts.

$$CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_P \cdot d_q + \beta_1 \cdot es_{jt} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt} + \varepsilon_{jt} \qquad (1)$$

$$d_q = \text{indicator variables}; \quad \forall \ q = 2, 3, \ldots, 10$$

$$\begin{cases} 1 & \text{if } es_{jt} \geq 0 \quad \text{for } q^{th} \text{ consecutive quarters,} \\ 0 & \text{otherwise.} \end{cases}$$

The slope coefficient β_q explains the different reactions to the same amount of earnings surprise. Thus, I predict that $\beta_2 < \beta_3 < \cdots < \beta_9 < \beta_{10}$ (where $\beta_1 + \beta_q$ represents the ERC for portfolio P_q) and that the coefficients are statistically significant from zero.[16] If the hypothesis is not rejected, I predict that $\beta_2 < \beta_3 < \cdots < \beta_9 < \beta_{10}$ in Regression 1.

Regression 2:

To test whether the firms meeting or beating analysts' forecasts for longer periods are fundamentally different from other firms meeting or beating for shorter periods, the regression equation (2) is examined. A number of recent studies find that such factors as issuance of new equity, growth, market-to-book ratios, size, profit, or litigation risk affect firms' incentives to meet analysts' forecasts. In addition, the firms' incentives are associated with risk, growth, and persistence. If the market tends to consistently assign a higher(lower) discount rate to certain firms, such relations would be revealed in the ERCs. If the market believes that the firms with higher incentive to meet the forecasts are more likely persistently to meet or beat earnings expectations in the future, those firms may have higher ERCs from the beginning of the pattern of meeting or beating the forecasts. Thus, regression 2 measures difference in ERCs for the last column of Table 1.

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[16]I include year dummy variables to control for the year effects. The results are qualitatively very similar with or without year dummy variables.

H2:   *The earnings response coefficients are greater for firms that persistently meet or beat analysts' forecast for a longer period overall.*

$$CAR_{jt} = \alpha_1 + \sum_{s=2}^{10} \alpha^s \cdot d_s + \beta^1 \cdot es_{jt} + \sum_{s=2}^{10} \beta^s \cdot d_s \cdot es_{jt} + \varepsilon_{jt} \qquad (2)$$

$$d_s = \text{indicator variables;} \quad \forall \ s = 2, 3, \dots, 10$$

$$\begin{cases} 1 & \text{if } es_{jt} \geq 0 \quad \text{for } s \text{ consecutive quarters overall,} \\ 0 & \text{otherwise.} \end{cases}$$

The hypothesis is to test whether the market believes firms with certain characteristics are more likely to meet or beat analysts' forecasts for longer periods. In this case, I predict that the earnings response coefficients for all portfolios P^s will be $\beta^2 < \beta^3 < \cdots < \beta^9 < \beta^{10}$ in equation (2).

On the basis of the result above, I examine whether the market penalizes the firms when a meeting or beating pattern is broken if the ERCs reveal increasing patterns in regression 1. In other words, the ERCs are estimated when the firms miss analysts' forecasts for the first time. If the market's rewards are systematically associated with the patterns, the premium will be dissipated after the pattern of meeting and beating earnings forecasts is broken conditional on the news of missing analysts' forecasts being unexpected to the market. In this case, I predict that the ERCs will show increasing patterns for the portfolios of the firms and the coefficients will be statistically significant. Conversely, if the market has foresight of the the bad news before the date of the earnings announcement, the pattern of incremental ERCs may not appear.[17]

Last, anecdotal evidence shows that the market efficiently expects earnings surprise

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[17]Skinner (1994) and Skinner (1997) find that bad news is frequently preannounced, and large negative price reactions may occur weeks before the earnings announcement date.

for firms persistently meeting or beating the expectations and punishes the firms show-ing systematic behavior.[18] I defined the systematic component of unexpected earnings as es^{sys}, that is the mean of earnings surprise for the past 4 quarters.[19] If the market dose not discount the systematic component of earnings surprise, the coefficients on es^{sys} should be significantly positive. If the coefficients are insignificant or negative, the result would suggest the market discounts the systematic behavior of persistently meeting or beating analysts' forecasts.

H3:   *The slope coefficients on the unsystematic components of earnings surprise will show an increasing pattern, and the slope coefficients on the systematic components of earnings surprise will be insignificant.*

Regression 3:

$$CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_P \cdot d_q + \beta_1 \cdot es_{jt}^{sys} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt}^{sys}$$
$$+ \gamma_1 \cdot es_{jt}^{unsys} + \sum_{q=2}^{10} \gamma_q \cdot d_q \cdot es_{jt}^{unsys} + \varepsilon_{jt}$$

$$(3)$$

es^{sys} : Systematic Earnings Surprise

= Mean of Earnings Surprise for the Past 4 Quarters;

es^{unsys} : Unsystematic Earnings Surprise

= Earnings Surprise - Mean of Earnings Surprise for the Past 4 Quarters.

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[18]For example, Vicker (1999) noted: "Microsoft, which has also beat the Street's earnings estimates in every one of the last 12 quarters, rallies 75% of the time in the week before it reports profits. But once earnings are out, the stock is down about half of the time."

[19]Lopez and Rees (2001) used the median unexpected earnings for the past 4 quarters as the proxy. For robustness of the result, I also used various variables for the systematic portion of earnings surprise including last earnings surprise. The result was qualitatively very similar.

I predict that the earnings response coefficients on es^{sys} will be insignificant. In addition, the earnings response coefficients on es^{unsys} will show increasing pattern. If the coefficients on es^{unsys} show an increasing pattern, this would suggest the market reward for earnings surprise is greater for the firms persistently meeting or beating analysts' forecasts.

2.3 Firm Characteristics

Prior studies show that firms are meeting or beating analysts' forecast because the market penalizes them when they miss the expectation. However, little is known about the characteristics of the firms that persistently meet or beat analysts' forecasts. In this section, I investigate the association between the patterns of meeting or beating analysts' forecasts and various firm characteristics as proxies for firm specific risk, growth, and/or persistence. This investigation will show how and why ERCs are associated with patterns of meeting or beating analysts' forecasts through the firm characteristics. In addition, the association between the firm characteristics and the patterns of meeting or beating analysts' forecasts will shed light on the firms' motivation for persistently meeting or beating analysts' forecasts. Firm characteristics are measured using firm characteristics similar to those used in Gebhardt, Lee, and Swaminathan (2000). First I will present the evidence on the liquidity measures.

2.3.1 Liquidity and Information

A number of studies suggest that large firms are more pessimistically biased in analysts' forecasts.[20] It follows that I would expect to see a positive relation between the liquidity variables and the number of times of consecutively meeting or beating analysts' forecasts since the firms that could achieve a long series of meeting or beating forecasts are more likely to be pessimistically biased. The firms persistently meeting or

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[20]See, Bhushan (1989), Brown (1999), Richardson, Teoh, and Wysocki (2000), etc.

beating analysts' forecasts are large in size, and the size (**Mk. Cap**) will progressively increase as they repeatedly meet or beat the forecasts. Brown (1999) shows that small firms are more optimistically biased. If the argument is accepted, smaller firms are less likely persistently to meet or beat analysts' forecasts. Likewise, I expect that Dollar trading volume (**Avg. Vol**) will show the same pattern as the size variable.

2.3.2 Earnings Variability

The dispersion of analysts' forecasts (**Disp**) measures the earnings variability of the portfolios. Payne and Robb (2000) document that managers have stronger incentive to increase income to meet or beat analysts' forecasts when the dispersion of earnings forecasts is low. Clement, Frankel, and Miller (2000) document that the dispersion of analysts' forecasts (a proxy for earnings uncertainty) is negatively associated with the magnitude of the stock market response. Therefore, I expect **Disp** to be negatively correlated with P_q and P^s.

2.3.3 Leverage

Next, I will examine the risk associated with the financial leverage of the portfolios. As the amount of debt in a firm's capital structure increases, the riskiness of the firm increases. The amount of long-term debt (**LTD**) in a firm's capital structure increases as the firm persistently meets or beats analysts' forecasts due to increase in the size of the firms. **D/B** reports debt-to-book ratio while **D/E** shows debt-to-market ratio. I predict that **D/B** and **D/E** are significantly negatively associated with P_q and P^s.

2.3.4 Market Volatility

The next two variables are used to capture firm specific risk related to market volatility. First, the capital asset pricing model beta (**Beta**) is computed using the 60-month return prior to the quarterly earnings announcement. Next, the standard deviation of daily returns (**Std. Ret**) over the previous year is computed. The firms

that are capable of achieving long strings of consecutively meeting or beating quarterly analysts' forecasts have lower firm specific risk, and their returns are less volatile as they repeatedly meet or beat analysts' forecasts. Consistent with risk arguments, I expect that the two risk factors **Beta** and **Std. Ret** will be negatively correlated with P_q and P^s.

2.3.5 Other Pricing Anomalies

B/P reports book-to-price ratio. Skinner and Sloan (1999) find that growth firms have more incentive to meet analysts' forecasts since "growth" stocks (low book-to-price ratio) exhibit a much larger negative price response to earnings disappointment. Similarly, Brown (2001) finds that growth firms are more likely to report small positive surprise. Thus, "growth" firms may have more incentive to avoid earnings disappointments. I expect **B/P** to be negatively correlated with P_q and P^s. Similarly, **LTG** represents analysts' forecasts of long-term growth, which is used as another proxy for a "growth" stock. **LTG** is expected to be positively associated with P_q and P^s. **Turn** indicates average daily turnover for the previous year. Firms persistently meeting or beating forecasts will have a higher turnover ratio. **Turn** will be positively correlated with P_q and P^s. The next pricing anomaly is the price momentum (**Momentum**) of the prior six months. Gebhardt, Lee, and Swaminathan (2000) find a negative association between price momentum and expected cost of capital. Thus, positive correlation between **Momentum** and the portfolios P_q and P^s is anticipated.

2.4 Implied Cost of Capital and Market Efficiency

Extant literature documents that managers may manipulate earnings to avoid earnings disappointment (Payne and Robb (2000) and Burgstahler and Eames (1999)). In particular, Skinner and Sloan (1999) show that managers of high growth firms have more incentive to avoid negative earnings surprise since the market reaction to the negative earnings surprise is significantly greater than the market reaction to positive earnings

surprise, particularly for those firms. If the firm characteristics show that the firms persistently meeting or beating analysts' forecasts are growth firms, the managers of those firms are more likely to take action of upward management of reported accounting earnings. Hence, in this section, I explore indirectly how the market interprets the potentially managed accounting earnings by examining the implied cost of capital (r), computed from realized accounting numbers and market price.[21] The effect of meeting or beating the expectation on the implied cost of capital will be discussed in the framework of residual income valuation model. I use the residual income valuation model to explore implied cost of capital. Easton, Taylor, Shroff, and Sougiannis (2001) simultaneously estimate growth and the internal cost of capital for a portfolio of stocks using the residual income model based on analysts' forecasts of accounting earnings for the subsequent four years.[22] The main advantage of their approach is that the estimation procedure is not dependent on the arbitrary expected growth assumption.[23] Unlike prior studies, this approach simultaneously estimates the implied cost of capital and the expected rate of growth. The present study uses a similar methodology, but differs in its perspective. The main difference between this paper and the literature described above is that this paper uses reported accounting numbers to estimate the implied cost of capital.

$$Pr_0 \equiv \sum_{t=1}^{\infty} \frac{dps_t}{(1+r)^t};$$
$$= bv_0 + \frac{eps_1 - r \cdot bv_0}{r - g}. \tag{4}$$

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[21]Note that implied cost of capital is not true cost of capital.

[22]Likewise, Easton (2001) uses stock prices, forecasts of earnings, and short-term earnings growth to estimate simultaneously the implied cost of capital and the implied long-term growth of portfolios.

[23]The main disadvantage of prior studies in estimating cost of capital using the residual income model is the arbitrary expected growth assumption. Estimating the costs of capital without controlling for the expected growth rate would lead to spurious results. For example, Claus and Thomas (2000), and Lee, Myers, and Swaminathan (1999)

where:

Pr_0 = price per share at t;

dps_t = expected dividends per share at t;

r = implied cost of capital.

The residual income model is equivalent to the dividend discount model, which equates the price to the sum of the discounted future stream of dividends.[24] The procedure uses stock price, book value and earnings to estimate simultaneously the implied cost of capital and growth. The residual income valuation model equates current market price and book value and the present value of the sum of expected future abnormal earnings. I estimate the cost of capital that the market implicitly uses to discount earnings after controlling for expected growth rate.[25] Figure 1 shows the time line for variables used to estimate the implied cost of capital.

Figure 1: Time line for Measurement of Variables
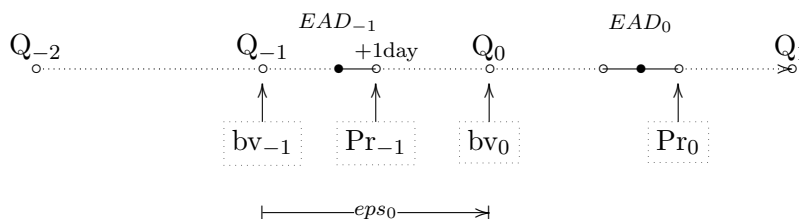
Notes to Figure 1:

EAD_0 is the earnings announcement date of firm j at time Q_0;

EAD_{-1} is the earnings announcement date of firm j at time Q_{-1}.

Even though I infer the implications of this result for market efficiency, I do not directly examine evidence of market efficiency.

Following Easton, Taylor, Shroff, and Sougiannis (2001), r is the internal rate of return and g is the perpetual growth rate implied by the current market price, current

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[24]See Appendix for details.

[25]Without loss of generality, I assume the market price reflects the stock's fundamental value.

book value of equity, lagged book value of equity, and current earnings. The key point of ETSS (2001) methodology is that the residual income model (4) is arranged in such a way that implied cost of capital and growth rate are simultaneously estimated using a linear regression model. The implied cost of capital and growth rate for a portfolio can be calculated by the use of the intercept and slope coefficient of the following regression model. Therefore, equation (4) may be expressed following the regression model.

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_0 + \gamma_1 \cdot \frac{Pr_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0} \tag{5}$$

$$r_1 = \gamma_0$$

where:

Pr_0 is the market price at time t;

bv_0 is the book value per share at time t;

bv_{-1} is the book value per share at time $t-1$;

eps_0 is the book value per share at time t;

r_1 is the implied cost of capital.

H4:   *The pattern of meeting or beating analysts' forecasts is positively correlated to the implied cost of capital.*

This hypothesis tests whether the market efficiently interprets reported earnings of a firm that potentially engages in upward management of earnings to maintain the pattern of persistently meeting or beating the analysts' forecasts. The intuition is that current earnings (eps_0) are decomposed into true earnings (eps_0^T) and managed earnings (eps_0^M),

$$eps_0 = eps_0^T + eps_0^M.$$

If $eps_0^M > 0$ to manage earnings upward, the dependent variable ($\frac{eps_0}{bv_{-1}}$) is inflated. However, the market interprets the earnings figure as eps_0^T (i.e., as if the dependent

variable were $\frac{eps_0 - eps_0^M}{bv_{-1}}$). As a result, to offset the effect of upward management of earnings, the regression coefficients will be adjusted upward as the length of time of consecutively meeting or beating analysts' forecasts increases.[26] In this case, I predict that the implied cost of capital will show an increasing pattern as the firms repeatedly meet or beat the market's expectation.

As a supplemental test, using the same methodology as that used above, the implied cost of capital according to the prior period book value of equity and current earnings is estimated. The intuition for using prior price is that price change over the quarter reflects revision in the market's expectation of future earnings.

Equation (4) may be expressed as in the following regression model.

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_2 + \gamma_3 \cdot \frac{Pr_{j-1}}{bv_{j-1}} + \varepsilon_{j0} \tag{7}$$

$$r_2 = \gamma_2 + \gamma_3$$

where:

Pr_{-1} is the market price at time $t-1$;

bv_{-1} is the book value per share at time $t-1$;

eps_0 is the book value per share at time t;

r is the implied cost of capital.

Equation (7) uses the price one day after the prior earnings announcement. If the market has perfect foresight of the actual earnings while the analysts' forecasts are lower

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[26]For example, suppose that there are five observations. The independent variables are (1, 1.5, 2, 2.5, 3) while the reported dependent variables are (0.15, 0.16, 0.17, 0.18, 0.19). In this case, the implied cost of capital is 13%. If the true dependent variables are (0.14, 0.15, 0.16, 0.17, 0.18) with same independent variables used above, the implied cost of capital is 12%. The necessary condition for this argument is that there is at least one j satisfying $\frac{\partial r_1}{\partial Pr_{j0}} < 0$. In other words,

$$\frac{Pr_{j0} - bv_{j0}}{bv_{j-1}} > \frac{n}{n-1} \tag{6}$$

than actual earnings, the difference should be embedded in the prices in equations (5) and (7). Then, the implied cost of capital and growth estimated using the two equations should be similar. Conversely, if the news of meeting or beating analysts' forecasts is unexpected to the market, r's estimated using the two equations will be different.

3   Data, Sample Selection and Descriptive Statistics

The sample consists of quarterly data from 1984-2000. Earnings per share (Compustat data item #19), book value (Compustat data item #59), and number of shares (Compustat data item #61) were obtained from the Compustat quarterly primary, secondary, tertiary and full coverage research files. The earnings per share is primary earnings per share excluding extraordinary items. All per share variables are adjusted for stock splits and stock dividends using Compustat Adjustment factors. The earnings announcement date is drawn from the Compustat Quarterly file. Consistent with prior studies, regulated firms (SIC codes 4,400-5,000) and financial institutions (SIC codes 6,000-6,500) are deleted since their accounting rules are different from those of other industries. Stock returns, market returns, and prices are from the 2000 CRSP daily return file. Price is at one day after the earnings announcement day. The analysts' forecasts are the latest mean values prior to the announcement obtained from the 1999 I/B/E/S data base.[27] I also collect number of analysts, long-term growth, and standard deviation of estimation from I/B/E/S. Since I/B/E/S uses either a primary or fully diluted basis for reporting analysts' forecasts, if the analysts' forecast data follow the fully diluted basis, I/B/E/S dilution factors are used to convert the data to the primary basis. Firm-quarter is included in the final sample if it satisfies the following

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[27]I also used median forecasts. In addition, fiscal quarter end price and price on the earnings announcement day are examined. The results remain qualitatively unchanged. Earnings surprise is computed using I/B/E/S earnings and forecasts since Compustat earnings are not comparable with I/B/E/S forecasts. I/B/E/S states "Actuals are normally obtained from the news services and adjusted by the I/B/E/S Data Center to be comparable to the estimates being made by analysts at that time. This is most frequently in response to the consensus of treatment of extraordinary items by the analyst community."

criteria:[28]

1. Firms have positive earnings, earnings announcement date, and return data;[29]

2. Firms have book value of equity, earnings announcement date, and prices;

3. Firms have I/B/E/S forecast data.

To investigate the pattern of persistently meeting or beating the expectation, I first outline descriptive statistics for the sample. Table 3 shows descriptive statistics for the variables over 17 years. I impose additional data requirements to compute earnings response coefficients. The earnings announcement date is acquired from the Compustat Quarterly database. The market adjusted return is computed using the CRSP Daily file. The sample comprises all firms meeting or beating analysts' forecasts up to 10 consecutive times. I delete the observation meeting or beating analysts' forecasts more than 10 consecutive times.[30] I have 23,119 observations after determining the number of quarters of meeting or beating analysts' forecasts and collecting price, return, value weighted market return, book value, and earnings. I eliminate outliers with extreme values of earnings surprise and abnormal returns. The top and bottom one percentile of observations based on abnormal returns and the top one percentile of observations based on earnings surprise are simultaneously eliminated.[31] The total number of final sample observations is 21,650. The number of observations monotonically increase from 401 in

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[28]I conducted the same analysis using annual data and obtained a very similar result.

[29]Prior studies find that investors first consider whether the firms make a profit or loss, and next consider whether the firms meet or miss analysts' forecasts. See Brown (1999) and DeGeorge, Patel, and Zeckhauser (1999). I also found qualitatively similar results using a sample including loss firms since the relatively fewer loss firms were persistently meeting or beating analysts' forecasts. However, the Figure 3 seems to show that the loss firms also have incentives to meet or beat the market's expectations.

[30]I also conducted same analysis up to 20 consecutive quarters. Even though the result was similar I delete those observations to maintain enough number of observations for each portfolio for the statistical test.

[31]I do not delete bottom one percentile of earnings surprise since the sample does not include negative earnings surprise.

1984 to 2,387 in 1999.[32] Even though the primary interest of this study is investigating firms that persistently meet or beat analysts' forecasts with profits, I also examine firms that persistently miss analysts' forecasts. I have 16,326 observations of firms missing the expectations with profits while 4,583 firms are persistently missing the forecasts with losses.[33]

To compute risk characteristics and implied cost of capital, I also collected number of shares, long-term debt, trading volume, returns, prices, book value, and earnings from CRSP and Compustat data. The book values and earnings less than or equal to zero are deleted since they are meaningless in the regression equation. In addition, the top and bottom one percentile of observations are simultaneously deleted based on the regression variables $\frac{eps_0}{bv_{-1}}$ and $\frac{Pr_{-1}}{bv_{-1}}$. The total number of final sample observations is 12,614.

Table 2 shows descriptive statistics for each variable used to estimated the earnings response coefficients. The earnings surprise deflated price and the market adjusted return , $\frac{ES}{price}$ and CAR, are the variables of interest. The mean earnings surprise and $\frac{ES}{price}$ decrease with the patterns of portfolios P_q and P^s while the mean market adjusted returns decrease with the patterns of only the portfolios P_q. The abnormal earnings decrease as a firm persistently meets or beats the market's expectation.[34]

Table 3 shows temporal changes of earnings surprises. Consistent with recent studies, ES in the 80's were greater compared to ES in the 90's. ES were monotonically decreasing in the 80's while they were relatively stable in the 90's.[35] As would be ex-

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[32] I have fewer observations in 2000 than in 1999 since the complete data was not available at the time of research. Not tabulated.

[33] I also test up to 10 consecutive misses for this analysis.

[34] Clement, Frankel, and Miller (2000)) document that the abnormal earnings are inversely related to firm size. Panel A of Table 8 shows that the size is monotonically increasing with the pattern.

[35] Kothari (2000) notes that the decline in analysts' optimism is due to: (1) analysts' learning from past biases; (2) incentive change; and (3) use of data in recent research that has better quality and suffers less from survivor biases or selection biases. Conversely, Richardson, Teoh, and Wysocki (2000) find that the bias has recently turned from optimism to pessimism.

pected, the mean ES decreases from a high of 0.0888 in 1984 to a low of 0.0284 in 1998. The following figures give the visual evidence that managers potentially manage earnings and/or forecasts to meet or beat the market's expectations persistently.

Figure 2 shows a histogram of the earnings surprise variable scaled by earnings. The observations are sorted on the earnings surprise to form equal-width partitions. The graph seems to show that large positive earnings surprises declined over the 90's. The figure shows that small positive errors are more frequent than large positive errors. This phenomenon is more obvious as P_q increases. For example, about 45% of P_{10} belong to the smallest group. This evidence demonstrates that managers prefer to reach or slightly exceed analysts' forecasts, especially when they have met or beaten analysts' forecasts for multiple periods.[36] Therefore, the unusually high frequency of small positive earnings surprise for the firms that repeatedly meet or beat analysts' forecasts can be regarded as an evidence of earnings management and/or forecast management.[37] The conditional probability of meeting or beating analysts' forecasts in the next period given a firm's meeting or beating the forecasts in the current period monotonically increases from a low of 26.1% in P_2 to a high of 75.4% in P_9.[38] In other words, 75.4% of firms in P_8 will meet or beat analysts' forecasts again in the next period. These results suggest that managers may manipulate reported earnings and/or analysts' forecasts in such a way as to generate a small positive surprise to continue the pattern of meeting and beating analysts' forecasts.[39]

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[36]An alternative interpretation is that as a firm meets or beats analysts' forecasts, analysts could become more optimistic. The analysts increase their earnings expectations for firms that repeatedly meet or beat analysts' forecasts. Cohen (1991) noted the difficulty of meeting or beating analysts' forecast for multiple periods; analysts seem to increase earnings expectations for firms with a greater tendency to meet or beat analysts' forecasts.

[37]Matsumoto (1999) provides evidence that managers guide analysts to lower forecasts before the earnings announcement while Payne and Robb (2000) examine the incentives for managers to achieve earnings figures given in analysts' forecasts.

[38]Not tabulated.

[39]Burgstahler and Eames (1999) find an unusually high frequency of zero and small positive surprise compared to small negative surprise. Similarly, Degeorge, Patel, and Zeckhauser (1999) show that there is an unusually high frequency of small positive surprise, including $0.00 and $0.01, in quarterly

Figure 3 shows a histogram of the earnings surprise variable, including persistently missing, meeting, and beating analysts' forecasts.[40] This figure shows an unusually low frequency of small negative earnings surprises compared to an unusually high frequency of small positive earnings surprise. If there is no earnings management and/or forecast management, the cross sectional distribution of analysts' forecast errors should be smooth around zero. An extremely high number of observations are concentrated in the first interval to the right of zero. This evidence is consistent with prior literature as to earnings management and/or forecast management to meet or slightly beat analysts' forecasts. Interestingly, the second graph seems to show that the loss firms still want to meet the market's expectations.[41] There are unusually high observations in the first interval to the right of zero compared to small negative earnings surprise. Interestingly, loss firms have an unusually high frequency of large negative earnings surprise compared to large positive earnings surprise.

Figure 4 summarizes the revision of forecast measures for each portfolio. The revisions of the earnings estimates and the standard deviation of analysts' forecasts over the quarter are compared.[42] As expected, earnings forecast is generally increasing while the standard deviation of analysts' forecasts is monotonically decreasing from P_1 to P_{10}.[43] This result provides evidence that the analysts increase the expectation as the firms persistently meet or beat the expectations. The bottom graphs show the same variables for portfolios P^s. The earnings forecast is not changing while the standard deviation of analysts' forecasts is decreasing from P^1 to P^{10}. An interesting aspect is the decline in the dispersion of estimates. The standard deviation of earnings forecasts is decreas-

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earnings.

[40]The earnings surprise deflated by reported earnings per share shows very similar figures.

[41]On the contrary, Brown (1999) argues that when a loss is reported, the managers do not care about meeting or beating analysts' forecasts.

[42]5th or greater revisions are included in the 4th revision.

[43]The long term growth and number of analysts are also increasing over the patterns.

ing monotonically from P_1 to P_{10}. Taken with the decreasing pattern of the earnings surprise in Table 2, the decreasing dispersion suggests that the pattern of meeting or beating the expectations actually decreases uncertainty in investors.[44]

Interestingly, the first graph reveals a downward revision of the last estimates, especially after a long series of meeting or beating analysts' forecasts. This could potentially be caused by forecast management by the managers of the firms to meet the expectation. However, P_9 and P_{10} show upward revision. This evidence may suggest that the analysts are increasing their expectations for firms engaging in forecast management.[45]

As would be expected, the last revision has lower standard deviation of analysts' forecasts.[46] This decline may be attributable to the short-horizon earnings guidance of the companies.

Figure 5 shows the frequency of downward revisions. The percentage of estimates revised downward exceeds the percentage revised upward. I expected that the longer the patterns of firms' meeting or beating analysts' forecasts, the higher the frequency of downward revision of analysts' forecasts would be.

The right-hand graph of Figure 5 shows that analysts' forecasts do not change from optimistic to pessimistic in the quarterly forecasts.[47]

Instead, optimistic forecasts are decreasing, unbiased forecasts are increasing and pessimistic forecasts are decreasing. Pessimistic change decreases in recent years. Sur-

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[44]For example, Morse, Stephan, and Stice (1991) and Baginski, Conrad, and Hassel (1993) document that large earnings surprise can increase standard deviation of analysts' forecasts and increase uncertainty in the market.

[45]An alternative interpretation is that the firms may have distributed sufficiently low earnings "guidance" to analysts for the first forecasts. Thus, pessimistic bias could be impounded in the early forecasts.

[46]Consistent with anecdotal evidence, the earnings growth forecasts vary within a narrower range, between 14.1% and 16.1%, and are rarely revised over the quarter.

[47]

Optimistic:	First earning forecasts < Last earning forecasts;
Unbiased:	First earning forecasts = Last earning forecasts;
Pessimistic:	First earning forecasts > Last earning forecasts.

prisingly, the left-hand graph of Figure 5 shows that the relative frequency of pessimistic revision is decreasing as the firms repeatedly meet or beat the forecasts even though the frequency of downward revision is prevalent in all partitions. This also provides evidence that the analysts are increasing expectations as the firms repeatedly meet or beat the forecasts. Interestingly, more forecasts are released for firms repeatedly meeting or beating the forecasts as the date of the earnings announcement approaches. In addition, the standard deviation of forecasts decreases as the earnings announcement approaches since more earnings information is available.

Masumoto (1999) and Richardson, Teoh, and Wysocki (2000) found that pessimistic forecasts are more common for firms with greater incentives to avoid earnings disappointments. The factors affecting forecast pessimism are issuance of new equity, growth, market-to-book ratios, size, profit, and litigation risk. Likewise, this study finds that those factors are more prevalent for firms persistently meeting or beating analysts' forecasts since they have stronger incentive to avoid earnings disappointment. Table 8 summarizes the association between the firm characteristics and the patterns of meeting or beating analysts' forecasts.

Table 4 shows descriptive statistics for variables used in estimating the implied cost of capital. The top half of the first column indicates the qth meeting or beating the expectations (i.e., P_q). Similarly, the second half shows the number of consecutive quarters that a firm meets or beats the analysts' forecasts overall (i.e., P^s).

The remaining columns of Table 4 show descriptive statistics for mean values of the regression variables. Key variables are $\frac{eps_{j0}}{bv_{j-1}}$, $\frac{P_{j0}-bv_{j0}}{bv_{j-1}}$, and $\frac{Pr_{-1}}{bv_{-1}}$, respectively. The mean $\frac{eps_0}{bv_{-1}}$ generally increases as the number of quarters to meet or beat analysts' forecasts increases. The mean $\frac{eps_{j0}}{bv_{j-1}}$'s are increasing from a low of 0.0355 in P_1 to a high of 0.0479 in P_9. $\frac{Pr_{-1}}{bv_{-1}}$ also increases with the length of the period of meeting or beating analysts' forecasts. The mean $\frac{Pr_{-1}}{bv_{-1}}$ is steadily increasing from 1.8919 to 3.2922. In other words, the firms with a higher tendency to meet or beat analysts' forecasts are

higher priced than those with a lower tendency.[48] Similarly, the mean $\frac{P_{j0}-bv_{j0}}{bv_{j-1}}$'s are increasing from 0.8670 to 2.3977. On average, this result seems to satisfy the necessary condition in equation (6). In other words, $\frac{P_{j0}-bv_{j0}}{bv_{j-1}} > 0$ except for P_1.[49] Therefore, if the market discounts the stock price compared to the reported earnings, the implied cost of capital will increase. The numerator, $P_{j0} - bv_{j0}$, also captures market premium since it measures price relative to book value. Again, the firms with a higher tendency to meet or beat analysts' forecasts are higher priced than those with a lower tendency.

The bottom half of the table shows the descriptive statistics for the portfolio P^s. The beginning book values are increasing less than ending book values over the portfolios. The price shows similar patterns. However, $\frac{Pr_{-1}}{bv_{-1}}$ increases with the patterns from a low of 1.8511 in P^1 to a high of 2.7954 in P^9. This result is consistent with prior findings in the context that the growth firms have more incentive to meet or beat the market's expectation.

4 Empirical Result

4.1 Earnings response coefficients

Easton and Zmijewski (1989) showed that the ERCs are negatively associated with the risk. As described in Section 2, I estimate ERCs for the portfolio of stocks to test the association between the risk and the pattern of meeting or beating the market expectation. Table 5 summarizes the output from regression equations (1) and (2). The estimates of the coefficients from the regression equations (1) are summarized in Panel A of Table 5. The data in the Panel A of Table 5 does not provide evidence to support the expectations the earnings response coefficients are increasing as firms persistently meet or beat analysts' forecasts. The estimated intercept coefficients are not statistically

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[48]Kasznik and McNichols (2001) also show that reported earnings and share prices are higher for firms meeting expectations.

[49]However, this condition is not sufficient. The sufficient condition is $\frac{P_{j0}-bv_{j0}}{bv_{j-1}} \geq 0$ for all j.

significant from zero.[50] The first two slope coefficients are positive and significantly different from zero at a 5% level. The coefficients, β_2 and β_7, are incremental earnings response coefficients to the base ERC, β_1. The remaining coefficients are not statistically significant at the 5% level. This finding does not offer evidence that the earnings response coefficients increase with pattern length in the predicted direction.

To investigate whether the firms meeting or beating analysts' forecasts for longer periods are fundamentally different from other firms meeting or beating forecasts for shorter periods, or if the market believes certain firms are more likely to meet or beat analysts' forecasts for longer periods when those firms meet or beat analysts' forecasts for the first time, the ERCs are estimated using the regression equations (2). The results are reported in Panel B of Table 5. The findings provide evidence supporting the expectation that the earnings response coefficients for firms with a greater tendency to meet or beat analysts' forecasts are larger than the earnings response coefficients for firms with less tendency to meet or beat the forecasts. The estimated slope coefficient is monotonically increasing from 0.536 in P^1 to 4.048 (0.536+3.512) in P^8.[51] The increasing pattern of ERC may imply the decreasing pattern of the firm specific risk.[52]

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[50]I also run the regression without year dummies and separate-year regression. The results are qualitatively similar. The intercept coefficients for years are positive and generally significant from zero except in the early 80's. The slope coefficients pertaining to years are significant only in 1993 and 1997. In other years, the coefficients are not statistically different from zero. Not tabulated.

[51]I also estimated ERCs for all P_q^s described in Table 1.

$$CAR_{jt} = \alpha_1^S + \sum_{q=2}^{S} \alpha_q^S \cdot d_q + \beta_1^S \cdot es_{jt} + \sum_{q=2}^{S} \beta_q^S \cdot d_q \cdot es_{jt} + \varepsilon_{jt}$$

$$d_q = \text{indicator variables}; \quad \forall \ q = 2, 3, \ldots, 10 \ \text{and} \ s = 2, 3, \ldots, 10$$

$$= \begin{cases} 1 & \text{at } q^{th} \text{ quarter for portfolio } P^s, \\ 0 & \text{otherwise.} \end{cases}$$

If the market premium exists as a firm persistently meets or beat analysts' forecasts, I expect that $\beta_2^s < \beta_3^s < \cdots < \beta_{s-1}^s < \beta_s^s$ for all portfolios, P^s. The slope coefficients for the first quarter, β_1^s, are statistically significant. The estimated slope coefficient is increasing from 0.536 in β_1^1 to 4.815 (0.536+4.279) in β_1^8. This result provides evidence that the ERCs of portfolios (P^s) are fundamentally different from the first quarter of the pattern. However, on average, other coefficients are not statistically significant from zero.

[52]Kasznik and McNichols (2001) also argue that the market reward could reflect lower cost of capital.

Based on this finding, taken together with the results from the regression equations (1), I can argue that the ERCs are not increasing with the patterns of meeting or beating analysts' forecasts. However, I offer evidence that the market provides a premium to the firms persistently meeting or beating analysts' forecasts (not to the pattern). In other words, the market reaction to earnings surprise for firms with a greater tendency to meet or beat analysts' forecasts is greater than that for firms with less tendency to meet or beat the forecasts. Thus, the market seems efficiently to expect the persistent patterns and to react to the earnings surprise accordingly from the first incidence of meeting or beating analysts' forecasts.

Next, Panel C of Table 5 summarizes the ERCs when firms first disappoint the market's expectations. Contrary to my hypothesis, the market does not distinguish firms with a greater tendency to meet or beat analysts' forecasts from others. The estimated slope coefficients and intercepts are not statistically different from zero. This finding is not surprising in the sense that the market prices are adjusted to bad news before the date of the earnings announcement. Consistent with prior studies, the results may suggest that bad news is released to the market quickly (e.g., Skinner (1994), Hayn (1995), Skinner (1997), Basu (1997), etc.). Many firms preannounce bad new before the earnings announcement to preempt large earnings disappointment when they can not meet analysts' forecasts. In such a case, the market incorporates the bad news in the price around the preannouncement date and reacts less to the earnings announcement.[53] To examine the leakage of bad news, I also tested long window abnormal returns around the date of the earnings announcements when the meeting or beating patterns were broken. I found significant negative abnormal returns for the period.[54]

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[53]For example, Soffer, Thiagarajan, and Walther (1997) found that the majority of the preannouncements are regarded as bad news. For example, on August 29, 2001, Sun Microsystems Inc. warned that it would probably miss analysts' forecasts in its first quarter, and lost 18 percent of its value for the next two days.

[54]Not tabulated. Kasznik and McNichols (2001) also showed that firms failing to meet analysts' forecasts had a lower annual abnormal returns.

Regression 3 in this study is intended to examine whether the market efficiently recognizes the systematic behavior of firms that persistently meet or beat analysts' forecasts.

The insignificant result from the regression equations (1) in Table 5 is not inconsistent with the anecdotal evidence provided by Pulliam (1999) and Vickers (1999) in the sense that an efficient market systematically discounts the expected portions of earnings surprise.

Table 6 summarizes the key results of this study from the Regression 3 portfolio P_q. The hypothesis predicts that the slope coefficients on the systematic portion are not significantly different from zero. As would be expected, the coefficients on the systematic components of earnings surprise are consistently smaller than the coefficients on the unsystematic components of earnings surprise and generally not significant. The result seems to suggest that the market efficiently anticipates the magnitude of the earnings surprise for firms with the tendency of meeting or beating the expectations. The coefficients on es^{unsys} capture the market's reaction to the unsystematic portion of the earnings surprise. Unlike Table 5, Table 6 provides evidence that the market rewards the firms that persistently meeting or beating analysts' forecasts. The estimated slope coefficient on es^{unsys} is generally monotonically increasing from a low of 0.687 in P_1 to a high of 5.668 (0.689+4.979) in P^9. The increasing pattern of intercept coefficients for the first five series of portfolios also supports the hypothesis.

Overall, the findings provide evidence supporting that the earnings response coefficients are increasing as firms persistently meet or beat analysts' forecasts. This provides additional evidence to support the findings provided by Lopez and Rees (2001) in explaining the greater ERCs for firms with the historical tendency of meeting or beating analysts' forecasts.

As a supplemental analysis, I examined the firms repeatedly missing analysts' forecasts. It is hard to persistently miss the expectations since bad news is frequently preannounced before the earnings announcement date. I have found that about 85% of

firms do not repeatedly miss analysts' forecasts for more than two consecutive quarters. DeGeorge, Patel, and Zeckhauser (1999) argue that investors first consider whether the firms are showing a profit or loss, and next consider whether the firms meet or miss analysts' forecasts. Brown (1999) also found that when a loss is reported, the managers do not care about meeting or beating analysts' forecasts. Thus, the implications of missing forecasts for loss firms and profit firms can be different. Hence, I further partition all the observations into profit and loss firms. As expected, Table 7 for profit and loss firms shows no significant patterns for ERCs. Table 7 also shows that investors do not seem to care about persistently missing analysts' forecasts. This result is not surprising in the context that bad news is frequently released weeks before the earnings announcement date. This can be considered further evidence that firms prefer to meet or beat analysts' forecasts by the management of earnings or forecasts.

4.2   Firm Characteristics

In the previous section, I documented that the ERCs to unsystematic portion of earnings surprises are increasing as the firms persistently meet or beat the expectations. Consistent with theory, a negative association between ERCs and risk factors is anticipated. As described in the Research Design section, I compare the patterns with various firm characteristics for the portfolio of stocks to examine whether the increasing patterns of ERCs are associated with the firm specific risk. In this section, I will compare the characteristics of firms that persistently meet or beat the expectation with those of firms that do not. This comparison will shed light on the differences among firms with longer or shorter patterns as well as the association between the patterns and the managers' incentives for potentially engaging in earnings management and/or forecast management. The consistent results of the findings will provide insight into the generality of the evidence in the sense that the patterns of meeting or beating the expectations is inversely related to the firm specific risk. Many of the correlations among the variables are particularly noteworthy.

Table 8 summarizes the median value of various risk factors for each portfolio. In addition, Table 9 documents correlation between the portfolio and the firm characteristics.[55] For the most part, the relation between the patterns and risk is apparent. In other words, the correlation between the pattern and each risk factor is generally consistent with my expectation.

The first two columns of Table 8 present evidence on the liquidity measures. As would be anticipated, the firms persistently meeting or beating analysts' forecasts are large in size, and the size (**Mk. Cap**) is progressively increasing as they repeatedly meet or beat the forecasts. Likewise, Dollar trading volume (**Avg. Vol**) shows the same pattern as the size variable. **Avg. Vol** is also positively correlated with P_q and P^s. This result also suggests that larger firms provide richer information and have a greater chance to meet the market's expectation.

The third column of Table 8 reports the association of the dispersion of analysts' forecasts (**Disp**). This measures the earnings variability of the portfolios. P^{10} firms have lower dispersion of analysts' forecasts than P^1 firms. **Disp** for each portfolio is decreasing as the firms repeatedly meet or beat the forecasts. In addition, **Disp** is negatively correlated with P_q and P^s. Consistent with prior studies, this evidence supports the expectation that the managers of firms with lower dispersion of forecasts have higher motivation to meet or beat analysts' forecasts.[56] This result also suggests that the increasing patterns of ERCs are associated with a reduction of uncertainty if the changes in the dispersion of analysts' forecasts is used as a proxy for changes in uncertainty (Barron and Stuerke (1998)).

The next three columns of Table 8 examine the risk associated with the financial leverage of the portfolios. The amount of long-term debt (**LTD**) in a firm's capital

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[55]I also computed Kendall's τ-b correlations. The result was not qualitatively different from the Spearman correlation.

[56]Alternatively, this may suggest that analysts can more accurately forecast earnings as the firms repeatedly meet or beat the forecasts.

structure increases as the firm persistently meets or beats analysts' forecasts due to the increase in size of the firms. Theoretically, ERCs should be decreasing in leverage. Table 9 provides evidence that **D/B** is positively associated with P_q and P^s while **D/E** is negatively associated with P_q and P^s.

B/P reports book-to-price ratio. As would be expected, this study finds that **B/P** is decreasing as a firm persistently meets or beats analysts' expectations. Table 9 shows **B/P** is negatively correlated with P_q and P^s. Similarly, **LTG** is positively correlated with P_q and P^s. This result seems to be consistent with prior studies in the sense that growth firms have more incentive to avoid earnings disappointment.

The next two variables are used to capture firm specific risk related to the market volatility. Table 9 shows that **Beta** is negatively correlated with P_q and P^s. The result is not surprising in the context that the firms that are capable of achieving long strings of consecutively meeting or beating quarterly analysts' forecasts have lower firm specific risk. Barry and Brown (1985) demonstrate that firms with a richer information environment have smaller betas. Hence, this finding is consistent with the argument since firm characteristics in this study show that firms persistently meeting or beating analysts' forecasts seem to provide more information to the market. However, it is difficult to explain in the context of risk that **Std. Ret** is positively correlated with P_q and P^s. The patterns in this variable is less apparent.

Turn indicates average daily turnover for previous year. The patterns for this variable are less apparent. On average, the firms persistently meeting or beating forecasts have a higher turnover ratio. Table 9 shows that **Turn** is positively correlated with P_q and P^s.

The last column presents price momentum (**Momentum**) of the prior six months. As expected, the result seems to show that firms repeatedly meeting or beating forecasts have higher momentum from the beginning of the pattern. On average, **Momentum** increases as the pattern continues. Table 9 shows that **Momentum** is positively correlated with P_q and P^s

In summary, the correlations are consistent with my expectations regarding firm characteristics. Taken together, this evidence suggests that **Mk. Cap**, **LTG**, **D/B**, **Avg. Vol**, **Std. Ret**, **Turn** and **Momentum** are positively associated with the length of time of meeting or beating analysts' forecasts while **Disp**, **D/E**, **B/P**, and **Beta** are negatively associated with the patterns.

4.3 Implied Cost of Capital and Market Efficiency

As would be expected form the Research Design Section, the firm characteristics show that the firms persistently meeting or beating analysts' forecasts are more likely to be growth firms and have lower risk. If the reported accounting numbers of the firms persistently meeting or beating analysts' forecasts are not managed upward and the market price reflects the fundamental value of the firms, the implied cost of capital will decrease as the firms persistently meet or beat the expectation. In contrast, if the reported earnings are managed upward and the market efficiently discounts the potentially inflated earnings figures, the implied cost of capital will show increasing pattern.

The implied cost of capital based on regression equations (15) and (20) is estimated to examine the market efficiency for each portfolio of firms.[57] Panel A of Table 10 shows the implied cost of capital based on regression equations (15) while Panel B of Table 10 summarizes those based on regression equations (20). The first row of each panel shows the implied cost of capital of the portfolio P_q, which includes firms' q^{th} meeting or beating the expectation. The bottom row of each panel includes the portfolio of firms P^s, which have met or beaten analysts' forecasts s consecutive times overall.[58]

On average, the implied cost of capital is weakly increasing as a firm persistently meets or beats analysts' forecasts. The average implied cost of capital of P_1 is 11.6%,

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[57]Since estimated r is quarterly implied cost of capital, Tables 10 reports annualized numbers.

[58]I also estimated implied cost of capital for all P_q^s described in Table 1. The result is qualitatively similar.

and the expected implied cost of capital of P_{10} is 14.3%. For most of portfolio P^s, patterns in the implied cost of capital are not apparent. Table 9 shows that the pattern of meeting or beating the expectation (i.e., P_q) is significantly positively correlated with the implied cost of capital.

As anticipated, the implied cost of capital is positively associated with pattern of meeting or beating the market expectation. This result provides evidence that the management potentially manipulates reported earnings upward to maintain the pattern of meeting or beating analysts' forecasts, and an efficient market seems to see through the reported earnings to the true earnings figures. That is, the market price is discounted as if true earnings were lower than reported earnings.[59] In addition, in regression equation (15), although the dependent variable ($\frac{eps_0}{bv_{-1}}$) is potentially inflated by the managed earnings, the independent variable ($\frac{Pr_0 - bv_0}{bv_{-1}}$) does not seem to change enough to justify the potentially managed earnings.[60] Taken together, these results suggest that the market seems efficiently to interpret the reported earnings figure and implicitly to reflect it in the stock price.

Panel B of Table 10 summarizes the output from regression equation (20). As anticipated, the implied cost of capital is generally increasing with the length of time of meeting or beating analysts' forecasts. The difference between Panel A and Panel B of Table 10 is the price. Panel B uses the price one day after the prior earnings announcement. Price change over the quarter reflects revision in the market's expectation for future earnings. If the market has foresight of the actual earnings while the analysts'

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[59]For example, Pulliam (1999) provides anecdotal evidence that the market discounts the price of the firms with earnings management and punishes them even though they were able to meet or beat the analysts' forecasts.:

"On Tuesday, CIBC Oppenheimer analyst Steven Eisman – noting that $80 million, or 12.4%, of American Express's $648 million in after-tax earnings came from two accounting changes – downgraded the card company's shares to "hold" from "buy". "If you take out those numbers, they would have missed earnings by one cent vs. last year. The company wants to show Wall Street increasing earnings, but they can't do all the investing they want to do without taking these kinds of gains," Mr. Eisman says. "They're trying to have their cake and eat it too.""

[60]On average, the descriptive statistics in Table 4 suggest that the evidence satisfies the necessary condition in equation (6).

forecasts are lower than actual earnings, the implied cost of capital using both equations should be similar. As expected, the implied cost of capital estimated in Panel A of Table 10 is not significantly different from that in Panel B of Table 10. This result implies that the market efficiently anticipated that firms would not disappoint earnings expectations at least one quarter before the earnings announcement.

5   Summary

It is well documented that firms want to avoid negative earnings surprise since negative earnings surprises generally lead to negative market returns. Prior studies suggest that the increasing tendency of meeting or beating analysts' forecasts is a rational response by the managers since the market penalizes missing the forecasts and rewards meeting or beating the analysts' forecasts. However, the characteristics of firms that repeatedly "meet or beat" analysts' forecasts and their association with the following market reactions have rarely been examined.

In summary, this paper provides compelling evidence that ERCs are positively associated with the length of time of meeting or beating analysts' forecasts after controlling for the systematic portions of earnings surprise. The market seems to anticipate earnings surprise for firms that are repeatedly meeting or beating the analysts' earnings forecasts. In addition, r's are increasing as a firm repeatedly meets or beats analysts' forecasts. As expected, the implied cost of capital is positively associated with the length of time of meeting or beating analysts' forecasts. This result reveals that the market effectively interprets the potentially managed earnings figure.

I then examined the relation between various firm characteristics that have been suggested as risk proxies and the patterns. I identified several characteristics of firms that exhibit a systematic relationship to the patterns. The results have important implications for explanation of the association between firms' incentives to meet or beat analysts' forecasts and market reaction to earnings surprise. Skinner and Sloan (1999) show that the market price reaction is more negative to negative earnings surprise than

to positive earnings surprise. They find that high growth firms in particular want to avoid negative earning surprise. Thus, the findings related to firm characteristics may have implications for earnings management and/or forecast management. If the characteristics of the firms indicate an incentive of the firms' managers to avoid earnings shortfall, the managers may persistently engage in earnings management and/or forecast management. Thus, the firms will be less likely to show earnings disappointment and to suffer from negative market price reactions. Many recent studies report that firms engage in earnings management and/or forecast management for various reasons. For example, Richardson, Teoh, and Wysocki (2000) found that pessimistic forecasts are more prevalent for the firms with the highest incentives to avoid earnings disappointment. Forecast pessimism is more common for firms that are about to issue new equity, have higher growth and higher market-to-book ratios, and are larger and more profitable.

I find no significant evidence relating ERCs and the patterns of meeting or beating analysts' forecasts after the original pattern is broken. It is well known that many firms preannounce bad news before the earnings announcement when they can not meet analysts' forecasts. The bad news might be already impounded in the price around the preannouncement date. Thus, it will be worthwhile if future research extends the analysis to explore the firms' performance over a longer interval after the first earnings shortfall.

On the earnings management side, another potential area of study could be investigating how the pattern of meeting or beating analysts' forecasts is associated with methods of earnings management. For example, if the increasing pattern of sales or cash flow is less likely to be related to earnings management activities, the accruals could be a tool for earnings management.[61]

Masumoto (1999), Burgstahler and Eames (1999), and Payne and Robb (2000) all

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[61]See Burgstahler and Dichev (1997a) or Defond and Jiambalvo (1994).

provide evidence with respect to earnings management and/or forecast management. However, this paper focuses on a sample of firms that achieved long strings of consecutive meeting or beating of quarterly analysts' forecasts. I believe that this study provides additional evidence for understanding the issues related to earnings management and forecast management.

References

Baginski, S., E. Conrad, and J. Hassel 1993. The Effects of Management Forecast Precision on Equity Pricing and on the Assessment of Earnings Uncertainty. *The Accounting Review* (October): 913–927.

Barron, O. and P. Stuerke 1998. Dispersion in Analysts' Forecasts as a Measure of Uncertainty. *Journal of Accounting Auditing and Finance* (Summer): 245–270.

Barry, C. and S. Brown 1985. Differential Information and Security Market Equilibrium. *Journal of Financial and Quantitative Analysis* 20: 407–422.

Barth, M., J. Elliott, and M. Finn 1999. Market Rewards Associated with Patterns of Increasing Earnings. *Journal of Accounting Research* : 387–414.

Basu, S. 1997. The Conservatism Principle and the Asymmetric Timeliness of Earnings. *Journal of Accounting and Economics* 24: 3–37.

Bhushan, R. 1989. Firm Characteristics and Analysts Following. *Journal of Accounting and Economics* 11: 256–274.

Brown, L. 1999. Managerial Behavior and the Bias in Analysts' Earnings Forecasts. *Working paper, Georgia State University* .

Brown, L. 2001. A Temporal Analysis of Earnings Surprises: Profits versus Losses. *Journal of Accouting Research* 39 (September): 221–241.

Burgstahler, D. 1997. Incentives to Manage Earings to Avoid Earnings Decreases and Losses: Evidence from Quarterly Earnings. *Working Paper, University of Washington* .

Burgstahler, D. and I. Dichev 1997a. Earnings, Adaptation and Equity Value. *The Accounting Review* 72: 187–215.

Burgstahler, D. and I. Dichev 1997b. Earnings Management to Avoid Earnings Decreases and Losses. *Journal of Accounting and Economics* 24: 99–126.

Burgstahler, D. and M. Eames 1999. Management of Earnings and Analyst Forecasts. *Working Paper,   University of Washington and Santa Clara University* .

Charan, R. and G. Colvin 2001. Managing for the Slowdown. *Forturne Magazine* (February 5): 80–83.

Claus, J. and J. Thomas 2000. Equity Premia as Low as Three Percent?: Empirical Evidence from Analysts' Earnings forecasts for Domestic and International Stock Markets. *Working Paper, Columbia University* .

Clement, M., R. Frankel, and J. Miller 2000. The Effect of Confirming Management Earnings Forecasts on Cost of Capital. *Working Paper, University of Texas at Austin and University of Michigan* (March 13).

Cohen, L. 1991. Low balling: How Some Companies Sand Stocks Aloft. *The Wall Street Journal* (May 6): C1.

Collins, D. and S. Kothari 1989. An Analysis of Intertemporal and Cross-sectional Determinants of Earnings Response Coefficients. *Journal of Accounting and Economics* 11: 143–181.

DeFond, M. and J. Jiambalvo 1994. Debt Covenant Violation and Manipulation of Accruals. *Journal of Accounting and Economics* 17: 145–176.

DeFond, M. and C. Park 1997. Smoothing Income in Anticipation of Future Earnings. *Journal of Accounting and Economics* 23 (September): 115–139.

Degeorge, F., J. Patel, and R. Zeckhauser 1999. Earnings Management to Exceed Thresholds. *Journal of Business* 72 (January).

Easton, P. 2001. PE Ratios, Short-term and Long-term Earnings Growth, and the Internal Rate of Return on a Portfolio of Stocks. *Working paper, The Ohio State University* .

Easton, P., G. Taylor, P. Shroff, and T. Sougiannis 2001. Empirical Estimation of the Expected Rate of Return on a Portfolio of Stocks. *Journal of Accounting Research, Forthcoming* .

Easton, P. and M. Zmijewski 1989. Cross-sectional Variation in the Stock Market Response to Accounting Earnings Announcements. *Journal of Accounting and Economics* 11: 117–141.

Geary, R. 1930. The Frequency Distribution of the Quotient of Two Normal Variates. *Journal of the Royal Statistical Society* 93: 442–446.

Gebhardt, W., C. Lee, and B. Swaminathan 2000. Toward an Implied Cost of Capital. *Journal of Accounting Research, Forthcoming* .

Hayn, C. 1995. The Information Content of Losses. *Journal of Accounting and Economics* 20: 125–153.

Imhoff, E. and G. Lobo 1992. The Effect of Ex Ante Earnings Uncertainty on Earnings Response Coefficients. *The Accounting Review* 67 (April): 427–439.

Kasznik, R. and M. McNichols 2001. Does Meeting Expectations Matter? Evidence from Analyst Forecast Revisions and Share prices. *Working Paper, Stanford University* .

Kormendi, R. and R. Lipe 1987. Earnings Innovations, Earnings Persistence, and Stock Returns. *Journal of Business* 60: 323–345.

Kothari, S. 2000. Capital Markets Research in Accounting. *Working Paper, Massachusetts Institute of Technology* (March).

Lee, C., J. Myers, and B. Swaminathan 1999. What is the Intrinsic Value of Dow? *Journal of Finance* : 1693–1742.

Levitt, A. 1998. Remarks by Chairman Arthur Levitt of Securities and Exchange Commission, The "Number Game". *NYU Center for Law and Business, New York, N. Y.* (September 28): http://www.sec.gov/news/speech/speecharchive/1998/spch220.txt.

Lopez, T. and L. Rees 2001. The Effect of Beating and Missing Analysts' Forecast on the Information Content of Unexpected Earnings. *Working Paper Texas A&M University* (April).

Matsumoto, D. 1999. Management's Incentives to Guide Analysts' Forecasts. *Working Paper, Harvard University* .

Morse, D., J. Stephan, and E. Stice 1991. Earnings Announcements and the Convergence (or Divergence) of Beliefs. *The Accounting Review* (April): 376–388.

O'Hanlon, J. and A. Steele 2000. Estimating the Equity Risk Premium Using Accounting Fundamentals. *Journal of Business, Finance and Accounting* 27.

Ohlson, J. and B. Juettner-Nauroth 2000. Expected EPS and EPS Growth as Determinancts of Value. *Working Paper, New York University* .

Payne, J. and S. Robb 2000. Earnings Management: The Effect of Ex Ante Earnings Expectations. *Journal of Accounting, Auditing, and Finance* 15n4: 371–392.

Pulliam, S. 1999. Earnings Management Spurs Selloffs Now. *Wall Street Journal* (October 29): C1.

Richardson, S., S. Teoh, and P. Wysocki 2000. Tracking Analysts' Forecasts over the Annual Earnings Horizon: Optimism, Pessimism, and Inside Trading. *Working Paper, University of Michigan and The Ohio State University* .

Rubinstein, M. 1976. The Valuation of Uncertain Income Streams and the Pricing of Options. *Bell Journal of Economics* : 407–425.

Skinner, D. 1994. Why Firms Voluntarily Disclose Bad News. *Journal of Accounting Research* 32: 38–60.

Skinner, D. 1997. Earnings Disclosures and Stockholder Lawsuits. *Journal of Accounting and Economics* 23: 249–282.

Skinner, D. and R. Sloan 1999. *Earnings Surprises, Growth Expectation, and Stock Returns or Don't Let and Earnings Torpedo Sink Your Portfolio.* University of Michigan, Working Paper.

Soffer, L., S. Thiagarajan, and B. Walther 1997. Earnings Preannouncements. *Working Paper, Northwestern University* .

Vickers, M. 1999. Ho-hum, Another Earnings Surprise. *Business Week* (May 24): 83–84.

Table 2: Descriptive Statistics: ERC

	N	ES	$\dfrac{\text{ES}}{\text{price}}$	CAR	Return	Market return
P_1	13963	0.0451	0.0034	0.0117	0.0148	0.0031
P_2	3644	0.0367	0.0028	0.0135	0.0166	0.0031
P_3	1733	0.0378	0.0024	0.0123	0.0161	0.0038
P_4	991	0.0346	0.0020	0.0137	0.0167	0.0030
P_5	680	0.0367	0.0018	0.0120	0.0153	0.0033
P_6	477	0.0323	0.0015	0.0127	0.0158	0.0031
P_7	352	0.0263	0.0013	0.0065	0.0089	0.0024
P_8	264	0.0286	0.0014	0.0109	0.0146	0.0037
P_9	199	0.0299	0.0014	0.0077	0.0139	0.0062
P_{10}	136	0.0274	0.0011	0.0046	0.0076	0.0030
P^1	10217	0.0479	0.0036	0.0103	0.0133	0.0029
P^2	3850	0.0399	0.0033	0.0126	0.0155	0.0029
P^3	2240	0.0404	0.0029	0.0140	0.0173	0.0033
P^4	1262	0.0327	0.0024	0.0116	0.0149	0.0033
P^5	1008	0.0426	0.0022	0.0145	0.0177	0.0031
P^6	749	0.0393	0.0020	0.0151	0.0190	0.0039
P^7	588	0.0291	0.0019	0.0118	0.0157	0.0039
P^8	531	0.0286	0.0016	0.0122	0.0162	0.0040
P^9	576	0.0288	0.0016	0.0137	0.0190	0.0053
P^{10}	1418	0.0239	0.0014	0.0151	0.0183	0.0033

Notes to Table 2:

ES	is the earnings surprise $= eps_{jt}^a - eps_{jt}^f$
$\dfrac{\text{ES}}{\text{price}}$	is the earnings surprise deflated by beginning price $= \dfrac{eps_{jt}^a - eps_{jt}^f}{P_{jt-1}};$
Return	is the raw return $= R_{jt};$
Market return	is the equally-weighted market return $= R_{mt};$
CAR	market adjusted return $= R_{jt} - R_{mt};$

Table 3: Descriptive Statistics: Mean for Each Year

Year	N	ES	$\dfrac{\text{ES}}{\text{price}}$	CAR	Return	Market return
1984	401	0.0888	0.0058	0.0036	0.0093	0.0057
1985	995	0.0755	0.0057	0.0063	0.0092	0.0029
1986	997	0.0671	0.0042	0.0120	0.0148	0.0029
1987	937	0.0675	0.0041	0.0114	0.0034	-0.0080
1988	1033	0.0527	0.0047	0.0089	0.0112	0.0023
1989	1125	0.0548	0.0041	0.0078	0.0084	0.0006
1990	1095	0.0467	0.0037	0.0139	0.0171	0.0032
1991	1125	0.0400	0.0038	0.0110	0.0178	0.0067
1992	1227	0.0311	0.0026	0.0147	0.0201	0.0053
1993	1179	0.0303	0.0023	0.0133	0.0170	0.0037
1994	1634	0.0353	0.0026	0.0101	0.0122	0.0021
1995	1661	0.0343	0.0026	0.0111	0.0161	0.0050
1996	1976	0.0316	0.0024	0.0135	0.0164	0.0030
1997	2145	0.0301	0.0021	0.0163	0.0191	0.0028
1998	2348	0.0284	0.0018	0.0121	0.0165	0.0044
1999	2387	0.0364	0.0022	0.0119	0.0173	0.0054
2000	174	0.0431	0.0020	0.0322	0.0259	-0.0063

Notes to Table 3:

ES	is the earnings surprise $= eps_{jt}^a - eps_{jt}^f$
$\dfrac{\text{ES}}{\text{price}}$	is the earnings surprise deflated by beginning price $= \dfrac{eps_{jt}^a - eps_{jt}^f}{P_{jt-1}}$;
Return	is the raw return $= R_{jt}$;
Market return	is the equally-weighted market return $= R_{mt}$;
CAR	market adjusted return $= R_{jt} - R_{mt}$;

Figure 2: Distribution of Earnings Surprise
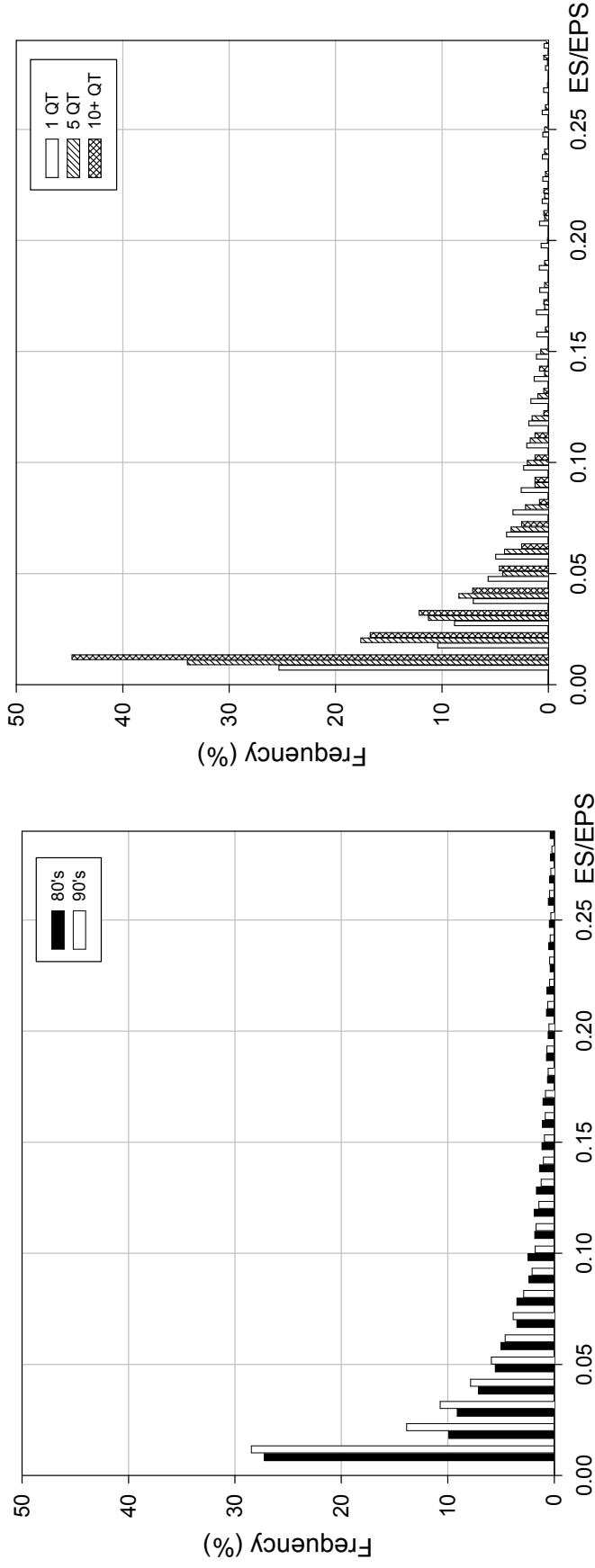
Notes to Figure 2:
The figure shows the histogram of the earnings surprises deflated by reported earnings per share ($\frac{\text{Reported earnings - Mean analysts' forecasts}}{\text{Reported earnings}}$). The histogram widths are 0.01. For example, the first interval to the right of zero contains all analysts' forecasts deflated by reported earnings between 0 and 0.01. The vertical bar shows the relative frequency of observations in each interval ($\frac{\text{Number of observations in the interval}}{\text{Total observations}}$).

Figure 3: Distribution of Earnings Surprise: Profit and Loss Firms
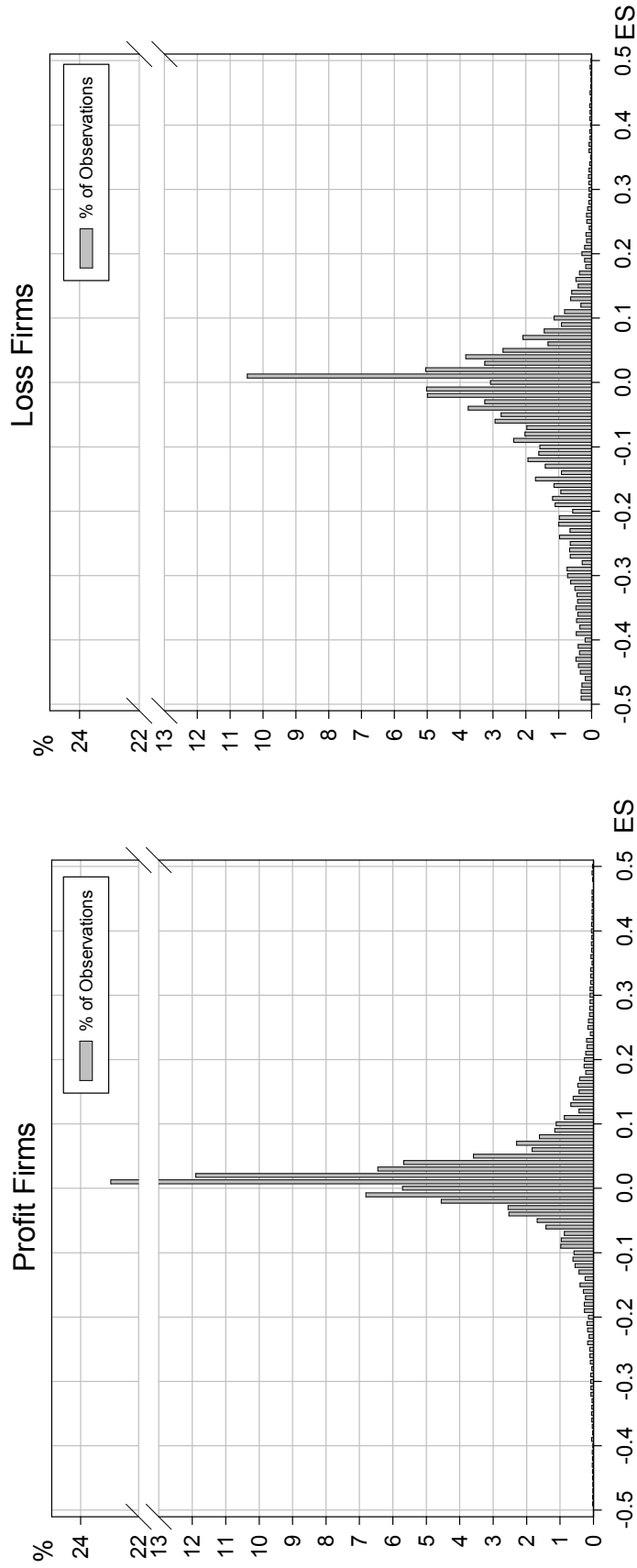
Notes to Figure 3:

The figure shows the histogram of the earnings surprises. The histogram widths for the graphs are 0.01. For example, the first interval to the left of zero contains all earnings surprise between -0.01 and 0. The vertical bar shows the percentage of all observations in each interval. The first graph covers firms report profits while the second graph includes firms report losses.

Figure 4: Revision of analysts' forecasts for P_q and P^s
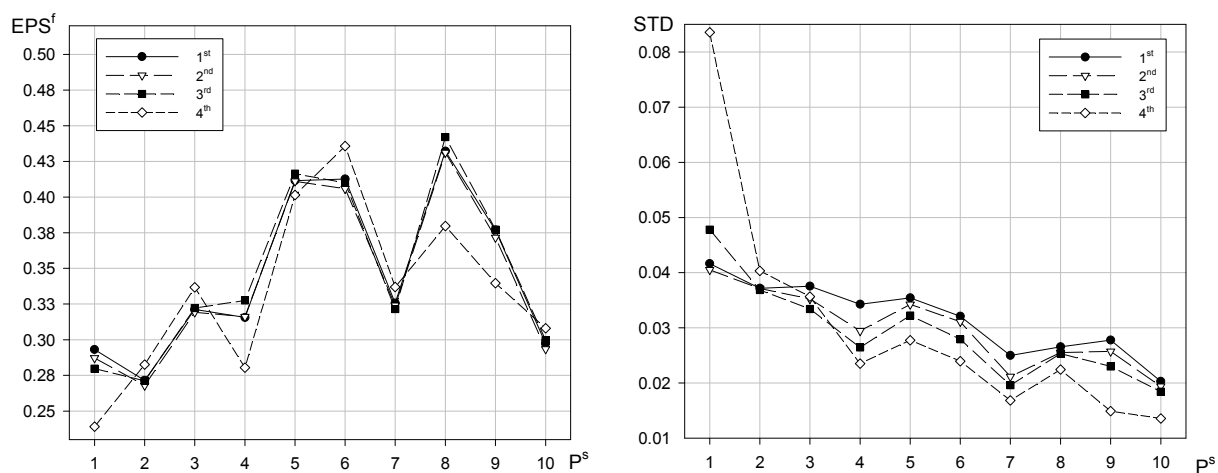
Notes to Figure 4:

The figure shows revision of analysts' forecasts over the quarter. EPS^f indicates earnings estimate. Portfolio P^s includes the observations that meet or beat analysts' forecasts exactly P^s consecutive times. 1st shows the first consensus forecasts and so on. STD indicates standard deviation of analysts' forecasts.

Figure 5: Optimistic and Pessimistic Revision
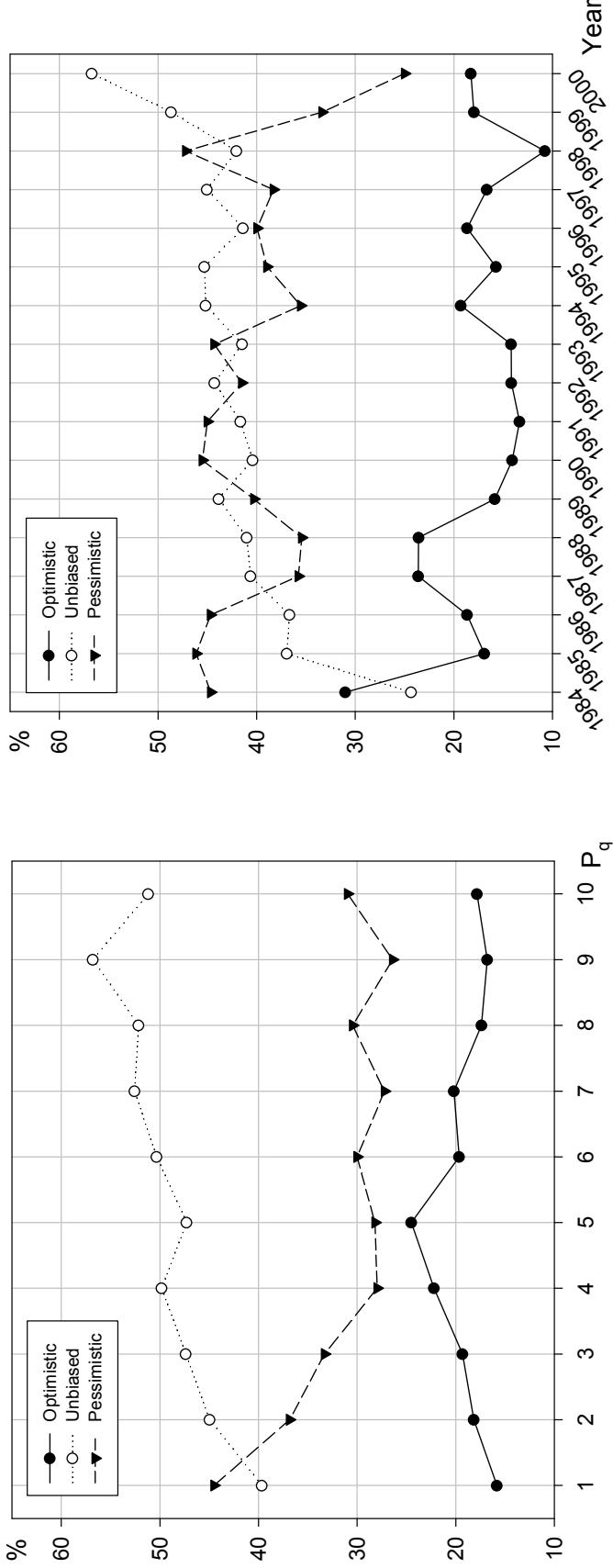
Notes to Figure 5:
The figure shows revision of analysts' forecasts over the quarter. Portfolio P_q includes the observations that meet or beat analysts' forecasts q^{th} consecutive times.
Where:

Optimistic:	First earning forecasts $<$ Last earning forecasts;
Unbiased:	First earning forecasts $=$ Last earning forecasts;
Pessimistic:	First earning forecasts $>$ Last earning forecasts.

Table 4: Descriptive Statistics: Implied Cost of Capital

	eps_{j0}	bv_{j-1}	P_{j-1}	P_{j0}	bv_{j0}	$P_{j0} - bv_{j0}$	$\frac{eps_{j0}}{bv_{j-1}}$	$\frac{P_{j0}-bv_{j0}}{bv_{j-1}}$	$\frac{Pr_{-1}}{bv_{-1}}$
P_1	0.22	6.62	6.79	13.33	13.50	5.10	0.0355	0.8670	1.8919
P_2	0.24	6.38	6.62	14.00	15.00	6.85	0.0388	1.1566	2.0304
P_3	0.27	6.12	6.26	15.13	15.75	8.56	0.0434	1.4545	2.2739
P_4	0.28	5.80	6.19	16.75	18.75	10.74	0.0431	1.9221	2.6214
P_5	0.28	6.19	6.41	18.63	20.25	12.41	0.0443	1.9165	2.9149
P_6	0.30	7.21	7.75	23.38	22.38	12.96	0.0467	2.1093	3.1799
P_7	0.34	6.53	7.48	26.50	22.31	14.59	0.0478	2.1764	3.0605
P_8	0.29	7.77	7.96	21.56	23.81	13.75	0.0392	1.9109	3.0753
P_9	0.29	6.95	7.32	21.34	19.19	10.60	0.0479	2.3977	3.1699
P_{10}	0.35	11.09	11.46	20.00	22.81	12.32	0.0393	2.0126	3.2922
P^1	0.23	6.69	6.83	13.23	13.25	4.93	0.0352	0.8141	1.8511
P^2	0.22	6.36	6.54	12.40	13.00	5.04	0.0365	0.9105	1.8507
P^3	0.24	6.77	6.96	14.00	14.94	6.55	0.0373	1.0716	1.9939
P^4	0.25	6.45	6.57	15.33	16.50	8.50	0.0410	1.3725	2.3007
P^5	0.26	6.24	6.39	15.75	16.88	9.29	0.0420	1.5063	2.4301
P^6	0.27	6.21	6.38	16.88	18.00	10.51	0.0425	1.6565	2.5667
P^7	0.27	6.17	6.30	17.33	18.67	10.70	0.0440	1.7471	2.6214
P^8	0.27	6.44	6.78	18.56	19.50	12.60	0.0426	1.9322	2.7884
P^9	0.24	6.35	6.50	18.17	18.75	11.81	0.0424	1.9589	2.7954
P^{10}	0.23	6.50	7.22	17.83	18.72	11.35	0.0391	1.6882	2.5894

Table 5: Result of regressions

Panel A	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
α_q	0.010	0.000	0.000	0.002	0.002	0.000	-0.009	-0.001	-0.002	-0.006
t	16.78	0.03	0.16	0.91	0.61	0.05	-2.32	-0.21	-0.33	-1.12
β_q	0.626	0.819	0.490	0.533	0.111	1.349	3.539	0.976	-0.832	1.104
t	7.89	3.97	1.40	1.03	0.16	1.39	2.38	0.62	-0.70	0.46

Panel B	P^1	P^2	P^3	P^4	P^5	P^6	P^7	P^8	P^9	P^{10}
α^s	0.008	0.001	0.003	0.000	0.003	0.004	-0.001	-0.003	0.004	0.004
t	12.59	0.61	1.65	-0.21	1.12	1.46	-0.51	-0.95	1.61	2.31
β^s	0.536	0.526	0.578	1.045	1.123	1.163	2.108	3.512	-0.021	1.417
t	6.02	2.88	2.24	2.62	2.16	1.96	3.00	4.08	-0.03	2.26

Panel C	P^1	P^2	P^3	P^4	P^5	P^6	P^7	P^8	P^9	P^{10}
γ^m	-0.005	-0.004	-0.006	-0.013	-0.015	-0.009	-0.024	-0.042	-0.037	0.000
t	-5.11	-1.54	-1.66	-2.14	-1.95	-0.85	-1.99	-2.47	-2.29	0.02
δ^m	0.519	0.348	0.035	-0.733	-1.938	1.101	4.168	9.783	18.516	0.445
t	2.81	0.64	0.04	-0.50	-0.74	0.34	0.50	0.88	1.62	0.17

Notes to Table 5:
Where:

Panel A: $CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_P \cdot d_q + \beta_1 \cdot es_{jt} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt} + \varepsilon_{jt}$ (1);

P_q : Portfolio P_q includes q^{th} meeting or beating;

Panel B: $CAR_{jt} = \alpha_1 + \sum_{s=2}^{10} \alpha^s \cdot d_s + \beta^1 \cdot es_{jt} + \sum_{s=2}^{10} \beta^s \cdot d_s \cdot es_{jt} + \varepsilon_{jt}$ (2);

P^s : Portfolio P^s includes the observations that overall meet or beat analysts' forecasts s consecutive times;

Panel C: $CAR_{jt+1} = \gamma_1 + \sum_{m=2}^{10} \gamma^m \cdot d_m + \delta^1 \cdot es_{jt+1} + \sum_{m=2}^{10} \delta^m \cdot d_m \cdot es_{jt+1} + \varepsilon_{jt+1}$;

Panel C shows the regression result that tests firms' first missing analysts forecasts after meeting or beating analysts' forecasts s consecutive times.

Table 6: Result of regressions after Controlling for the Systematic and Unsystematic Earning Surprise

	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
α_q	0.060	0.003	0.006	0.005	0.015	0.004	-0.007	-0.009	0.008	0.000
t	4.20	2.23	2.97	2.05	4.50	1.05	-1.83	-1.82	1.68	0.02
β_q	0.271	0.423	0.404	0.786	-0.612	1.043	3.295	3.081	-2.565	1.019
t	1.03	1.50	0.95	1.17	-0.72	0.83	1.96	1.63	-1.74	0.30
γ_q	0.687	0.341	0.631	0.711	1.532	2.111	3.682	0.238	4.979	1.420
t	8.23	1.95	1.70	1.23	1.71	1.63	2.35	0.15	1.87	0.45

Notes to Table 6:

Where:

$$CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_P \cdot d_q + \beta_1 \cdot es_{jt}^{sys} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt}^{sys} + \gamma_1 \cdot es_{jt}^{unsys} + \sum_{q=2}^{10} \gamma_q \cdot d_q \cdot es_{jt}^{unsys} + \varepsilon_{jt}$$

P_q : Portfolio P_q includes $q^t h$ meeting or beating;

es^{sys} : **Systematic Earnings Surprise**

= Mean of Earnings Surprise for the Past 4 Quarters;

es^{unsys} : **Unsystematic Earnings Surprise**

= Earnings Surprise - Mean of Earnings Surprise for the Past 4 Quarters.

Table 7: Result of regressions: Profit and Loss Firms that Persistently Miss Analysts' Forecasts

Panel A	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
Profit Firms										
β_q	0.876	-0.173	0.651	1.635	-0.632	1.558	-1.508	-3.998	-0.435	-6.907
t	6.26	-0.53	1.20	1.91	-0.42	0.82	-0.56	-1.46	-0.14	-2.02
Loss Firms										
β_q	0.014	0.055	0.143	-0.115	0.456	-0.162	-0.253	-1.073	2.211	
t	0.63	1.19	1.82	-0.72	1.34	-0.35	-0.85	-0.44	0.51	

Panel B	P^1	P^2	P^3	P^4	P^5	P^6	P^7	P^8	P^9	P^{10}
Profit Firms										
β^s	0.881	0.112	0.476	0.152	-1.038	-0.267	0.235	-0.041	-0.833	-1.924
t	5.71	0.37	1.09	0.25	-1.19	-0.18	0.12	-0.02	-0.28	-1.79
Loss Firms										
β^s	0.069	0.115	0.203	0.163	0.249	-0.384	0.043	2.467	-0.207	
t	1.47	1.88	2.00	0.70	0.68	-1.29	0.03	0.78	-0.79	

Notes to Table 5:
Where:

Panel A: $CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_P \cdot d_q + \beta_1 \cdot es_{jt} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt} + \varepsilon_{jt}$;

P_q : Portfolio P_q includes q^{th} meeting or beating;

Panel B: $CAR_{jt} = \alpha_1 + \sum_{s=2}^{10} \alpha^s \cdot d_s + \beta^1 \cdot es_{jt} + \sum_{s=2}^{10} \beta^s \cdot d_s \cdot es_{jt} + \varepsilon_{jt}$;

P^s : Portfolio P^s includes the observations that overall meet or beat analysts' forecasts s consecutive times.

Table 8: Firm Characteristics

Panel A: P_q

	Mk. Cap.	Avg. Vol.	Disp.	LTD	D/B	D/E	B/P	Beta	Std. Ret.	Turn	Momentum
P_1	2400.0	7467.6	0.145	441.4	0.588	0.354	0.400	1.003	0.0250	0.109	0.068
P_2	3116.5	8144.5	0.128	457.6	0.592	0.341	0.408	0.990	0.0263	0.112	0.122
P_3	3977.9	11758.6	0.125	606.3	0.647	0.342	0.363	0.975	0.0260	0.136	0.185
P_4	5214.9	16178.5	0.114	689.0	0.597	0.311	0.343	0.968	0.0250	0.158	0.187
P_5	6582.9	18510.1	0.081	781.2	0.645	0.308	0.320	0.961	0.0248	0.171	0.205
P_6	8111.1	14410.0	0.077	853.8	0.691	0.276	0.305	0.952	0.0246	0.155	0.148
P_7	8380.8	16185.0	0.049	844.2	0.667	0.244	0.284	0.934	0.0246	0.152	0.111
P_8	9826.0	20948.7	0.058	1006.0	0.637	0.251	0.298	0.923	0.0251	0.159	0.135
P_9	8966.7	26789.0	0.051	1039.9	0.680	0.293	0.308	0.934	0.0249	0.161	0.115
P_{10}	9244.5	43554.9	0.066	982.5	0.657	0.266	0.285	0.925	0.0237	0.187	0.169

Notes to Table 8:
Where:

Mk. Cap.: Market Capitalization in millions;

Avg. Vol.: Average \$ Volume Previous Year is calculated over the previous year using CRSP database;

Disp.: $\text{Dispersion of Analysts' Forecasts} = \frac{\text{Standard Deviations of Analysts' Forecasts}}{\text{Consensus Median Forecasts}}$;

LTD: Long-Term Debt;

D/B: Long-Term Debt-to-Book ratio comes from Compustat;

D/E: Long-Term Debt-to-Market Value of Equity ratio comes from Compustat;

B/P: Book-to-market ratio comes from Compustat;

Beta: Five-year rolling beta is computed using CRSP database;

Std. Ret.: Standard Deviation of Daily returns is calculated over the previous year using CRSP database;

Turn: Average daily turnover is calculated over the previous year using CRSP database $= \frac{\text{Average \$ Volume}}{\text{Average Number of Shares}}$;

Momentum: Prior 6 month momentum is calculated using CRSP database.

Continued in the next page.

Table 8: continued from the previous page.

Panel B: P^s

	Mk. Cap.	Avg. Vol.	Disp.	LTD	D/B	D/E	B/P	Beta	Std. Ret.	Turn	Momentum
P^1	2225.4	7126.3	0.151	438.5	0.582	0.356	0.398	1.005	0.0247	0.107	0.065
P^2	2487.0	5425.2	0.122	357.5	0.573	0.346	0.438	0.999	0.0266	0.101	0.094
P^3	2703.5	5875.7	0.139	492.5	0.685	0.385	0.410	0.979	0.0268	0.115	0.130
P^4	2162.2	6850.3	0.137	468.4	0.594	0.362	0.395	0.973	0.0263	0.119	0.145
P^5	3663.6	10804.6	0.123	606.9	0.634	0.357	0.430	0.984	0.0255	0.164	0.130
P^6	5895.2	14405.7	0.084	885.1	0.720	0.314	0.355	0.992	0.0254	0.156	0.146
P^7	8727.3	22022.2	0.100	480.6	0.544	0.218	0.267	0.986	0.0266	0.167	0.134
P^8	11243.7	26902.1	0.095	837.1	0.473	0.178	0.276	0.962	0.0254	0.161	0.129
P^9	7853.4	20608.6	0.097	1140.5	0.703	0.289	0.305	0.971	0.0244	0.173	0.117
P^{10}	6698.4	24900.1	0.070	855.6	0.633	0.279	0.242	0.947	0.0234	0.154	0.180

Notes to Table 8:
Where:

Mk. Cap.: Market Capitalization in millions;

Avg. Vol.: Average $ Volume Previous Year is calculated over the previous year using CRSP database;

Disp.: Dispersion of Analysts' Forecasts $= \dfrac{\text{Standard Deviations of Analysts' Forecasts}}{\text{Consensus Median Forecasts}}$;

LTD: Long-Term Debt;

D/B: Long-Term Debt-to-Book ratio comes from Compustat;

D/E: Long-Term Debt-to-Market Value of Equity ratio comes from Compustat;

B/P: Book-to-market ratio comes from Compustat;

Beta: Five-year rolling beta is computed using CRSP database;

Std. Ret.: Standard Deviation of Daily returns is calculated over the previous year using CRSP database;

Turn: Average daily turnover is calculated over the previous year using CRSP database $= \dfrac{\text{Average } \$ \text{ Volume}}{\text{Average Number of Shares}}$;

Momentum: Prior 6 month momentum is calculated using CRSP database.

Table 9: Correlation Analysis among the Variable Representing Firm Characteristics

	P_q	P^s	r_1	LTG	Mk. Cap.	Avg. Vol	Disp.	D/B	D/E	B/P	Beta	Std. Ret	Turn	Momentum
P_q		0.782	0.472	0.067	0.138	0.084	-0.115	0.042	-0.034	-0.028	-0.080	0.043	0.089	0.152
P^s	0.765		0.001*	0.085	0.136	0.101	-0.121	0.047	-0.032	-0.034	-0.083	0.057	0.103	0.136
r_1	0.434	-0.001*		0.010*	0.040	0.004*	-0.017*	-0.003*	-0.018	0.003*	-0.009*	0.002*	0.010*	0.050
LTG	0.057	0.077	-0.001*		-0.239	-0.075	-0.131	-0.205	-0.287	-0.187	-0.119	0.462	0.148	0.088
Mk. Cap.	0.129	0.140	0.028	-0.082		0.881	-0.157	0.078	-0.122	-0.361	-0.167	-0.503	0.537	0.081
Avg. Vol	0.114	0.162	-0.002*	-0.022	0.773		-0.113	0.030	-0.139	-0.307	-0.099	-0.237	0.788	0.003*
Disp.	-0.033	-0.034	-0.009*	-0.016*	-0.023	-0.016*		0.139	0.253	0.321	0.184	0.099	-0.117	-0.111
D/B	0.025	0.021	0.004*	-0.101	-0.047	-0.037	0.036		0.896	0.157	0.048	-0.106	-0.085	-0.033
D/E	-0.039	-0.051	-0.006*	-0.150	-0.094	-0.087	0.067	0.717		0.373	0.192	-0.043	-0.216	-0.138
B/P	-0.062	-0.093	0.007*	-0.143	-0.126	-0.128	0.079	0.045	0.300		0.266	0.196	-0.305	-0.264
Beta	-0.084	-0.077	-0.015*	-0.113	-0.086	-0.083	0.037	0.050	0.157	0.209		0.166	-0.156	-0.153
Std. Ret	0.001	-0.007	0.010*	0.408	-0.149	-0.061	0.028	-0.022	0.046	0.186	0.169		-0.035	0.017
Turn	0.087	0.109	0.019	0.176	0.167	0.380	-0.021	-0.066	-0.116	-0.173	-0.147	0.082		0.043
Momentum	0.112	0.118	0.049	0.110	0.036	0.027	-0.032	-0.033	-0.136	-0.224	-0.153	0.064	0.049	

Notes to Table 9:

Spearman correlations are reported in the upper triangular matrix, Pearson correlations are reported in the lower triangular matrix.

The correlations are statistically significant at 5% level except that ∗ indicates that the correlation is <u>insignificant</u> at 5% level.

Where:

- **LTG :** Long-Term Growth from I/B/E/S;
- **Mk. Cap.:** Market Capitalization in millions;
- **Avg. Vol.:** Average $ Volume Previous Year is calculated over the previous year using CRSP database;
- **Disp.:** Dispersion of Analysts' Forecasts $= \dfrac{\text{Standard Deviations of Analysts' Forecasts}}{\text{Consensus Median Forecasts}}$;
- **D/B:** Long-Term Debt-to-Book ratio comes from Compustat;
- **D/E:** Long-Term Debt-to-Market Value of Equity ratio comes from Compustat;
- **B/P:** Book-to-market ratio comes from Compustat;
- **Beta:** Five-year rolling beta is computed using CRSP database;
- **Std. Ret.:** Standard Deviation of Daily returns is calculated over the previous year using CRSP database;
- **Turn:** Average daily turnover is calculated over the previous year using CRSP database $= \dfrac{\text{Average } \$ \text{ Volume}}{\text{Average Number of Shares}}$;
- **Momentum:** Prior 6 month momentum is calculated using CRSP database.

Table 10: Estimated Implied Cost of Capital

Panel A	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
r_1	11.6 %	11.8 %	13.7 %	13.2 %	17.5 %	13.6 %	13.2 %	10.3 %	14.9 %	14.3 %
	P^1	P^2	P^3	P^4	P^5	P^6	P^7	P^8	P^9	P^{10}
r_1	12.0 %	12.0 %	11.3 %	11.9 %	13.7 %	14.0 %	14.7 %	13.7 %	10.7 %	11.2 %

Notes to Panel A:

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_0 + \gamma_1 \cdot \frac{P_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0} \quad (15)$$

Where:

P_{j0} is the price of firm j at time t;

eps_{j0} is the earnings per share of firm j at time t;

bv_{j-1} is the book value of equity per share of firm j at time $t-1$;

r_1 is the estimated annual implied cost of capital.

Panel B	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}
r_2	11.7 %	12.1 %	14.1 %	13.0 %	17.7 %	14.2 %	12.3 %	10.3 %	14.8 %	3.8 %
	P^1	P^2	P^3	P^4	P^5	P^6	P^7	P^8	P^9	P^{10}
r_2	11.8 %	12.2 %	11.9 %	12.4 %	13.7 %	13.9 %	14.6 %	13.7 %	10.7 %	11.2 %

Notes to Panel B:

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_2 + \gamma_3 \cdot \frac{P_{j-1}}{bv_{j-1}} + \varepsilon_{j0} \quad (20)$$

Where:

P_{j-1} is the price of firm j at time $t-1$;

r_2 is the estimated annual implied cost of capital.

APPENDIX

Simultaneous Estimation of Implied Cost of Capital and Growth

The no arbitrate assumption is sufficient to derive the dividend discount model.[62] The price can be equated to the sum of discounted future stream of dividends. That is,

$$Pr_0 \equiv \sum_{t=1}^{\infty} \frac{dps_t}{(1+r)^t}. \tag{8}$$

Where:

$$P_q = \text{price per share at } t;$$

$$dps_t = \text{expected dividends per share at } t;$$

$$r = \text{implied cost of capital.}$$

The residual income model equates the price and book value and the present value of expected future abnormal earnings. Ohlson and Juettner-Nauroth (2000) show the following identity.

$$0 \equiv y_0 + \frac{y_1 - (1+r)y_0}{(1+r)} + \frac{y_2 - (1+r)y_1}{(1+r)^2} + \ldots$$

$$\equiv y_0 + \sum_{t=1}^{\infty} \frac{y_t - (1+r)y_{t-1}}{(1+r)^t} \quad \forall \ y_t \ \text{s.t.} \ \frac{y_t}{(1+r)^t} \xrightarrow[t\to\infty]{} 0 \tag{9}$$

The key in equation (9) is y_t. y_t can be any sequence of numbers as long as discounted value $\left(\frac{y_t}{(1+r)^t}\right)$ converges to zero in the long run.

Adding equations (8) and (9) yields:

$$Pr_0 = y_0 + \sum_{t=1}^{\infty} \frac{y_t + dps_t - (1+r)y_{t-1}}{(1+r)^t} \tag{10}$$

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[62]See Rubinstein (1976).

Without loss of generality, I can assume the discounted book value per share would converge to zero quickly. Let y_t replace book value per share at t,

$$y_t = bv_t \quad \text{Since} \quad \frac{bv_t}{(1+r)^t} \xrightarrow[t\to\infty]{} 0,$$

Where:

$$bv_t = \text{book value per share at } t.$$

equation (10) leads to the residual income model

$$
\begin{aligned}
Pr_0 &= bv_0 + \sum_{t=1}^{\infty} \frac{bv_t + dps_t - (1+r)bv_{t-1}}{(1+r)^t} \\
&= bv_0 + \sum_{t=1}^{\infty} \frac{z_t}{(1+r)^t}
\end{aligned}
\tag{11}
$$

where $z_t = eps_t - r \cdot bv_{t-1}$ by the Clean Surprise Condition.

If I assume that the abnormal earnings grow at g (i.e., $z_{t+1} = (1+g)z_t$), the residual income model (11) can be rearranged as

$$
\begin{aligned}
Pr_0 &= bv_0 + \frac{z_1}{r-g} \\
&= bv_0 + \frac{eps_1 - r \cdot bv_0}{r-g}.
\end{aligned}
\tag{12}
$$

Use of Pr_0 and eps_0

By definition, $eps_1 - r \cdot bv_0 = (eps_0 - r \cdot bv_{-1}) \cdot (1+g)$.

Then, equation (4) may be expressed as:

$$Pr_0 = bv_0 + \frac{eps_0 - r \cdot bv_{-1}}{r-g} \cdot (1+g) \tag{13}$$

where:

Pr_0 is the market price at time t;

bv_0 is the book value per share at time t;

bv_{-1} is the book value per share at time $t-1$;

eps_0 is the book value per share at time t;

r is the implied cost of capital;

g is the perpetual rate of growth of abnormal earnings.

Following Easton, Taylor, Shroff, and Sougiannis (2001), r is the internal cost of capital and g is the perpetual growth rate implied by the current market price, current book value of equity, lagged book value of equity, and current earnings. The implied cost of capital and growth rate for a portfolio can be calculated by the use of the intercept and slope coefficient of the following model.

$$\boxed{\frac{eps_0}{bv_{-1}} = r + \frac{r-g}{1+g} \cdot \frac{Pr_0 - bv_0}{bv_{-1}}} \tag{14}$$

Therefore, equation (14) may be expressed following the regression model.[63]

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_0 + \gamma_1 \cdot \frac{P_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0} \tag{15}$$

$$\gamma_0 = r_1$$

$$\gamma_1 = \frac{r_1 - g_1}{1 + g_1}$$

The error term, ε_{j0}, is related to the firm specific component of intercept and slope coefficients. Therefore, r and g will be considered as the average implied cost of capital

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[63] I avoid the equation $\frac{Pr_0 - bv_0}{bv_{-1}} = -r \cdot \frac{1+r}{r-g} + \frac{1+r}{r-g} \cdot \frac{eps_0}{bv_{-1}}$, although the equation has the same implications, since the coefficients estimated using the equation may be biased due to the potential error in the independent variable. That is, the current period earnings may contain measurement error in the sense that the market expects future earnings differently from the current earnings. Implied cost of capital is computed by the ratio of intercept to slope coefficient. However, both intercept and slope coefficient are estimated with error. See ETSS (2001), O'Hanlon and Steele (2000), and Geary (1930) for details.

and the growth for the firms included in the portfolio.[64]

The implied cost of capital and growth are estimated as

$$r_1 = \gamma_0 \tag{16}$$

$$g_1 = \frac{\gamma_0 - \gamma_1}{1 + \gamma_1} \tag{17}$$

Use of Pr_{-1} and eps_0

Using implied cost of capitalior period book value of equity, and current earnings are estimated.

Equation (4) may be expressed as follows at $t - 1$:

$$Pr_{-1} = bv_{-1} + \frac{eps_0 - r \cdot bv_{-1}}{r - g} \tag{18}$$

where:

Pr_{-1} is the market price at time $t - 1$;

bv_{-1} is the book value per share at time $t - 1$;

eps_0 is the book value per share at time t;

r is the implied cost of capital;

g is the perpetual rate of growth of abnormal earnings.

Therefore, equation (18) may be expressed as follows:

$$\boxed{\frac{eps_0}{bv_{-1}} = r + (r - g) \cdot \frac{Pr_{-1}}{bv_{-1}}} \tag{19}$$

By the linear relation between $\frac{eps_0}{bv_{-1}}$ and $\frac{Pr_{-1}}{bv_{-1}}$ in equation (19), the average implied cost of capital and the average growth rate of the portfolio firms can be estimated using

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[64]Since estimated r and g are quarterly implied cost of capital and growth, Tables 10 reports annualized numbers.

the following regression:

$$\frac{eps_{j0}}{bv_{j-1}} = \gamma_2 + \gamma_3 \cdot \frac{P_{j-1}}{bv_{j-1}} + \varepsilon_{j0} \tag{20}$$

$$\gamma_2 = g_2$$

$$\gamma_3 = r_2 - g_2$$

As in the prior section, the error term, ε_{j0}, is related to the firm specific component of intercept and slope coefficients. Therefore, the average implied cost of capital (r_2) and the average growth rate (g_2) are estimated from the intercept and slope coefficients. The implied cost of capital and growth are estimated as:

$$r_2 = \gamma_2 + \gamma_3 \tag{21}$$

$$g_2 = \gamma_2 \tag{22}$$