A Study of Meeting or Beating Analysts’ Forecasts of Earnings and Timeliness of Write-Offs

DISSERTATION

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By

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* * * * *

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ABSTRACT

Empirical evidence supports the notion that both reported earnings and analysts' forecasts of earnings are managed in response to a variety of incentives of managers. One of the important incentives to manage earnings and/or analysts' forecasts is to exceed the market's expectation. The purpose of this study is to explore issues associated with earnings management and/or forecast management. In this thesis, I will present two essays to investigate issues pertaining to earnings management and/or forecast management.

First, chapter 2 will explore earnings management and/or forecast management by examining whether the market rewards firms that persistently meet or beat analysts' forecasts of earnings. In particular, I will investigate the association between the pattern of meeting or beating expectations and the market reaction to the earnings announcement. Then, I will examine the association between these patterns and the firm-specific risk characteristics. By doing so, we can better understand the issues pertaining to the earnings management and forecast management, firm-specific risk, and market efficiency. The results provide compelling evidence that the earnings response coefficients are positively associated with the length of time of meeting or beating analysts' forecasts even after controlling for the growth and persistence of earnings. In addition, the negative correlation between the patterns of persistently
meeting or beating the earnings expectation and the proxies for firm-specific risk suggests that firms maintaining the patterns generally have lower firm-specific risk.

Chapter 3 examines the relation between asset write-offs in the financial statements and the associated change in security market prices. That is, I investigate whether the write-offs are recorded in a timely manner. Investigating the impact of write-offs on the financial market is important for at least two reasons. Write-offs could be one specific form of earnings management that managers of firms can strategically use to maintain a long string of meeting or beating analysts’ forecasts. Further, those items can have a significant impact on earnings and book value of assets. The result shows that the write-offs are not recorded in a timely manner. In addition, the significant association between lagged returns and the contemporaneous write-offs suggests that write-offs summarize underlying economic events of the past. Finally, it appears that the large write-offs provide some information content for future returns.
Dedicated to My Father and Mother
ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

A number of recent studies have provided evidence that both earnings and analysts' forecasts are managed in response to a variety of incentives of managers. Generally Accepted Accounting Principles (GAAP) allow managers to exercise discretion in financial reporting because they are considered to be highly knowledgable about the business and expected to exercise their judgement to reveal the true underlying economics of their firms. However, this flexibility also provides opportunities for managers to abuse their discretion.

The purpose of this study is to explore issues associated with earnings management and/or forecast management. I am particularly interested in the interactions between those issues and the capital market.

One of the important incentives of managers to have an impact on reported earnings and/or analysts' forecasts is the desire to exceed the market's expectation.¹ A number of studies have provided evidence that meeting the market's expectation of earnings is an important motive for earnings management. For example, DeFond and Park (1997) showed that managers are motivated to smooth income between

¹Degeorge, Patel, and Zeckhauser (1999) documented three thresholds that drive earnings management: (1) to report profit; (2) to sustain current performance; and (3) to meet analysts' forecasts.
periods to avoid disappointing market's expectations. They found that the managers of firms take advantage of upward (downward) management of earnings if current earnings are low (high). Abarbanell and Lehavy (2000) showed that analysts' stock recommendations are reflected in firms' incentives to manage earnings. They found that firms that have a Buy (Sell) recommendation are more (less) likely to engage in income-increasing earnings management to achieve the target of meeting or beating the expectation.

Alternatively, the popular business press has reported considerable anecdotal evidence of downward guidance of analysts' forecasts because in this way meeting or beating the estimates is made easier.² Recently, several studies have investigated managers' incentive in the context of expectation management. For example, Matsumoto (1999) provided evidence that managers of firms with higher growth, higher institutional ownership, and higher litigation risk are more likely to engage in downward guidance of analysts' forecasts to avoid market disappointment surrounding earnings announcements.

However, empirically isolating these two types of management is a difficult (if not impossible) task because neither of them is a subset of the other nor are they completely independent events. Thus, in this thesis, I do not attempt to capture the separate impacts of earnings management and forecast management on earnings

²For example, Fox (1997) reported: "...analysts rely heavily on guidance from companies to form their forecasts, and companies have in recent years figured out that it pays to guide the analysts' for a lower rather than a higher number." Similarly, Schonfeld (1998) commented concerning the 'guidance game': "Analysts have to guess how much a company will earn every quarter. But a company is allowed to provide the analysts' with clues, or so called guidance, about what it thinks earnings will be. This guidance number usually shows up as the consensus estimate among analysts. If the company's actual earnings meet or just beat the consensus, both the company and the analyst win: The stock goes up, and everyone looks smart."
surprise. Nor do I determine which components of earnings are manipulated upward or downward.

Nevertheless, a number of studies have documented clear evidence that earnings management and/or forecast management exist by examining the distribution of reported earnings and/or earnings surprises. This line of studies includes Burgstahler and Dichev (1997b), DeGeorge, Patel, and Zeckhauser (1999), Brown (1999), and Burgstahler and Eames (1999). The distribution of reported earnings and earnings surprises indicates that there is an unusually high (low) frequency of firms with slightly positive (negative) earnings, earnings changes, and earnings surprises. Similarly, Figure 2.3 and the associated discussion in chapter 2 of this thesis clearly support this prior evidence concerning the existence of earnings management and/or expectation management.

The remainder of this thesis proceeds as follows.

Chapter 2 explores earnings management and/or forecast management by examining whether firms' tendency to meet or beat analysts' forecasts of earnings has an effect on the security price of firms. Since the existence of earnings management and/or forecast management is not directly observable, I use the systematic patterns of meeting or beating analysts' forecasts as a proxy for evidence of earnings management and/or firm-provided guidance of analysts' forecasts. The underlying assumption is that firms exhibiting repeated success in meeting or beating analysts' forecasts are more likely to have engaged in earnings management and/or forecast

3 Healy and Wahlen (1999) document that these types of studies have the appealing feature that researchers do not have to estimate the potentially noisy abnormal accruals used for the earnings management.
management to exceed the market's expectation of earnings. It is extremely difficult to meet or beat analysts' forecasts repeatedly without expectation management even though the managers want to do so because the analysts may raise their earnings projections for those firms. However, increasing numbers of firms have persistently met or beaten the market's expectation since the early 90's. One example is CISCO Systems, a firm that had beaten analysts' earnings estimates by exactly one penny for 13 quarters in a row until it finally missed the expectation in February 2001.

An observed pattern of persistently meeting or beating the market's expectation may reflect either upward management of reported earnings (earnings management) and/or downward guidance of analysts' forecasts (forecast management). I investigate market rewards associated with persistently meeting or beating analysts' forecasts to explore managers' incentives for earnings management and/or forecast management to avoid earnings disappointment. In particular, I examine differences in earnings response coefficients as the number of consecutive times actual earnings are greater than or equal to the forecast increases.

---

4Cohen (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"."

5See Table 1.1 for details.
A number of articles in the financial press have alleged that the market anticipates and discounts systematic patterns of meeting or beating analysts' forecasts. Consistent with anecdotal evidence, I found that the market seems to efficiently interpret a systematic portion of earnings surprise as a firm persistently meets or beats the analysts' earnings forecasts. In addition, the increasing pattern of slope coefficients on unsystematic portions of earnings surprise suggests that the market rewards the firms that repeatedly meet or beat the analysts' earnings forecasts. The result also supports a conclusion that the patterns of meeting or beating analysts' forecasts are inversely associated with various firm risk characteristics. In other words, the increasing pattern of slope coefficients after controlling for growth and persistence of earnings suggests that the firm specific risk is decreasing as the firms persistently meet or beat analysts' forecasts of earnings.

A number of managers, accounting standard setters, regulators, financial press, and academics have been interested in asset write-offs. Although there are many issues pertaining to earnings management, one specific form of earnings management

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6For example, Hill (1999) commented concerning the market's interpretation of a systematic pattern of earnings surprise: "A company reports quarterly earnings that beat the First Call estimate, but the company's stock goes down. Why? More often than not, it's because the earnings fell short of the "whisper number"... Fast-growing technology companies like Microsoft (Nasdaq: MSFT) and Cisco Systems (Nasdaq: CSCO) almost always beat the consensus estimates (and usually by more than a penny) and so are regularly saddled with whisper numbers... Determining a whisper number may be as simple as gathering consensus earnings data and calculating an unweighted average of the difference between the consensus estimates and the actual earnings numbers for each of the last four quarters.... For selected companies, First Call has developed a history-based (rather than an insider-based) adjusted estimate called HISPERS (Historical SurPrise-based EaRnings)...."

7Since CISCO systems had beaten earnings estimates by one penny for 13 quarters, the market might have anticipated those patterns. In this case, the market systematically expects the firms to beat by one penny in the next quarter.

8The definitions of Systematic and Unsystematic portions of earnings are described on page 28.
that managers of firms can strategically use to smooth earnings to maintain a long string of meeting or beating analysts’ forecasts (i.e., income smoothing), or to clean up the bad performance of the past for a fresh start, is asset write-offs (i.e., big bath). On the one hand, Fox (1997) and Fox (2002) provided anecdotal evidence that write-offs are one of the widely used tools that managers strategically use to smooth earnings numbers to avoid market disappointment. On the other hand, SEC chairman Levitt (1998) expressed concern with respect to the increasing tendency for management to abuse “big bath” restructuring charges. MacDonald (1999) reported the SEC’s concern regarding the abuse of the big bath:

SEC has increasingly seen companies report “big bath” restructuring charges, in which they pad the costs for revamping their organization in order to clean up their balance sheet. The thinking is that by taking a big hit to earnings early on, Wall Street will look beyond this one-time loss and focus on future earnings growth, which will look more rosy as a result of the inflated charge.

In a similar vein, Byrnes and Henry (2001) commented on the profusion of big baths in bad times:

Critics contend that excess reserves are often used as a sort of “cookie jar” from which earnings can be taken in future quarters to meet Wall Street’s expectations....“People are going to write off everything they can

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9For example, in asserting that General Electric is one of the companies using the write-offs to smooth earnings, Kahn (2001) reported: “...GE never seems to have had a loss in one division that wasn’t happily offset by a gain in another; it never seems to have encountered a windfall profit that wasn’t smoothed away by a “one time” restructuring charge.”
in the next two quarters because they're having a bad year anyway," says Rover G. Atkins, a Mercer Management consultant.

Thus, in chapter 3 of this thesis, I investigate the issues associated with asset write-offs. Investigating the capital market implications of write-offs is particularly important because the write-offs have a significant impact on earnings and the book value of assets.

Zucca and Campbell (1992) documented that managers use write-offs to manage earnings. They found that there were many write-offs recorded when earnings were below expectation (i.e., big bath) or when earnings were above expectation (i.e., income smoothing). Similarly, Pourciau (1993) found that incoming executives manage earnings downward by taking large write-offs and increase earnings in subsequent years.

With respect to asset write-offs, anecdotal evidence shows that managers have plenty of discretion to manage the timing of write-offs to take action related to earnings management. For example, Heflin and Warfield (1997) found that the write-off may be delayed up to three years. In addition to the timing issue, the magnitude of the write-off amount is subject to manipulation.

I am particularly interested in the issues pertaining to the timeliness and magnitude of asset write-offs. In other words, I examine whether write-offs are recorded in a timely manner.\textsuperscript{10} In particular, I investigate the association between asset write-offs and the market return over a long window as a metric of testing the timeliness

\textsuperscript{10}The magnitude of asset write-offs is closely related to the timeliness of asset write-offs in a broad sense. For example, if a company decides to take one time large write-offs instead of a series of small write-offs, the magnitude of the write-offs would be significantly associated with the recognition timing of the write-offs.
of write-offs. In doing so, however, I do not attempt to argue that the accounting standard overemphasizes either credibility or timeliness in accounting data, while the evidence provided by this study will help many stakeholders including standard setters and regulators to assess the issues pertaining to write-offs.\textsuperscript{11}

A number of articles in the financial press provide anecdotal evidence supporting the expectation of a positive market reaction to the big bath announcement. For example, Bleakley (1995) observed that the market positively reacts to write-off announcements because a write-off, a one-time charge that reduces earnings, may signal the management’s intent to purge itself of money losing businesses or excessive costs.\textsuperscript{12} Therefore, in addition to long window association studies, I conduct a short window event study with respect to the information content of earnings announcements by investigating earnings response coefficients when firms concurrently report large write-offs. If the investors expect firms to take a big bath and subsequently to report improved performance, the market will react more favorably to the earnings surprise.\textsuperscript{13}

\textsuperscript{11}In asserting potential conflicts between timeliness and credibility of accounting information with respect to the alternative accounting standards, Healy and Wahlen (1999) noted: “...standards that over-emphasize credibility in accounting data are likely to lead to financial statements that provide less relevant and less timely information on a firm’s performance. Alternatively, standards that stress relevance and timeliness without appropriate consideration for credibility will generate accounting information that is viewed skeptically by financial report users....”

\textsuperscript{12}Similarly, with respect to CISCO’s example of this thesis, CNNfn (2001) reported that CISCO Systems announced restructuring including write-off and executives changes, and the market positively responded to the announcement.

\textsuperscript{13}Beaton and Miller (1986) addressed the issues regarding the magnitude of write-offs: “Wall Street analysts generally favor the “big bath” in one quarter over a series of write-downs in several quarters. The bath allows a company “to wash away all of its past problems in one quarter and clear the way for a surge in profits,” one analyst says, while a lingering series of write-downs “would probably erode the company’s reputation and its stock price.””
In summary, the correlations between lagged returns and write-offs are higher than the correlation between contemporaneous return and write-offs while the aggregate write-off is significantly associated with the aggregate return.\textsuperscript{14} This result suggests that write-offs are recorded in a less timely manner compared to other components of earnings. In addition, the negative association between future returns and write-offs indicates that the loss firms seem to boost future profits and substantially increase the future return by cleaning up the balance sheet. Supplementary to the negative association, the negative earnings response coefficients also suggest that the market interprets large one time write-offs as good news. This result seems to support the anecdotal evidence that "the bigger the bath, the better".

The next two chapters discuss these findings in detail. Chapter 4 summarizes the results of the thesis, and provides suggestions for future research. Appendix A explains how the implied cost of capital in chapter 2 is derived using the residual income model. Appendix B shows how the aggregate earnings and aggregate special items are measured in chapter 3.

\textsuperscript{14}The aggregation process for the test of the long window association study is reported in Appendix B.
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<td>-0.019</td>
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Notes:

* EAD = Earnings Announcement Date;
* QT = Fiscal quarter;
* eps<sup>a</sup> = Actual earnings per share;
* eps<sup>f</sup> = Forecasted earnings per share;
* es = Earnings surprise = eps<sup>a</sup> − eps<sup>f</sup>;
* Rt = Raw return at EAD;<br/>* * = Meet after rounding up to the nearest cent.

Table 1.1: Example: The Historical Pattern of CISCO Systems' Earnings Reports
CHAPTER 2

CHARACTERISTICS OF FIRMS THAT PERSISTENTLY MEET OR BEAT ANALYSTS’ FORECASTS

2.1 Introduction

The purpose of this chapter is to examine the effects of firms’ tendency to meet or beat the analysts’ forecasts of earnings on the earnings response coefficient (henceforth: ERC) and the firm-specific risk characteristics. This study is motivated by anecdotal evidence that firms have a strong incentive to meet or beat analysts’ forecasts. In 1998, 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....

Charan and Colvin (2001) observed that 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. It follows that managers have a strong incentive to take actions to ensure that reported earnings are equal to or greater than analysts’ forecasts. Managers can take two actions to avoid earnings disappointment. On the one hand, earnings can be managed upward to meet or beat analysts’ forecasts. On the other hand, analysts’ forecasts can be managed downward so that reported earnings will easily meet or beat them. Or, managers can take both actions simultaneously.

The characteristics of firms that repeatedly “meet or beat” analysts’ forecasts and their association with the consequent market reactions have rarely been examined in the extant literature. It is extremely difficult to meet or beat analysts’ forecasts repeatedly even though the managers want to do so. That is, it is more likely that firms exhibiting repeated success in meeting or beating analysts’ forecasts engage in earnings management and/or forecast management to exceed the market’s expectation of earnings.

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15See Table 1.1 on page 10 for details.

16Alternatively, the managers can take income decreasing actions if current earnings are high.

17Cohen (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.””

18Barth, 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.
In this study, I investigate the incentives for earnings management and/or forecast management by exploring the market’s rewards and characteristics of firms that persistently meet or beat analysts’ forecasts.

The first section of this chapter will examine patterns of repeatedly meeting or beating analysts’ forecasts and the association of these patterns and ERCs. I investigate whether the market rewards firms that repeatedly meet or beat the analysts’ forecasts as evidenced by greater ERCs (implicitly lower cost of capital). Easton and Zmijewski (1989) find that ERCs are a decreasing function of risk and an increasing function of earnings persistence.\(^{19}\) Hence, the ERC is negatively correlated with a firm’s systematic risk. 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 on these factors. I also investigate whether the market penalizes a firm’s first failure to meet the analysts’ forecasts after a long pattern of meeting or beating expectations.

Contrary to my expectation, the earnings response coefficients are not increasing as the firms persistently meet or beat the market’s expectation. Lopez and Rees (2002) provide evidence that the market adjusts analysts’ forecasts on the basis of the historical tendency of meeting or beating analysts’ forecasts. 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 in February 2001. In this case, the market may have anticipated CISCO Systems’ beating the analysts’

\(^{19}\)See also Collins and Kothari (1989) and Kormendi and Lipe (1987).
forecasts by one penny (the systematic portion of the earnings surprise).\footnote{Footnote 6 of chapter 1 describes how the market interprets systematic patterns of meeting or beating analysts’ forecasts.} If this systematic pattern is recognized by the market, the market may not significantly react to the difference between the forecast and the actual earnings.\footnote{Colvin (2002) provided documentation concerning the “guidance game” between investors and managers, saying: “...They wanted the real earnings forecast, and the infamous “whisper number” arrived. If a company didn’t beat that, its stock could fall even if it surpassed the published earnings consensus. So companies had to start guiding the whisper number too...”} Therefore, I investigate the effect of systematic patterns of meeting or beating on the market’s expectation. I use the mean of earnings surprise for the past four quarters as the systematic component of earnings surprise. 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 the market response to the unsystematic portion of earnings surprise is increasing almost monotonically with the length of time of meeting or beating the expectations.

Next, I will summarize the relation between the patterns of persistently meeting or beating the analysts’ forecasts and the firm characteristics, including various risk characteristics. If the increasing pattern of ERCs is significantly associated with firms’ specific risk and/or persistence of earnings, the proxies for these characteristics will be significantly associated with the pattern. For example, Gebhardt, Lee, and Swaminathan (2000) examined firm characteristics that are systematically related to the estimate of cost-of-capital (i.e., firm-specific risk). They found that a firm’s cost-of-capital is associated with its industry membership, book-to-market ratio, forecasted long term growth of earnings, and the dispersion in analysts’ earnings forecasts.
Likewise, 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 trading volume for the previous year, average daily share turnover for the previous year, standard deviation of daily return, and price momentum of the prior six months 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.

In a supplemental test, to investigate how the market interprets potentially managed earnings figures, I examine the relations between differences in the cost of capital implied by 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 takes income increasing actions to maintain the pattern of meeting or beating analysts' forecasts, the implied cost of capital (based on potentially managed earnings) will reveal an association between potentially managed earnings and stock prices. In other words, we can indirectly see how the market interprets the earnings number. The result provides evidence that 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 result indicates that market participants recognize the potentially managed earnings, and this managed portion is reflected in the price reaction to earnings announcement.

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22See equation 2.7 on page 39 for details.
The remainder of this chapter is organized as follows. The next section reviews the literature related to this study. Section 2.3 describes the research design. Data and summary statistics are presented in Section 2.6. The results are presented and discussed in Section 2.5. A summary is provided in Section 2.6.

2.2 Review of Related Literature

This section summarizes previous literature related to this study. The extant literature investigates the motivation for managers to reduce negative earnings surprises.

A number of recent papers document evidence of earnings management to meet earnings forecasts. DeFond and Park (1997) focus on accruals to examine earnings management. They 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. Conversely, they use discretionary accruals to reduce current income when the firms are experiencing “good” performance in the current period.

Similarly, Kasznik (1999) provides evidence that firms with overestimated earnings have significantly larger discretionary accruals that are positively associated with litigation cost proxies. He interprets the result as evidence that managers of these firms use discretionary accruals to manage earnings to avoid negative earnings surprise.

Degeorge, Patel and Zeckhauser (1999) identify three thresholds that drive earnings management: (1) to report a profit; (2) to sustain current performance; and (3) to meet analysts’ forecasts. They report that meeting or beating the expectation is one of the three thresholds that management tries to attain.
Payne and Robb (2000) find that managers have an incentive to increase income to “meet or beat” analysts’ consensus forecasts when the dispersion of earnings forecasts is “low”.

These studies argue that the findings show managers’ motivation to manipulate earnings to ensure that the market is not disappointed.

Several recent studies, on the other hand, report that an increasing number of firms use short-horizon earnings guidance to pre-warn investors about forthcoming unfavorable earnings.

Francis, Philbrick and Schipper (1994), Skinner (1997), and Soffer, Thiagarajan, and Walther (2000) find that managers preannounce bad news to avoid negative earnings surprise.

Kasznik and Lev (1995) show that firms in high-litigation industries are more likely to preannounce bad news before large earnings surprise.

Several papers provide indirect evidence of earnings management and/or forecast management by investigating the distribution of reported earnings and/or earnings surprise. 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. These studies hypothesize that managers have incentives to avoid reporting negative earnings. They argue that the unusually low frequency of small negative earnings is evidence of upward management of earnings.

In addition to avoiding reporting loss, a number of studies argue that managers have incentive to avoid missing the market’s expectation of earnings. Burgstahler and Eames (1999) argue that managers take actions to avoid negative earnings surprises based on the observation that the frequency of zero and slightly positive earnings
surprises is unusually high and the frequency of slightly negative earnings surprises is unusually low. In addition, they show that earnings can be managed upward and/or analysts’ forecasts can be managed downward. Thus, firms may meet or beat analysts’ forecasts through earnings management and/or forecast management.

Similarly, Brown (1999) finds that zero and small positive earnings surprises have been common and small negative surprises have been unusually rare in recent years. He also reports that firms expecting positive earnings have significant incentive to meet or beat analysts’ forecasts. He 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. In addition, he shows that analysts’ forecasts are pessimistically biased when firms report profits (85.3% of the sample).

Other studies of earnings management have examined the market rewards associated with meeting or beating analysts’ forecasts.

Bartov, Givoly, and Hayn (2000) find that firms that meet or beat analysts’ forecasts have almost 3% higher quarterly returns than firms that miss the expectation. They argue that meeting or beating analysts’ forecasts obtained through both earnings management and expectation management are informative of the firms’ future performance. They also address the issue that the increase in the premium associated with meeting or beating the market’s expectation suggests increase in incentive to avoid earnings disappointment over recent years.

Similarly, 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 firms that
miss the forecasts. They show that the market premium is associated with repeatedly meeting analysts’ forecasts for up to three years.

This research can be viewed as an extension of Lopez and Rees (2002), with a focus on the link between the magnitude of price response to the consecutive meeting or beating the expectation and various firm characteristics. To measure the unexpected portion of earnings surprise, I adapt the notion of systematic and unsystematic portions of earnings surprise developed by Lopez and Rees (2002). To examine how the market interprets the prior history of systematic beating, Lopez and Rees (2002) examined the earning response coefficients of firms that have beaten analysts’ forecasts for five quarters including the current quarter. They found that the market rewards the firms that exceed the expectation by providing a higher earnings multiple after controlling for prior history of beating expectations.

2.3 Research Design

2.3.1 Portfolio Formation

To identify observations that persistently meet or beat analysts’ forecasts, I partition the sample by the number of consecutive quarters of meeting or beating analysts’ forecasts. That is, to determine whether ERCs, risk characteristics, and implied costs of capital are associated with the pattern of meeting or 'beating analysts’ forecasts, I construct portfolios on the basis of the number of quarters for which earnings
surprises \( (e\sigma_{jt}) \) are greater than or equal to zero.\(^{23}\) Then, I calculate ERCs, risk characteristics, and implied costs of capital for the portfolios of stocks.

Details of the portfolio formation procedure are as follows. If a firm meets or beats analysts’ forecasts for “q” consecutive quarters, the firm is assigned to portfolio \( P_q \).\(^{24}\) These portfolios are used to investigate whether the ERCs and other characteristics are associated with the length of time over which the firm meets or beats analysts’ forecasts.

The bottom row of Table 2.1 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 not analyzed because there are not enough observations in each portfolio for a statistical test.

The last column of Table 2.1 shows \textit{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.\(^{25}\)

---

\(^{23}\)Baber and Kang (2002) document that earnings surprises based on the I/B/E/S database are biased toward zero due to rounding of the split-adjusted forecasts of earnings. Thus, to check the potential effect of stock split on the results, I constructed portfolios based on the number of quarters for which earnings surprises are strictly greater than zero. The results were qualitatively similar.

\(^{24}\)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 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 \textit{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.

\(^{25}\)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 \( P^7 \).
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<td></td>
<td>$P_{10}$</td>
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</table>

Table 2.1: Portfolio Formation

difference in ERCs, risk characteristics, and implied costs of capital 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 growth from the other firms meeting or beating forecasts for shorter periods.

For each cell inside Table 2.1, $P^s_q$ indicates the $q^{th}$ quarter of meeting or beating analysts’ forecasts for a firm that has met or beaten analysts’ forecasts “$s$” consecutive times overall.\textsuperscript{26}

\textsuperscript{26}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 $6^{th}$ quarter of meeting or beating (i.e., the third quarter in 1995), is included in $P^7_6$.  

21
2.3.2 Earnings Response Coefficient

The aim of this section is to 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 forecast.

Consistent with prior studies, I hypothesize that 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.\textsuperscript{27} 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 consecutively 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 future earnings, the persistence of current earnings surprise will affect expected future earnings and revise

\textsuperscript{27}Similarly, Imhoff and Lobo (1992) found that firms with relatively less \textit{ex ante} uncertainty in earnings have larger earnings response coefficients.
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 for 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., $\text{ERC} = f(\text{risk}, \text{growth}, \text{persistence})$). The impact of these factors on ERC will be examined in regression analysis.

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.\(^{28}\)

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, $\text{eps}_{jt}^a$. Earnings surprise ($\text{es}_{jt}$) is measured as the actual earnings per share ($\text{eps}_{jt}^a$) less the most recent forecast ($\text{eps}_{jt}^f$) prior to the earnings announcement of the quarter from the I/B/E/S database.\(^{29}\) These variables are deflated by beginning-of-period price.

\(^{28}\)I use the short window event study approach to reduce the correlated omitted variables problem. In contrast, Kaszaik and McNichols (2001) examine whether firms achieve higher market prices by meeting analysts' forecasts using annual market adjusted returns.

\(^{29}\)The results are qualitatively similar when I/B/E/S mean and median estimates are used.
Variable Definition

\( j \) = denotes firms;

\( t \) = denotes quarters;

\( eps^a_{jt} \) = actual earnings per share for quarter \( t \);

\( eps^f_{jt} \) = 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 = \( \frac{eps^a_{jt} - eps^f_{jt}}{P_{jt-1}} \).

Regression 2.1:

\[
CAR_{jt} = \alpha_1 + \sum_{q=2}^{10} \alpha_q \cdot d_q + \beta_1 \cdot es_{jt} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt} + \epsilon_{jt} \quad (2.1)
\]

\( d_q \) = indicator variables; \( \forall \ q = 2, 3, \ldots, 10 \)

\[
\begin{cases} 
1 & \text{if } es_{jt} \geq 0 \text{ for } q^{th} \text{ consecutive quarters}, \\
0 & \text{otherwise}.
\end{cases}
\]
The basic hypothesis of the first regression is that the difference in ERCs between partitions is driven by a different response to earnings surprise of each portfolio. Note that this regression equation tests whether the market revises its expectations based on how many times a firm meets or beats the expectation. If the market rewards firms persistently meeting or beating analysts’ forecasts, 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.

**Hypothesis 2.1** The earnings response coefficients are greater for the firms that persistently meet or beat analysts’ forecasts.

The slope coefficient $\beta_q$ is an estimate of the different reactions to the same amount of earnings surprise. Thus, if the hypothesis is not rejected, 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 estimates of the coefficients are significantly greater than zero.$^{30}$

---

$^{30}$I include year dummy variables to control for the year effects. The results are qualitatively very similar with or without year dummy variables.
Regression 2.2:

\[
CAP_{jt} = \alpha^1 + \sum_{s=2}^{10} \alpha^s \cdot d_s + \beta^1 \cdot es_{jt} + \sum_{s=2}^{10} \beta^s \cdot d_s \cdot es_{jt} + \varepsilon_{jt} \tag{2.2}
\]

\(d_s = \text{indicator variables; } \forall \ s = 2, 3, \ldots, 10\)

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

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. Thus, 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 (2.2) is examined. 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 2.2 measures difference in ERCs for the last column of Table 2.1.

**Hypothesis 2.2** The earnings response coefficients are greater for firms that persistently meet or beat analysts’ forecast for a longer period overall.
The test of the hypothesis sheds light on whether the market believes firms with certain characteristics are more likely to meet or beat analysts’ forecasts for longer periods.\textsuperscript{31} 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 (2.2).

I also examine whether the market penalizes the firms when a meeting or beating pattern is broken if the ERCs reveal increasing patterns in regression 2.1. 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 dissipate 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 anticipates the missing analysts’ forecasts before the date of the earnings announcement and sufficiently adjusts to the bad news, the pattern of incremental ERCs may not appear.\textsuperscript{32}

\textsuperscript{31}For example, prior studies showed that managers of firms with higher growth want to avoid market disappointment.

\textsuperscript{32}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.
Regression 2.3:

\[ CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_p \cdot d_q + \beta_1 \cdot es_{jt}^{sys} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt}^{sys} \]

\[ + \gamma_1 \cdot es_{jt}^{unsys} + \sum_{q=2}^{10} \gamma_q \cdot d_q \cdot es_{jt}^{unsys} + \varepsilon_{jt} \]

(2.3)

\[ es^{sys} : \text{Systematic Earnings Surprise} \]

\[ = \text{Mean of Earnings Surprise for the Past 4 Quarters;} \]

\[ es^{unsys} : \text{Unsystematic Earnings Surprise} \]

\[ = \text{Earnings Surprise - Mean of Earnings Surprise for the Past 4 Quarters.} \]

Next, anecdotal evidence shows that the market efficiently anticipates earnings surprise for firms persistently meeting or beating the expectations and punishes the firms showing systematic behavior.\(^3\) Thus, to test whether the market sees through the systematic amount of beating based on the past pattern of a firm, I split unexpected earnings into a systematic component of unexpected earnings and an unsystematic component of unexpected earnings.\(^4\) I impose the assumption that the systematic component of unexpected earnings, \(es^{sys}\), is the mean of earnings surprise

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\(^3\)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.”

\(^4\)See footnote 7 of chapter 1 for an example of CISCO Systems.
for the past 4 quarters.\textsuperscript{35} By this partition, the unsystematic component of unexpected earnings, \( es^{\text{unsy}} \), is defined as \( es - es^{\text{sys}} \). The slope coefficients on systematic and unsystematic components of earnings surprise are analogous to ERCs. If the market discounts the systematic component of earnings surprise, the coefficients on \( es^{\text{sys}} \) should be insignificant.\textsuperscript{36}

If the estimates of coefficients are insignificant or negative, the result would suggest the market discounts the systematic behavior of persistently meeting or beating analysts' forecasts.

**Hypothesis 2.3** The market response to the unsystematic components of earnings surprise will be significantly greater for firms that persistently meet or beat analysts' forecasts.

I predict that the earnings response coefficients on \( es^{\text{sys}} \) will not be significantly different from zero.\textsuperscript{37} In addition, the earnings response coefficients on \( es^{\text{unsy}} \) will show an increasing pattern as firms persistently meet or beat analysts' forecasts. If the coefficients on \( es^{\text{unsy}} \) show an increasing pattern, this would suggest the market

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\textsuperscript{35}Lopez and Reece (2002) 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 and the median unexpected earnings for the past 4 quarters. The result was qualitatively very similar.

\textsuperscript{36}Anecdotal evidence has documented that the market discounts the expected portion of earnings surprise. For example, Ip (1997) cites Drew Peck, an analyst at Cowen & Co.: "...Mr. Peck acknowledged in an interview yesterday that although he thought the company would beat his estimate, he saw no point in changing it because most investors knew the whisper number and were discounting it."

\textsuperscript{37}In this chapter, I will use the terms earnings response coefficient on \( es^{\text{sys}} \) (\( es^{\text{unsy}} \)) and slope coefficient on \( es^{\text{sys}} \) (\( es^{\text{unsy}} \)) synonymously.
responds to the unsystematic portion of earnings surprise for the firms persistently meeting or beating analysts’ forecasts.38

Regression 2.4:

\[
CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_p \cdot d_q + \beta_1 \cdot es_{jt}^{sys} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt}^{sys} \\
+ \gamma_1 \cdot es_{jt}^{unsys} + \sum_{q=2}^{10} \gamma_q \cdot d_q \cdot es_{jt}^{unsys} \\
+ \delta_1 \cdot SC_{jt} + \delta_2 \cdot SC_{jt} \cdot es_{jt}^{sys} + \delta_3 \cdot SC_{jt} \cdot es_{jt}^{unsys} + \varepsilon_{jt} \quad (2.4)
\]

\(es^{sys} \): 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;

\(SC \): Proxy for Growth and Persistence of Earnings

= Serial Correlation of Quarterly Earnings for Past 5 Years.

38The financial press has provided anecdotal evidence that the market reacts favorably for meeting or beating the unsystematic portion of the earnings surprise. For example, Blumenthal (2000) cites Paul Hauck, co-founder of whispernumber.com: “...Companies would beat the consensus number and the stock wouldn’t move... a stock that beats the whisper number has a 70% chance of rising over one, five and 10 trading days...."
Last, previous studies suggested several variables for growth and persistent earnings as determinants of ERCs. Hence, I included the estimate of the serial correlation of quarterly earnings for past five years as a proxy for earnings growth and persistence. By doing this I will test whether the market responds differently to the unsystematic amount of beating based on the past pattern of a firm after controlling for the past growth and persistence of earnings. If the increasing pattern of ERCs is due to persistence and growth, the estimates of the coefficients on \( es^{uns} \) should not be significantly different from zero. Estimates of the coefficients on \( es^{uns} \) and \( SC \times es^{uns} \) that are significantly different from zero would suggest that the market revises the risk of the firms that persistently meet or beat analysts’ forecasts.

**Hypothesis 2.4** The market response to the unsystematic components of earnings surprise will be significantly greater for firms that persistently meet or beat analysts’ forecasts after controlling for the persistence of earnings.

I predict that the earnings response coefficients on \( es^{sys} \) will be insignificant and the earnings response coefficients on \( es^{uns} \) will show increasing patterns as the firms persistently meet or beat analysts’ forecasts. In addition, I expect the slope coefficient on \( SC \times es^{uns} \) to be significantly greater than zero.

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39I also used book-to-price ratio, average percentage change in earnings for past 5 years, and rank of serial correlation of quarterly earnings for past 5 years as proxies for growth and persistence of earnings. The results were qualitatively similar.
2.3.3 Firm Characteristics

Prior studies show that firms have significant incentives to meet or beat analysts’ forecasts 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 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.

Liquidity and Information

A number of studies suggest that large firms are more pessimistically biased in analysts’ forecasts.\textsuperscript{40} 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 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

\textsuperscript{40}For example, Bhushan (1989), Brown (1999), and Richardson, Teoh, and Wysocki (2000)
firms are more optimistically biased. If the argument is accepted, smaller firms are less likely to persistently meet or beat analysts’ forecasts. Likewise, I expect that Dollar trading volume (Avg. Voi) will show the same pattern as the size variable.

**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 the patterns of meeting or beating analysts’ forecasts.

**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/M shows debt-to-market ratio. I predict that D/B and D/M are significantly negatively associated with the patterns of meeting or beating analysts’ forecasts.

**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 the patterns of meeting or beating analysts’ forecasts.

Other Pricing Anomalies

B/P reports book-to-price ratio. Skinner and Sloan (1999) found 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 the patterns of meeting or beating analysts’ forecasts. 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 the patterns of meeting or beating analysts’ forecasts. Turn indicates average daily turnover for the previous year, that is, dollar trading volume deflated by average number of shares in the previous year. Firms persistently meeting or beating forecasts will have a higher turnover ratio. Turn will be positively correlated with the patterns of meeting or beating analysts’ forecasts. The next factor 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 \textit{Momentum} and the patterns of meeting or beating analysts' forecasts is anticipated.

\subsection{2.3.4 Supplemental Test: Implied Cost of Capital}

The extant literature documents that managers may manipulate earnings upward 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 a 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 to manage reported accounting earnings upward. 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.\footnote{Note that the implied cost of capital is not the true cost of capital if the reported earnings figures are managed.} The effect of meeting or beating the expectation on the implied cost of capital will be discussed in the framework of the residual income valuation model. I use the residual income valuation model to explore implied cost of capital. Easton, Tayler, Shroff, and Sougiannis (2001) simultaneously estimate growth and the internal rate of return for a portfolio of stocks using the residual income model based on analysts' forecasts of accounting earnings for the subsequent four years.\footnote{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.} The main advantage
of their approach is that the estimation procedure is not dependent on an arbitrary expected growth assumption. Unlike prior studies, this approach simultaneously estimates the implied cost of capital and the expected rate of growth. The present research uses a similar methodology, but differs in its perspective. The main difference between this study and the literature described above is that this study uses reported accounting numbers instead of earnings forecasts to estimate the 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. The residual income valuation model equates current market price with book value and the present value of the sum of expected future abnormal earnings.

\[
P_{r_0} = \sum_{t=1}^{\infty} \frac{dps_t}{(1 + r)^t},
\]

\[
= bv_0 + \frac{eps_{t1} - r \cdot bv_0}{r - g}. 
\]  

(2.5)

---

43 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:

\[ Pr_0 = \text{price per share at time } t; \]
\[ bv_0 = \text{book value per share at time } 0; \]
\[ eps_1 = \text{book value per share at time } 1; \]
\[ dps_t = \text{expected dividends per share at } t; \]
\[ r = \text{implied cost of capital}; \]
\[ g = \text{perpetual rate of growth of abnormal earnings}. \]

I will estimate the implied cost of capital that the market implicitly uses to incorporate reported earnings figures into the stock price after controlling for expected growth rate. Figure 2.1 shows the timeline for variables used to estimate the implied cost of capital.

![Timeline for Measurement of Variables](image)

Notes:

- \( EAD_0 \) is the earnings announcement date of firm \( j \) at time \( Q_0 \);
- \( EAD_{-1} \) is the earnings announcement date of firm \( j \) at time \( Q_{-1} \).

**Figure 2.1: Timeline for Measurement of Variables**

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 book value of equity, lagged book value of equity, and current earnings. The
key point of the ETSS (2001) methodology is that the residual income model (2.5) 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 (2.5) may be expressed following the regression model.\(^4^4\)

\[
\frac{eps_{j0}}{bv_{j-1}} = \gamma_0 + \gamma_1 \cdot \frac{Pr_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0} = \gamma_0 + \gamma_1 \cdot \frac{Pr_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0}
\]  

(2.6)

where:

\(Pr_{t0} = \) market price at time \(t\);

\(bv_{t0} = \) book value per share at time \(t\);

\(bv_{t-1} = \) book value per share at time \(t - 1\);

\(eps_{t0} = \) book value per share at time \(t\);

\(r_1 = \) implied cost of capital.

**Hypothesis 2.5** The implied cost of capital will be significantly greater for firms that persistently meet or beat analysts’ forecasts.

This hypothesis is tested to examine whether the market efficiently interprets reported earnings of a firm that potentially engages in upward management of earnings

\(^{4^4}\)The detail of the derivation procedure is provided in Appendix A

38
to maintain the pattern of persistently meeting or beating the analysts' forecasts. The intuition is that current earnings ($ε_{0}^{T}$) are decomposed into true earnings ($ε_{0}^{T}$) and managed earnings ($ε_{0}^{M}$),

$$ε_{0} = ε_{0}^{T} + ε_{0}^{M}.$$  \hspace{1cm} (2.7)

If $ε_{0}^{M} > 0$ to manage earnings upward, the dependent variable ($\frac{ε_{0}}{bv_{-1}}$) is inflated. However, the market interprets the earnings figure as $ε_{0}^{T}$ (i.e., $Pr_{j0}$ on the independent variable is discounted as if the true earnings were $ε_{0} - ε_{0}^{M}$). 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.\(^{45}\) 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.\(^{46}\)

As an additional 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 (2.5) may be expressed as in the following regression model.

\(^{45}\)The necessary condition for this argument is that there is at least one $j$ satisfying $\frac{Pr_{j0}}{Pr_{j0}} < 0$. In other words,

$$\frac{Pr_{j0} - bv_{j0}}{bv_{j-1}} > \frac{n}{n-1}.$$  \hspace{1cm} (2.8)

\(^{46}\)If we constructed an unmanaged dependent variable $\frac{ε_{0}}{bv_{-1}}$ for use in the regression 2.6, I predict decreasing pattern of the implied cost of capital. 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%.
\[
\frac{eps_{j0}}{bv_{j-1}} = \gamma_2 + \gamma_3 \cdot \frac{Pr_{j-1}}{bv_{j-1}} + \varepsilon_{j0} \\
r_2 = \gamma_2 + \gamma_3
\] 

where:

\(Pr_{t-1}\) = market price at time \(t - 1\);
\(bv_{t-1}\) = book value per share at time \(t - 1\);
\(eps_{t0}\) = book value per share at time \(t\);
\(r_2\) = implied cost of capital.

Equation (2.9) 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 than actual earnings, the difference should be embedded in the prices in equations (2.6) and (2.9). 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, the \(r\)'s estimated using the two equations will be different.

### 2.4 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.\footnote{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.”} I also have collected 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 observations are included in the final sample if they satisfy the following criteria:

1. earnings are positive;\footnote{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, Pauel, 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.}

2. return and price data are available;

3. book value of equity is available;
4. I/B/E/S forecast data are available.

To investigate the pattern of persistently meeting or beating the expectation, I first outline descriptive statistics for the sample. 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.\(^4^9\) 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 market adjusted returns. The top and bottom one percentile of observations based on market adjusted returns and the top one percentile of observations based on earnings surprise are simultaneously eliminated.\(^5^0\) The total number of observations in the final sample is 21,550. The number of observations monotonically increase from 401 in 1984 to 2,387 in 1999.\(^5^1\) 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

\(^4^9\)I also conducted the same analysis up to 20 consecutive quarters. Even though the result was similar, I delete those observations to maintain a sufficient number of observations for each portfolio for the statistical tests.

\(^5^0\)I do not delete the bottom one percentile of earnings surprise since the sample does not include negative earnings surprise.

\(^5^1\)I have only 174 observations in 2000 since the complete data was not available at the time of research.
missing the expectations with profits while there are 4,583 firms persistently missing the forecasts with losses.\footnote{I also test up to 10 consecutive misses for this analysis.}

To compute risk characteristics and implied cost of capital, I also collected number of shares outstanding, long-term debt, trading volume, returns, prices, book value, and earnings from the CRSP and Compustat databases. Book values and earnings less than or equal to zero are deleted since they are meaningless in computing implied cost of capital. In addition, the top and bottom one percentile of observations are simultaneously deleted based on the regression variables $\frac{\text{EPS}}{\text{bt}_{-1}}$ and $\frac{\text{pr}_{-1}}{\text{bt}_{-1}}$. The total number of observations used to compute implied cost of capital is 12,614.

Table 2.2 shows descriptive statistics for each variable used to estimate the earnings response coefficients. Earnings surprise deflated by price and market adjusted return, $\frac{\text{ES}}{\text{price}}$ and CAR, are the variables of interest. The mean earnings surprise, $\frac{\text{ES}}{\text{price}}$, and mean market adjusted returns decrease as firms persistently meet or beat analysts' forecasts. The abnormal earnings decrease as a firm persistently meets or beats the market's expectation.\footnote{Clement, Frankel, and Miller (2000)) document that the abnormal earnings are inversely related to firm size. Panel A of Table 2.9 shows that the size is monotonically increasing with the pattern.}

Table 2.3 shows temporal changes of earnings surprises over 17 years. Consistent with recent studies, ES in the 80's were greater than ES in the 90's. ES were monotonically decreasing in the 80's while they were relatively stable in the 90's. Consistent with the prior studies, the mean ES decreases from a high of 0.0888 in 1984 to a low of 0.0284 in 1998.\footnote{For example, Richardson, Teoh, and Wysocki (2000)} The following figures give visual evidence that
managers potentially manage earnings and/or forecasts to meet or beat the market's expectations persistently.

Figure 2.2 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 may suggest that managers prefer to reach or slightly exceed analysts' forecasts, especially when they have met or beaten analysts' forecasts for multiple periods.\textsuperscript{55} The unusually high frequency of small positive earnings surprises for the firms that repeatedly meet or beat analysts' forecasts can be regarded as an evidence of earnings management and/or forecast management.\textsuperscript{56} That is, the frequency of the firms' consecutively meeting and/or beating analysts' forecasts is greater than it would be if the frequency occurred by chance. 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 $P_9$. In other words, 75.4% of firms in $P_9$ will meet or beat analysts' forecasts again in the

\textsuperscript{55}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' forecasts for multiple periods; analysts seem to increase earnings expectations for firms with a greater tendency to meet or beat analysts' forecasts.

\textsuperscript{56}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.
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.\textsuperscript{57}

Figure 2.3 shows a histogram of the earnings surprise variable, including persistently missing, meeting, and beating analysts’ forecasts.\textsuperscript{58} 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.\textsuperscript{59} There is an unusually large number of observations in the first interval to the right of zero compared to small negative earnings surprise (the first interval to the left of zero). Interestingly, loss firms have an unusually high frequency of large negative earnings surprises compared to large positive earnings surprise.

\textsuperscript{57}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 earnings.

\textsuperscript{58}The earnings surprise deflated by reported earnings per share shows very similar figures.

\textsuperscript{59}Brown (1999) reports that when a loss is reported, the managers do not care about meeting or beating analysts’ forecasts.
Figure 2.4 summarizes the revision of earnings forecasts for each portfolio. The revisions of the earnings forecasts and the standard deviation of analysts’ forecasts over the quarter are compared. Earnings forecast is generally increasing while the standard deviation of analysts’ forecasts is monotonically decreasing from $P_1$ to $P_{10}$. This result provides evidence that the analysts increase the expectation of earnings as the firms persistently meet or beat the expectations. The bottom graphs show the same variables for portfolios $P^5$. 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 decreasing monotonically from $P_1$ to $P_{10}$. Taken with the decreasing pattern of the earnings surprise in Table 2.2, the decreasing dispersion suggests that the pattern of meeting or beating the expectations actually decreases uncertainty among investors.

Interestingly, the first graph reveals a downward revision of the most recent 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, $P_5$ and $P_{10}$ show upward revision. This evidence may

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60 The $5^{th}$ or greater revisions are included in the $4^{th}$ revision.

61 The long term growth and number of analysts are also increasing over the patterns.

62 For example, Morse, Stephan, and Stice (1991) and Baginski, Conrad, and Hassel (1993) document that large earnings surprise can increase the standard deviation of analysts’ forecasts and increase the uncertainty in the market.
suggest that the analysts are increasing their expectations for firms that persistently meet or beat analysts forecasts.\textsuperscript{63}

As would be expected, the last revision has lower standard deviation of analysts’ forecasts.\textsuperscript{64} This decline may be attributable to the short-horizon earnings guidance of the companies, among other things.

Figure 2.5 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 since the managers of those firms may have greater incentive to avoid earnings disappointment.

The right-hand graph of Figure 2.5 shows that analysts’ forecasts do not change from optimistic to pessimistic in the quarterly forecasts.\textsuperscript{65}

Instead, optimistic forecasts are decreasing, unbiased forecasts are increasing and pessimistic forecasts are decreasing. Pessimistic change is decreasing in recent years. Surprisingly, the left-hand graph of Figure 2.5 shows that the relative frequency of

\textsuperscript{63}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.

\textsuperscript{64}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.

\textsuperscript{65}Optimistic, unbiased, and pessimistic are defined as follows:

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

Matsumoto (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 associated with the pessimistic forecasts are issuance of new equity, growth, market-to-book ratios, size, profit, and litigation risk. Likewise, this study finds that those factors are strongly associated with the patterns of meeting or beating analysts’ forecasts. The association between the firm characteristics and the patterns of meeting or beating analysts’ forecasts will be discussed in the next section.

Descriptive statistics for variables used in computing implied cost of capital

Table 2.4 shows descriptive statistics for variables used in estimating the implied cost of capital. The top half of the first column indicates the $q^{th}$ quarter of 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., $P^a$).
The remaining columns of Table 2.4 show descriptive statistics for mean values of the regression variables. Key variables are $\frac{eps_{j0}}{bv_{j-1}}$, $P_{j0} - bv_{j0}$, and $\frac{Pr_{-1}}{bv_{-1}}$, respectively. The mean $\frac{eps_{j0}}{bv_{j-1}}$ 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 $P_3$. $\frac{Pr_{-1}}{bv_{-1}}$ 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.\(^{66}\) 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 (2.8). In other words, $\frac{P_{j0} - bv_{j0}}{bv_{j-1}} > 0$ except for $P_1$.\(^{67}\) 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 the market premium by definition. 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 $P^g$. 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 $P^g$. This result is consistent with prior findings in the sense that the growth firms have more incentive to meet or beat the market’s expectation.

\(^{66}\)Kaszniak and McNichols (2001) also show that reported earnings and share prices are higher for firms meeting expectations.

\(^{67}\)However, this condition is not sufficient. The sufficient condition is $\frac{P_{j0} - bv_{j0}}{bv_{j-1}} \geq 0$ for all $j$.  

49
2.5 Empirical Result

2.5.1 Earnings Response Coefficients

Easton and Zmijewski (1989) showed that the ERCs are negatively associated with the risk. As described in Section 2.3, I estimate ERCs for each portfolio of stocks to test the association between the risk and the pattern of meeting or beating market expectations. Table 2.5 summarizes the output from regression equations (2.1) and (2.2). The estimates of the coefficients from regression equation (2.1) are summarized in Panel A of Table 2.5. The data in Panel A of Table 2.5 does not provide evidence to support the expectations that earnings response coefficients are increasing as firms persistently meet or beat analysts’ forecasts. The estimated intercept coefficients are not statistically significantly different from zero. The first two slope coefficients are positive and significantly different from zero at a 5% level. The coefficients, $\beta_2$ and $\beta_7$, are incremental earnings response coefficients to the base ERC, $\beta_1$. 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, the ERCs are estimated using regression equations (2.2). The results are reported in Panel B of Table 2.5. The findings provide evidence supporting the

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68I 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 significantly different 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.
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 $P^i$ to 4.048 (0.536+3.512) in $P^*$.  

The increasing pattern of ERGs may imply the decreasing pattern of the firm-specific risk. Based on this finding, taken together with the results from regression equation (2.1), I can argue that the ERGs are not increasing with the patterns of meeting or beating analysts’ forecasts. However, I offer evidence that the market provides greater ERGs to the firms persistently meeting or beating analysts’ forecasts (not to the pattern). In other words, the market reaction to earnings surprises 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.

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69 I also estimated ERGs for all $P_q^*$ described in Table 2.1.

$$CAR_{jt} = \alpha_1^q + \sum_{q=2}^S \alpha_q^S \cdot d_q + \beta_{1}^S \cdot \epsilon_{s,jt} + \sum_{q=2}^S \beta_q^S \cdot d_q \cdot \epsilon_{s,jt} + \epsilon_{jt}$$

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

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

I expect that $\beta_2^* < \beta_3^* < \cdots < \beta_{*}^{S-1} < \beta_{*}^S$ for all portfolios, $P^*$. The slope coefficients for the first quarter, $\beta_1^*$, are statistically significantly different from zero. The ERGs are increasing from 9.536 in $\beta_1^2$ to 4.815 (0.536+4.279) in $\beta_1^2$. This result provides evidence that the ERGs of portfolios ($P^*$) are fundamentally different from the first quarter of the pattern. However, on average, other coefficients are not statistically significant from zero.

70 Kasznik and McNichols (2001) also argue that the market reward could reflect lower cost of capital.
Next, Panel C of Table 2.5 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 significantly 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 news 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.\textsuperscript{71} To examine the leakage of bad news, I also tested long window market adjusted returns around the date of the earnings announcements when the meeting or beating patterns were broken. I found significant negative market adjusted returns for the period.\textsuperscript{72}  

Regression 2.3 in this chapter is intended to examine whether the market efficiently recognizes the patterns as firms persistently meet or beat analysts’ forecasts.

The result from regression equations (2.1) in Table 2.5 is not inconsistent with the anecdotal evidence provided by Pulliam (1999) and Vickers (1999) in the sense

\textsuperscript{71}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 over the next two days.

\textsuperscript{72}Kaszniak and McNichols (2001) also showed that firms failing to meet analysts’ forecasts had lower annual market adjusted returns.
that an efficient market systematically discounts the expected portions of earnings surprise.

Table 2.6 summarizes the key results of this study from the Regression 2.3 portfolio $P_q$. I predicted that the slope coefficients on the systematic portion would not be significantly different from zero. As 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 for firms with the tendency of meeting or beating the expectations. The coefficients on $e_s^{unsys}$ capture the market's reaction to the unsystematic portion of the earnings surprise. Unlike Table 2.5, Table 2.6 provides evidence that the market rewards the firms that persistently meet or beat analysts' forecasts. The estimated slope coefficient on $e_s^{unsys}$ is generally monotonically increasing from a low of 0.687 in $P_1$ to a high of 5.668 (0.689+4.979) in $P_5$. The increasing pattern of intercept coefficients for the first five series of portfolios also supports the hypothesis.\footnote{This result suggests that the market rewards the firms that persistently meet analysts' forecasts.} Overall, the result from the regression equations (2.3) suggests that the market has systematically expected the repeated portions of earnings surprise.

Regression 2.4 is intended to examine whether the increasing pattern of coefficients on the unsystematic component of earnings surprise is related to firm-specific risk.

Table 2.7 summarizes the slope coefficients on earnings surprise after controlling for growth and persistence of earnings. The theory suggests that the slope coefficients on the unsystematic portion show an increasing pattern after controlling for...
the growth and persistence of earnings if the pattern is significantly associated with 
decreasing firm-specific risk. Consistent with my expectation, the coefficients on 
the systematic components of earnings surprise are generally not significant. How-
ever, the coefficients on the unsystematic components of earnings surprise show an 
increasing pattern after controlling for the growth and persistence of earnings. As 
would be expected, the coefficient on the $SC \times es^{unsy}$ interaction is significantly 
positive at a 1% level (0.347). In addition, the coefficients on $SC$ and $SC \times es^{sys}$ 
are positive although the level of statistical significance is low (0.405). The result 
seems to suggest that the market rewards firms that persistently meet or beat ana-
lysts' forecasts by providing lower firm-specific risk. The estimated slope coefficient 
on $es^{unsy}$ is generally monotonically increasing from a low of 0.669 in $P_1$ to a high of 
7.207 (0.669+6.538) in $P_9$.

Overall, the findings provide evidence supporting the notion that the earnings 
response coefficient increases as firms persistently meet or beat analysts' forecasts. 
This provides additional evidence to support the findings provided by Lopez and 
Rees (2002) in explaining the greater ERCs for firms with the historical tendency to 
meet or beat analysts' forecasts.

As a supplemental analysis, I examined the firms that repeatedly miss analysts' 
forecasts. It is hard to persistently miss the expectations since bad news is frequently 
preannounced before the earnings announcement date. Among my sample, 85% of 
firms do not miss analysts' forecasts for more than two consecutive quarters. De-
George, Patel, and Zeckhauser (1999) argue that investors first consider whether the

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74 For example, Easton and Zmijewski (1989) documented that ERCs are a decreasing function of 
risk and an increasing function of earnings persistence.
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 may be different. Hence, I further partition all the observations into profit and loss firms. As expected, Table 2.8 for profit and loss firms shows no significant patterns for ERCs. Table 2.8 also shows that investors do not seem to care about persistently missing analysts' forecasts. This result is not surprising in view of the observation 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.

2.5.2 Firm Characteristics

In the previous section, I documented that the market response to the unsystematic portion of earnings surprises increases as firms persistently meet or beat expectations even after controlling for the growth and persistence of earnings. Consistent with prior findings, a negative association between ERCs and risk factors is anticipated. As described in the Research Design section, I compare various firm characteristics for the portfolio of stocks with various patterns of meeting or beating analysts' forecasts 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 are inversely related to the firm-specific risk. Many of the correlations among the variables are particularly noteworthy.

Table 2.9 summarizes the median value of various risk factors for each portfolio. In addition, Table 2.10 documents correlation between the portfolios, that is, the number of times that realized earnings are greater than or equal to forecasted earnings and the firm characteristics.\textsuperscript{75} For the most part, the relation between the patterns and risk is apparent. In other words, the correlation between the pattern of meeting or beating analysts’ forecasts and each risk factor is generally consistent with my expectations.

The first two columns of Table 2.9 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 (\textbf{Mk. Cap}) is progressively increasing as they repeatedly meet or beat the forecasts. One possible explanation for this trend is that increasing stock prices is driven by good financial performance. Likewise, Dollar trading volume (\textbf{Avg. Vol}) shows the same pattern as the size variable. \textbf{Avg. Vol} is also positively correlated with $P_q$ and $P^2$. 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 2.9 reports the association of the dispersion of analysts’ forecasts (\textbf{Disp}). This association measures the earnings variability of the portfolios. $P^{10}$ firms have lower dispersion of analysts’ forecasts than $P^1$ firms. \textbf{Disp} for each

\textsuperscript{75}I also computed Kendall’s $\tau$-b correlations. The result was not qualitatively different from the Spearman correlation.
portfolio is decreasing as the firms repeatedly meet or beat the forecasts. In addition, **Disp** is negatively correlated with the patterns of meeting or beating analysts' forecasts. 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. 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 2.9 examine the risk associated with the financial leverage of the portfolios. 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 the increase in the size of the firms. Theoretically, ERCs should be decreasing in leverage. Table 2.10 provides evidence that **D/M** is negatively associated with the patterns of meeting or beating analysts' forecasts. However, it is unclear that **D/B** is positively associated with the patterns of meeting or beating analysts' forecasts.

**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 2.10 shows **B/P** is negatively correlated with the patterns of meeting or beating analysts' forecasts. Similarly, **LTG** is positively correlated with the patterns of meeting or beating analysts' forecasts. This result seems to be consistent with prior studies in the sense that growth firms have more incentive to avoid earnings disappointment.

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76 Alternatively, this may suggest that analysts can more accurately forecast earnings as the firms repeatedly meet or beat the forecasts.
The next two variables are used to capture firm-specific risk related to the market volatility. Table 2.10 shows that **Beta** is negatively correlated with the patterns of meeting or beating analysts’ forecasts. The result is not surprising inasmuch as 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. For example, **Mk. Cap** (a proxy for information availability) is positively associated with the patterns of meeting or beating analysts’ forecasts and negatively associated with **Beta**. 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 the patterns of meeting or beating analysts’ forecasts. The patterns in this variable are less apparent.

**Turn** indicates average daily turnover for the previous year. Firms persistently meeting or beating forecasts will have a higher turnover ratio. However, the patterns for this variable are less apparent. On average, the firms persistently meeting or beating forecasts have a higher turnover ratio. Table 2.10 shows that **Turn** is positively correlated with the patterns of meeting or beating analysts’ forecasts.

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 2.10 shows that **Momentum** is positively correlated with the patterns of meeting or beating analysts’ forecasts.
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/M**, **B/P**, and **Beta** are negatively associated with the patterns.

### 2.5.3 Supplemental Test: Implied Cost of Capital

As would be expected from 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 computed using the reported earnings figures 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 increase with the patterns of meeting or beating analysts' forecasts.

The implied cost of capital based on regression equations (A.8) and (A.13) is estimated to examine how the market interprets the reported earnings numbers for each portfolio of firms.\(^\text{77}\) Panel A of Table 2.11 shows the implied cost of capital based on regression equations (A.8) while Panel B of Table 2.11 summarizes the implied cost of capital based on regression equations (A.13). The first row of each panel shows the implied cost of capital of the portfolio \(P_q\), which includes firms' \(q\text{th}\) meeting or

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\(^{77}\)Estimated \(r\) is the quarterly implied cost of capital. Table 2.11 reports annualized numbers.
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.\footnote{I also estimated the implied cost of capital for all $P^s$ described in Table 2.1. The results are qualitatively similar.}

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%, 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 2.10 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 the pattern of meeting or beating market expectations. This result provides indirect evidence that management potentially manipulates reported earnings upward to maintain the pattern of meeting or beating analysts' forecasts, and the 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.\footnote{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."}

In addition, in regression equation (A.8), although the dependent variable $\frac{\text{r}_{t+1}}{b_{t-1}}$ is potentially inflated by the managed earnings, the independent variable $\frac{\text{r}_{t+1} - b_{t-1}}{b_{t-1}}$ does not seem to
change enough to justify the potentially managed earnings.\footnote{On average, the descriptive statistics in Table 2.4 suggest that the evidence satisfies the necessary condition in equation \eqref{eq:2.8}.} Taken together with the decreasing patterns of firm-specific risk provided in previous sections, 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 2.11 summarizes the output from regression equation \eqref{eq:A.13}. 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 2.11 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’ 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 2.11 is not significantly different from that in Panel B of Table 2.11. This result implies that the market anticipated firms’ reported earnings at least one quarter before the earnings announcement.

2.6 Summary

It is well documented that firms want to avoid negative earnings surprises because negative earnings surprises generally lead to negative market returns. Prior studies suggest that the increasing tendency to meet or beat analysts’ forecasts is a rational response by the managers because 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.

This chapter 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. However, the market seems to have anticipated the systematic portion of earnings surprises for firms that are repeatedly meeting or beating the analysts’ earnings forecasts.

I examine the relation between various firm characteristics that have been suggested as risk proxies and patterns of meeting or beating analysts’ forecasts. I have identified several characteristics of firms that exhibit a systematic relation to the patterns. The results have important implications for an explanation of the association between firms’ incentives to meet or beat analysts’ forecasts and the market reaction to earnings surprises. Skinner and Sloan (1999) show that the market price reaction is more negative to negative earnings surprises than to positive earnings surprises. They find that high growth firms, in particular, want to avoid negative earnings surprises. Thus, the findings related to firm characteristics may have implications for research into earnings management and/or forecast management. If the characteristics of the firms indicate an incentive of the firms’ managers to avoid an 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 have reported 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, for those that have higher growth and higher market-to-book ratios, and for those that are larger and more profitable.

The implied cost of capital increases as a firm repeatedly meets or beats analysts’ forecasts. As expected, the implied cost of capital (i.e., implied by reported earnings) is positively associated with the length of time of meeting or beating analysts’ forecasts. This result suggests that the market effectively interprets the potentially managed earnings figure.

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. Thus, the bad news might be already impounded in the price around the preannouncement date.
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<td>0.0014</td>
<td>0.0151</td>
<td>0.0183</td>
<td>0.0033</td>
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</table>

Notes:

- ES is the earnings surprise $= \epsilon_{jt}^b - \epsilon_{jt}^f$.
- $\frac{ES}{\text{price}}$ is the earnings surprise deflated by beginning price $= \frac{\epsilon_{jt}^b - \epsilon_{jt}^f}{P_{jt-1}}$.
- 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 2.2: Descriptive Statistics: ERC
<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>ES</th>
<th>ES/price</th>
<th>CAR</th>
<th>Return</th>
<th>Market return</th>
</tr>
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<td>1984</td>
<td>401</td>
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<tr>
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<td>0.0026</td>
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<td>0.0322</td>
<td>0.0259</td>
<td>-0.0063</td>
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Notes:

- **ES** is the earnings surprise = $\Delta \text{eps}_{jt} = \text{eps}_{jt} - \text{eps}_{jt}^f$
- **ES/price** is the earnings surprise deflated by beginning price = $\frac{\Delta \text{eps}_{jt} - \Delta \text{eps}_{jt}^f}{P_{jt-1}}$
- **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 2.3: Descriptive Statistics: Mean for Each Year
Notes:
The figure shows the histogram of the earnings surprises deflated by reported earnings per share ($\frac{\text{Reported earnings} - \text{Mean analysts' forecasts}}{\text{Reported earnings}}$). 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 2.2: Distribution of Earnings Surprise
Notes:
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 reporting profits while the second graph includes firms reporting losses.

**Figure 2.3: Distribution of Earnings Surprise: Profit and Loss Firms**
Notes:
The figure shows revision of analysts’ forecasts over the quarter. $\text{EPS}'$ indicates earnings estimate. Portfolio $P^s$ includes the observations that meet or beat analysts’ forecasts exactly $P^s$ consecutive times. 1$^\text{st}$ shows the first consensus forecasts and so on. STD indicates standard deviation of analysts’ forecasts.

Figure 2.4: Revision of Analysts’ Forecasts for $P_q$ and $P^s$
Notes to Figure:
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.

\textbf{Figure 2.5: Optimistic and Pessimistic Revision}
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<th></th>
<th>$\text{eps}_{j0}$</th>
<th>$\text{bv}_{j-1}$</th>
<th>$P_{j-1}$</th>
<th>$P_{j0}$</th>
<th>$\text{bv}_{j0}$</th>
<th>$P_{j0} - \text{bv}_{j0}$</th>
<th>$\frac{\text{eps}<em>{j0}}{\text{bv}</em>{j-1}}$</th>
<th>$\frac{P_{j0} - \text{bv}<em>{j0}}{\text{bv}</em>{j-1}}$</th>
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<td>6.79</td>
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<td>1.8919</td>
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<td>15.00</td>
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<td>6.26</td>
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<td>15.75</td>
<td>8.56</td>
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<td>1.4545</td>
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Table 2.4: Descriptive Statistics: Implied Cost of Capital
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<th>$P_6$</th>
<th>$P_7$</th>
<th>$P_8$</th>
<th>$P_9$</th>
<th>$P_{10}$</th>
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<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.009</td>
<td>-0.001</td>
<td>-0.002</td>
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<td>0.16</td>
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<th>$P^9$</th>
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<td>-0.95</td>
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Table 2.5: Result of Regressions
Continued

Notes:

Panel A: \[ CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_p \cdot d_q + \beta_1 \cdot e_{sjt} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot e_{sjt} + \varepsilon_{jt} \quad (2.1); \]

\[ P_q : \] Portfolio \( P_q \) includes \( q^{th} \) meeting or beating;

Panel B: \[ CAR_{jt} = \alpha_1 + \sum_{s=2}^{10} \alpha^s \cdot d_s + \beta^1 \cdot e_{sjt} + \sum_{s=2}^{10} \beta^s \cdot d_s \cdot e_{sjt} + \varepsilon_{jt} \quad (2.2); \]

\[ P^s : \] Portfolio \( P^s \) includes the observations that overall meet or beat analysts' forecasts \( s \) consecutive times;

Panel C: \[ CAR_{jt+1} = \gamma_1 + \sum_{m=2}^{10} \gamma^m \cdot d_m + \delta^1 \cdot e_{sjt+1} + \sum_{m=2}^{10} \delta^m \cdot d_m \cdot e_{sjt+1} + \varepsilon_{jt+1}; \]

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

Table 2.5: Result of Regressions
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</table>

Notes:

$CAR_{10} = \alpha + \sum_{q=2}^{10} \beta_{q} \cdot d_{q} + \sum_{q=2}^{10} \gamma_{q} \cdot e_{t,q}^{sys} + \sum_{q=2}^{10} \gamma_{t} \cdot e_{t,q}^{sys} + \varepsilon_{t}$

$P_{q}$: Portfolio $P_{q}$ includes $q/4$ meeting or beating

$e_{t}^{sys}$: Systematic Earnings Surprise

$e_{t}^{unsys}$: Unsystematic Earnings Surprise

Mean of Earnings Surprise for the Past 4 Quarters

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

Table 2.6: Result of Regressions after Controlling for the Systematic and Unsystematic Earning Surprise
<table>
<thead>
<tr>
<th></th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>$P_4$</th>
<th>$P_5$</th>
<th>$P_6$</th>
<th>$P_7$</th>
<th>$P_8$</th>
<th>$P_9$</th>
<th>$P_{10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_q$</td>
<td>0.010</td>
<td>0.003</td>
<td>0.003</td>
<td>0.005</td>
<td>0.005</td>
<td>0.004</td>
<td>-0.064</td>
<td>0.005</td>
<td>0.008</td>
<td>-0.004</td>
</tr>
<tr>
<td>$t$</td>
<td>13.75</td>
<td>2.00</td>
<td>1.41</td>
<td>1.74</td>
<td>1.48</td>
<td>0.93</td>
<td>-0.84</td>
<td>1.03</td>
<td>1.72</td>
<td>-0.54</td>
</tr>
<tr>
<td>$\beta_q$</td>
<td>1.004</td>
<td>-0.474</td>
<td>-1.029</td>
<td>-1.623</td>
<td>-2.386</td>
<td>-0.682</td>
<td>0.637</td>
<td>-0.884</td>
<td>-3.566</td>
<td>0.314</td>
</tr>
<tr>
<td>$t$</td>
<td>2.68</td>
<td>-1.10</td>
<td>-1.45</td>
<td>-1.75</td>
<td>-2.19</td>
<td>-0.37</td>
<td>0.29</td>
<td>-0.30</td>
<td>-2.44</td>
<td>0.09</td>
</tr>
<tr>
<td>$\gamma_q$</td>
<td>0.669</td>
<td>0.346</td>
<td>1.162</td>
<td>2.132</td>
<td>3.994</td>
<td>1.044</td>
<td>5.682</td>
<td>3.486</td>
<td>6.538</td>
<td>2.634</td>
</tr>
<tr>
<td>$t$</td>
<td>7.04</td>
<td>1.22</td>
<td>2.35</td>
<td>2.91</td>
<td>3.25</td>
<td>0.68</td>
<td>2.91</td>
<td>1.26</td>
<td>2.50</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Notes:

\[
CAR_{jt} = \alpha_a + \sum_{q=2}^{10} \alpha_p \cdot d_q + \beta_1 \cdot es_{jt}^{sys} + \sum_{q=2}^{10} \beta_q \cdot d_q \cdot es_{jt}^{sys} + \gamma_1 \cdot es_{jt}^{unsys} + \sum_{q=2}^{10} \gamma_q \cdot d_q \cdot es_{jt}^{unsys}
\]
\[
+ \delta_1 \cdot SC_{jt} + \delta_2 \cdot SC_{jt} \cdot es_{jt}^{sys} + \delta_3 \cdot SC_{jt} \cdot es_{jt}^{unsys} + \epsilon_{jt};
\]

$P_q$: Portfolio $P_q$ includes $q$th 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;

$SC$: Proxy for Growth and Persistence of Earnings = Serial Correlation of Quarterly Earnings for Past 5 Years.

Table 2.7: Result of Regressions after Controlling for the Persistence of Earnings
<table>
<thead>
<tr>
<th>Panel A</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>$P_4$</th>
<th>$P_5$</th>
<th>$P_6$</th>
<th>$P_7$</th>
<th>$P_8$</th>
<th>$P_9$</th>
<th>$P_{10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta_q$</td>
<td>0.876</td>
<td>-0.173</td>
<td>0.651</td>
<td>1.635</td>
<td>-0.632</td>
<td>1.558</td>
<td>-1.508</td>
<td>-3.998</td>
<td>-0.435</td>
<td>-6.907</td>
</tr>
<tr>
<td>$t$</td>
<td>6.26</td>
<td>-0.53</td>
<td>1.20</td>
<td>1.91</td>
<td>-0.42</td>
<td>0.82</td>
<td>-0.56</td>
<td>-1.46</td>
<td>-0.14</td>
<td>-2.02</td>
</tr>
<tr>
<td>Loss Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta_q$</td>
<td>0.014</td>
<td>0.055</td>
<td>0.143</td>
<td>-0.115</td>
<td>0.456</td>
<td>-0.162</td>
<td>-0.253</td>
<td>-1.073</td>
<td>2.211</td>
<td></td>
</tr>
<tr>
<td>$t$</td>
<td>0.63</td>
<td>1.19</td>
<td>1.82</td>
<td>-0.72</td>
<td>1.34</td>
<td>-0.35</td>
<td>-0.85</td>
<td>-0.44</td>
<td>0.51</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

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.

Table 2.8: Result of Regressions: Profit and Loss Firms that Persistently Miss Analysts' Forecasts

Continued
Continued

<table>
<thead>
<tr>
<th>Panel B</th>
<th>$p^1$</th>
<th>$p^2$</th>
<th>$p^3$</th>
<th>$p^4$</th>
<th>$p^5$</th>
<th>$p^6$</th>
<th>$p^7$</th>
<th>$p^8$</th>
<th>$p^9$</th>
<th>$p^{10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta^s$</td>
<td>0.881</td>
<td>0.112</td>
<td>0.476</td>
<td>0.152</td>
<td>-1.038</td>
<td>-0.267</td>
<td>0.235</td>
<td>-0.041</td>
<td>-0.833</td>
<td>-1.924</td>
</tr>
<tr>
<td>$t$</td>
<td>5.71</td>
<td>0.37</td>
<td>1.09</td>
<td>0.25</td>
<td>-1.19</td>
<td>-0.18</td>
<td>0.12</td>
<td>-0.02</td>
<td>-0.28</td>
<td>-1.79</td>
</tr>
<tr>
<td>Loss Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta^s$</td>
<td>0.069</td>
<td>0.115</td>
<td>0.203</td>
<td>0.163</td>
<td>0.249</td>
<td>-0.384</td>
<td>0.043</td>
<td>2.467</td>
<td>-0.207</td>
<td></td>
</tr>
<tr>
<td>$t$</td>
<td>1.47</td>
<td>1.88</td>
<td>2.00</td>
<td>0.70</td>
<td>0.68</td>
<td>-1.29</td>
<td>0.03</td>
<td>0.78</td>
<td>-0.79</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

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

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

Table 2.8: Result of Regressions: Profit and Loss Firms that Persistently Miss Analysts’ Forecasts
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>2400.0</td>
<td>7467.6</td>
<td>0.145</td>
<td>441.4</td>
<td>0.588</td>
<td>0.354</td>
<td>0.400</td>
<td>1.003</td>
<td>0.0250</td>
<td>0.109</td>
<td>0.068</td>
</tr>
<tr>
<td>$P_2$</td>
<td>3116.5</td>
<td>8144.5</td>
<td>0.128</td>
<td>457.6</td>
<td>0.592</td>
<td>0.341</td>
<td>0.408</td>
<td>0.990</td>
<td>0.0263</td>
<td>0.112</td>
<td>0.122</td>
</tr>
<tr>
<td>$P_3$</td>
<td>3977.9</td>
<td>11758.6</td>
<td>0.125</td>
<td>606.3</td>
<td>0.647</td>
<td>0.342</td>
<td>0.363</td>
<td>0.975</td>
<td>0.0260</td>
<td>0.136</td>
<td>0.185</td>
</tr>
<tr>
<td>$P_4$</td>
<td>5214.9</td>
<td>16178.5</td>
<td>0.114</td>
<td>689.0</td>
<td>0.597</td>
<td>0.311</td>
<td>0.343</td>
<td>0.968</td>
<td>0.0250</td>
<td>0.158</td>
<td>0.187</td>
</tr>
<tr>
<td>$P_5$</td>
<td>6582.9</td>
<td>18510.1</td>
<td>0.081</td>
<td>781.2</td>
<td>0.645</td>
<td>0.308</td>
<td>0.320</td>
<td>0.961</td>
<td>0.0248</td>
<td>0.171</td>
<td>0.205</td>
</tr>
<tr>
<td>$P_6$</td>
<td>8111.1</td>
<td>14410.0</td>
<td>0.077</td>
<td>853.8</td>
<td>0.691</td>
<td>0.276</td>
<td>0.305</td>
<td>0.952</td>
<td>0.0246</td>
<td>0.155</td>
<td>0.148</td>
</tr>
<tr>
<td>$P_7$</td>
<td>8380.8</td>
<td>16185.0</td>
<td>0.049</td>
<td>844.2</td>
<td>0.667</td>
<td>0.244</td>
<td>0.284</td>
<td>0.934</td>
<td>0.0246</td>
<td>0.152</td>
<td>0.111</td>
</tr>
<tr>
<td>$P_8$</td>
<td>9826.0</td>
<td>20948.7</td>
<td>0.058</td>
<td>1006.0</td>
<td>0.637</td>
<td>0.251</td>
<td>0.298</td>
<td>0.923</td>
<td>0.0251</td>
<td>0.159</td>
<td>0.135</td>
</tr>
<tr>
<td>$P_9$</td>
<td>8966.7</td>
<td>26789.0</td>
<td>0.051</td>
<td>1039.9</td>
<td>0.680</td>
<td>0.293</td>
<td>0.308</td>
<td>0.934</td>
<td>0.0249</td>
<td>0.161</td>
<td>0.115</td>
</tr>
<tr>
<td>$P_{10}$</td>
<td>9244.5</td>
<td>43554.9</td>
<td>0.066</td>
<td>982.5</td>
<td>0.657</td>
<td>0.266</td>
<td>0.285</td>
<td>0.925</td>
<td>0.0237</td>
<td>0.187</td>
<td>0.169</td>
</tr>
</tbody>
</table>

Notes:

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 = $\frac{\text{Standard Deviations of Analysts' Forecasts}}{\text{Consensus Median Forecasts}}$

LTD: Long-Term Debt;

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

D/M: 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.

Table 2.9: Firm Characteristics

Continued
Continued

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( p^1 )</td>
<td>2225.4</td>
<td>7126.3</td>
<td>0.151</td>
<td>438.5</td>
<td>0.582</td>
<td>0.356</td>
<td>0.398</td>
<td>1.005</td>
<td>0.0247</td>
<td>0.107</td>
<td>0.065</td>
</tr>
<tr>
<td>( p^2 )</td>
<td>2487.0</td>
<td>5425.2</td>
<td>0.122</td>
<td>357.5</td>
<td>0.573</td>
<td>0.346</td>
<td>0.438</td>
<td>0.999</td>
<td>0.0266</td>
<td>0.101</td>
<td>0.094</td>
</tr>
<tr>
<td>( p^3 )</td>
<td>2703.5</td>
<td>5875.7</td>
<td>0.139</td>
<td>492.5</td>
<td>0.685</td>
<td>0.385</td>
<td>0.420</td>
<td>0.979</td>
<td>0.0268</td>
<td>0.115</td>
<td>0.130</td>
</tr>
<tr>
<td>( p^4 )</td>
<td>2162.2</td>
<td>6850.3</td>
<td>0.137</td>
<td>468.4</td>
<td>0.594</td>
<td>0.362</td>
<td>0.395</td>
<td>0.973</td>
<td>0.0263</td>
<td>0.119</td>
<td>0.145</td>
</tr>
<tr>
<td>( p^5 )</td>
<td>3663.6</td>
<td>10804.6</td>
<td>0.123</td>
<td>606.9</td>
<td>0.634</td>
<td>0.357</td>
<td>0.430</td>
<td>0.984</td>
<td>0.0255</td>
<td>0.164</td>
<td>0.130</td>
</tr>
<tr>
<td>( p^6 )</td>
<td>5885.2</td>
<td>14405.7</td>
<td>0.084</td>
<td>885.1</td>
<td>0.720</td>
<td>0.314</td>
<td>0.355</td>
<td>0.992</td>
<td>0.0254</td>
<td>0.156</td>
<td>0.146</td>
</tr>
<tr>
<td>( p^7 )</td>
<td>8727.3</td>
<td>22022.2</td>
<td>0.100</td>
<td>480.6</td>
<td>0.544</td>
<td>0.218</td>
<td>0.267</td>
<td>0.986</td>
<td>0.0266</td>
<td>0.167</td>
<td>0.134</td>
</tr>
<tr>
<td>( p^8 )</td>
<td>11243.7</td>
<td>26902.1</td>
<td>0.095</td>
<td>837.1</td>
<td>0.473</td>
<td>0.178</td>
<td>0.276</td>
<td>0.962</td>
<td>0.0254</td>
<td>0.161</td>
<td>0.129</td>
</tr>
<tr>
<td>( p^9 )</td>
<td>7853.4</td>
<td>20608.6</td>
<td>0.097</td>
<td>1140.5</td>
<td>0.703</td>
<td>0.289</td>
<td>0.305</td>
<td>0.971</td>
<td>0.0244</td>
<td>0.173</td>
<td>0.117</td>
</tr>
<tr>
<td>( p^{10} )</td>
<td>6698.4</td>
<td>24900.1</td>
<td>0.076</td>
<td>855.6</td>
<td>0.633</td>
<td>0.279</td>
<td>0.242</td>
<td>0.947</td>
<td>0.0234</td>
<td>0.154</td>
<td>0.180</td>
</tr>
</tbody>
</table>

Notes:
- 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 = \( \frac{\text{Standard Deviations of Analysts' Forecasts}}{\text{Consensus Median Forecasts}} \);
- LTD: Long-Term Debt;
- D/B: Long-Term Debt-to-Book ratio comes from Compustat;
- D/M: 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 = \( \frac{\text{Average } $ \text{ Volume}}{\text{Average Number of Shares}} \);
- Momentum: Prior 6 month momentum is calculated using CRSP database.

Table 2.9: Firm Characteristics
<table>
<thead>
<tr>
<th></th>
<th>$P_0$</th>
<th>$P^*$</th>
<th>$r_1$</th>
<th>LTG</th>
<th>Mk. Cap.</th>
<th>Avg. Vol</th>
<th>Disp.</th>
<th>D/B</th>
<th>D/M</th>
<th>B/P</th>
<th>Beta</th>
<th>Std. Ret</th>
<th>Turn</th>
<th>Momentum</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_0$</td>
<td>0.782</td>
<td>0.472</td>
<td>0.067</td>
<td>0.138</td>
<td>0.084</td>
<td>-0.115</td>
<td>0.042</td>
<td>-0.034</td>
<td>-0.028</td>
<td>-0.080</td>
<td>0.043</td>
<td>0.089</td>
<td>0.152</td>
<td></td>
</tr>
<tr>
<td>$P^*$</td>
<td>0.765</td>
<td>0.001*</td>
<td>0.085</td>
<td>0.136</td>
<td>0.101</td>
<td>-0.121</td>
<td>0.047</td>
<td>-0.029</td>
<td>-0.034</td>
<td>-0.083</td>
<td>0.057</td>
<td>0.103</td>
<td>0.136</td>
<td></td>
</tr>
<tr>
<td>$r_1$</td>
<td>0.434</td>
<td>-0.001*</td>
<td>0.010*</td>
<td>0.040</td>
<td>0.004*</td>
<td>-0.017*</td>
<td>-0.003*</td>
<td>-0.018</td>
<td>0.009*</td>
<td>0.009*</td>
<td>0.002*</td>
<td>0.010*</td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td>LTG</td>
<td>0.057</td>
<td>0.077</td>
<td>-0.001*</td>
<td>0.040</td>
<td>0.004*</td>
<td>-0.017</td>
<td>-0.003</td>
<td>-0.018</td>
<td>0.009*</td>
<td>0.009*</td>
<td>0.002*</td>
<td>0.010*</td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td>Mk. Cap.</td>
<td>0.129</td>
<td>0.140</td>
<td>0.028</td>
<td>0.082</td>
<td>0.881</td>
<td>-0.157</td>
<td>0.078</td>
<td>-0.122</td>
<td>-0.361</td>
<td>-0.167</td>
<td>-0.503</td>
<td>0.537</td>
<td>0.081</td>
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</tr>
<tr>
<td>Avg. Vol</td>
<td>0.114</td>
<td>0.162</td>
<td>-0.002*</td>
<td>0.022</td>
<td>0.773</td>
<td>-0.113</td>
<td>0.030</td>
<td>-0.139</td>
<td>-0.307</td>
<td>-0.099</td>
<td>0.237</td>
<td>0.788</td>
<td>0.003*</td>
<td></td>
</tr>
<tr>
<td>Disp.</td>
<td>-0.033</td>
<td>-0.034</td>
<td>-0.009*</td>
<td>-0.016*</td>
<td>-0.023</td>
<td>-0.016*</td>
<td>0.139</td>
<td>0.253</td>
<td>0.321</td>
<td>0.184</td>
<td>0.099</td>
<td>-0.117</td>
<td>-0.111</td>
<td></td>
</tr>
<tr>
<td>D/B</td>
<td>0.025</td>
<td>0.021</td>
<td>0.004*</td>
<td>-0.101</td>
<td>0.047</td>
<td>-0.037</td>
<td>0.036</td>
<td>0.486</td>
<td>0.157</td>
<td>0.048</td>
<td>-0.106</td>
<td>-0.085</td>
<td>-0.333</td>
<td></td>
</tr>
<tr>
<td>D/M</td>
<td>-0.039</td>
<td>-0.051</td>
<td>-0.006*</td>
<td>-0.150</td>
<td>0.094</td>
<td>0.087</td>
<td>0.067</td>
<td>0.717</td>
<td>0.373</td>
<td>0.192</td>
<td>-0.043</td>
<td>-0.216</td>
<td>-0.138</td>
<td></td>
</tr>
<tr>
<td>B/P</td>
<td>-0.062</td>
<td>-0.093</td>
<td>0.007*</td>
<td>-0.143</td>
<td>0.126</td>
<td>0.128</td>
<td>0.079</td>
<td>0.045</td>
<td>0.300</td>
<td>0.266</td>
<td>0.196</td>
<td>-0.305</td>
<td>-0.264</td>
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<tr>
<td>Beta</td>
<td>-0.064</td>
<td>-0.077</td>
<td>-0.015*</td>
<td>-0.113</td>
<td>0.062</td>
<td>0.037</td>
<td>0.050</td>
<td>0.157</td>
<td>0.209</td>
<td>0.166</td>
<td>-0.256</td>
<td>-0.153</td>
<td>-0.153</td>
<td></td>
</tr>
<tr>
<td>Std. Ret</td>
<td>0.001</td>
<td>-0.007</td>
<td>0.010*</td>
<td>0.408</td>
<td>0.149</td>
<td>0.061</td>
<td>0.028</td>
<td>-0.022</td>
<td>0.046</td>
<td>0.186</td>
<td>0.169</td>
<td>-0.035</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>Turn</td>
<td>0.087</td>
<td>0.209</td>
<td>0.019</td>
<td>0.176</td>
<td>0.167</td>
<td>0.380</td>
<td>-0.021</td>
<td>-0.066</td>
<td>-0.116</td>
<td>-0.173</td>
<td>-0.147</td>
<td>0.082</td>
<td>0.043</td>
<td></td>
</tr>
<tr>
<td>Momentum</td>
<td>0.112</td>
<td>0.118</td>
<td>0.049</td>
<td>0.110</td>
<td>0.036</td>
<td>0.027</td>
<td>-0.032</td>
<td>-0.033</td>
<td>-0.136</td>
<td>-0.224</td>
<td>-0.153</td>
<td>0.064</td>
<td>0.049</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- 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 insignificant at 5% level.

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 / Standard Deviation of Analysts' Forecasts;
D/B: Long-Term Debt-to-Book ratio comes from Compustat;
D/M: 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 = Average Volume / Average Number of Shares;
Momentum: Prior 6 month momentum is calculated using CRSP database.

Table 2.10: Correlation Analysis among the Variable Representing Firm Characteristics
### Table 2.11: Estimated Implied Cost of Capital

<table>
<thead>
<tr>
<th>Panel A</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>$P_4$</th>
<th>$P_5$</th>
<th>$P_6$</th>
<th>$P_7$</th>
<th>$P_8$</th>
<th>$P_9$</th>
<th>$P_{10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r_1$</td>
<td>11.6%</td>
<td>11.8%</td>
<td>13.7%</td>
<td>13.2%</td>
<td>17.5%</td>
<td>13.6%</td>
<td>13.2%</td>
<td>10.3%</td>
<td>14.9%</td>
<td>14.3%</td>
</tr>
<tr>
<td></td>
<td>$p^1$</td>
<td>$p^2$</td>
<td>$p^3$</td>
<td>$p^4$</td>
<td>$p^5$</td>
<td>$p^6$</td>
<td>$p^7$</td>
<td>$p^8$</td>
<td>$p^9$</td>
<td>$p^{10}$</td>
</tr>
<tr>
<td>$r_1$</td>
<td>12.0%</td>
<td>12.0%</td>
<td>11.3%</td>
<td>11.9%</td>
<td>13.7%</td>
<td>14.0%</td>
<td>14.7%</td>
<td>13.7%</td>
<td>10.7%</td>
<td>11.2%</td>
</tr>
</tbody>
</table>

Notes:

\[
\frac{\text{eps}_{j0}}{b_{v_j-1}} = \gamma_0 + \gamma_1 \cdot \frac{P_{j0} - b_{v_j0}}{b_{v_j-1}} + \varepsilon_{j0} \quad (2.6)
\]

- $P_{j0}$ is the price of firm $j$ at time $t$;
- $\text{eps}_{j0}$ is the earnings per share of firm $j$ at time $t$;
- $b_{v_j-1}$ 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.

<table>
<thead>
<tr>
<th>Panel B</th>
<th>$P_1$</th>
<th>$P_2$</th>
<th>$P_3$</th>
<th>$P_4$</th>
<th>$P_5$</th>
<th>$P_6$</th>
<th>$P_7$</th>
<th>$P_8$</th>
<th>$P_9$</th>
<th>$P_{10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r_2$</td>
<td>11.7%</td>
<td>12.1%</td>
<td>14.1%</td>
<td>13.0%</td>
<td>17.7%</td>
<td>14.2%</td>
<td>12.3%</td>
<td>10.3%</td>
<td>14.8%</td>
<td>3.8%</td>
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<tr>
<td></td>
<td>$p^1$</td>
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<td>$p^6$</td>
<td>$p^7$</td>
<td>$p^8$</td>
<td>$p^9$</td>
<td>$p^{10}$</td>
</tr>
<tr>
<td>$r_2$</td>
<td>11.8%</td>
<td>12.2%</td>
<td>11.9%</td>
<td>12.4%</td>
<td>13.7%</td>
<td>13.9%</td>
<td>14.6%</td>
<td>13.7%</td>
<td>10.7%</td>
<td>11.2%</td>
</tr>
</tbody>
</table>

Notes:

\[
\frac{\text{eps}_{j0}}{b_{v_j-1}} = \gamma_2 + \gamma_3 \cdot \frac{P_{j-1}}{b_{v_j-1}} + \varepsilon_{j0} \quad (2.9)
\]

- $P_{j-1}$ is the price of firm $j$ at time $t - 1$;
- $r_2$ is the estimated annual implied cost of capital.
CHAPTER 3

TIMELINESS OF WRITE-OFFS

3.1 Introduction

This chapter examines the timeliness of accounting recognition of write-offs by investigating the association between earnings with negative special items and security market returns. Managers, investors, academics, and regulators have been interested in the increasing prevalence of write-off of long-lived assets since they have a great impact on earnings, book values of assets, and security prices. In March 1995, the Financial Accounting Standards Board (FASB) released statement No. 121, Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of, which requires that the loss should be equal to the difference between the carrying value and the market value of the asset. The evidence to date shows that Generally Accepted Accounting Principles (GAAP) allow firms great discretion

\[81\text{A write-off is a one-time accounting adjustment that decreases the carrying values of assets and net income (e.g., termination of a division of the firm, closing of a plant, discontinuance of a product line, or disposal of a segment of a business). A write-off is not the same as a special item. Special items also include other unusual or nonrecursive accruals. The financial press uses the terms synonymously in a broad sense.}

\[82\text{Clifford (2001) cites Warren Buffett in Berkshire Hathaway’s 2000 annual report: “...In recent years it has seemed that no earnings statement is complete without them.”}

81
with respect to the magnitude and timing of write-offs. This flexibility leaves managers room to manage earnings. Therefore, after the FASB issued statement No. 121, the Emerging Issues Task Force (EITF) began a project on the impairment of assets, and the FASB proposed exposure draft (2000), which would supersede FASB statement No. 121. The proposed objective of exposure draft (2000) is to develop a single accounting model for the disposal of assets. On October 3, 2001, the FASB released statement No. 144, Accounting for the Impairment or Disposal of Long-Lived Assets. While statement No. 144 supersedes both statement No. 121, Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of and APB Opinion No. 30, it retains many provisions of statement No. 121. FASB statement No. 144 requires that asset write-offs should reflect contemporaneous information. Hence, the recent issuance of the statement has raised particular interest with respect to the measurement and timing issues of the write-offs. This study regarding these issues is important for at least two reasons.

First, the statement requires that an asset should be tested for impairment whenever events or changes in circumstance indicate that its carrying amount may not be recoverable. However, under FASB statement No. 144, companies have broad discretion to decide when to write down the book value of assets. It is difficult to determine whether the write-off has been recorded in a timely manner since each firm has discretion to choose different lags in accounting recognition of write-offs.

83 For example, FASB statement No. 144 allows the management to use either a probability-weighted or best-estimate approach to estimate future cash flows for the undiscounted cash flow recoverability test.
Second, many companies tend to overstate one-time write-offs in order to increase future earnings. In such cases, the market may react favorably to large write-offs because a company’s profit almost always improves sharply after large write-offs. SEC chairman Levitt (1998) noted the tendency for management to abuse “big bath” restructuring charges:

Why are companies tempted to overstate these charges? When earnings take a major hit, the theory goes Wall Street will look beyond a one-time loss and focus only on future earnings. And if these charges are conservatively estimated with a little extra cushioning, that so-called conservative estimate is miraculously reborn as income when estimates change or future earnings fall short.

The extant literature has documented the information content of write-off disclosure while there has been relatively little research on the measurement and timing issues associated with write-offs.\(^{84}\) In other words, the studies have tried to determine the security price reaction to unexpected write-off amounts over shorter intervals (e.g., a two-day market adjusted return surrounding the announcement). They argue that if the write-off decision is related to restructuring, the market may applaud the write-off as an effective management reaction to a bad business environment (e.g., disposal of unprofitable segments and/or product lines of the business). In this case, the stock market will show a positive market adjusted return over the period surrounding the write-off announcement (e.g., John and Ofek (1995)). On the other hand, the write-off decision might be related to asset impairment without future prospects for

\(^{84}\)See Alciatore, Dee, Easton, and Spear (1998) for a extensive review of the write-off studies.
improvement. This line of study finds a negative market reaction to the write-off announcement (e.g., Elliott and Shaw (1988) and Elliott and Hanna (1996)). However, the majority of studies provide little evidence on the relation between market reaction and write-off disclosure (e.g., Zucca and Campbell (1992), Bunsis (1997), Bartov, Lindahl, and Ricks (1998), Francis, Hanna, and Vincent (1997), and Chaney, Hogan and Jeter (1999)). Collectively, the evidence shows that market reactions to write-off announcements are mixed and unclear. These results reveal that there are many difficulties in information content studies of write-offs.

A primary issue is the lack of timeliness in disclosing value relevant events. If the write-off is not announced in a timely manner, the write-off response coefficient on an unexpected write-off will not be significant, or may merely capture value irrelevant noise. The market might have made the adjustment far before the write-off announcement. If write-off announcements are not unexpected, event studies will find spurious results due to potential noise in the information pertaining to the write-off announcements. These difficulties raise important issues as to whether the write-off is recorded in a timely manner (e.g., Heflin and Warfield (1997), Alciatore, Easton, and Spear (2000), and Collins and Henning (2000)).

Another related issue is the leaking of information before the write-off disclosure. That is, a significant portion of a write-off decision is not new to the market. For

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85Easton, Harris, and Ohlson (1992) observe that there are two kinds of errors due to recognition timing: “(i) value-relevant events occurring during the return interval which are recognized in earnings of subsequent periods, and (ii) value relevant-events occurring prior to the return interval which are reorganized in earnings during the interval. However, for long intervals, the two error sources should be relatively unimportant compared to the effects due to value-relevant events correctly recognized during the interval.”

Thus, the meaning of timeliness of write-off here is simply the extent to which contemporaneous market return is associated with current period write-off amounts.
example, the current quarter write-off could have been anticipated through various channels in previous periods. As a result, the studies require that researchers measure the unexpected portion of write-off amounts.

Third, the majority of event studies have disaggregated write-offs (e.g., discretionary write-off vs nondiscretionary write-off, restructuring vs pure asset impairment, etc.). However, it is hard to disaggregate the write-offs. Wilson (1996) notes that the distinction between discretionary write-offs and nondiscretionary write-offs is vague. Managers are allowed considerable discretion in reporting nondiscretionary write-offs including announcement magnitude and timing. In addition, many firms announce asset impairment and/or restructuring simultaneously with other announcements.86

In this study, I consider issues related to those tested in the prior literature, but the study differs in its perspective. First, I will test the timeliness of write-offs by investigating the association between the contemporaneous return and write-off amounts. The traditional accounting conventions of objectivity, verifiability, and/or conservatism may lead to a lack of timeliness in the write-off. If the recognition of the write-off summarizes value relevant events of the past, the contemporaneous write-off should be significantly correlated with past returns to the extent the market incorporates the decline in asset value in prior periods. In other words, the security market was already aware of the information pertaining to the write-offs. Further, this study will take into consideration longer interval association between the asset write-offs and the security returns to examine the timeliness hypothesis. Easton,

86For example, Strong and Meyer (1987) noted that a write-off announcement involves restructuring, change in dividend policy, share repurchases, and/or employment adjustments. They found only 78 observations that were eligible for their study.
Harris, and Ohlson (1992) and Warfield and Wild (1992) suggest that timing errors in aggregate earnings become relatively less important as the length of the aggregation period increases. Therefore, I posit that aggregation is likely to capture value relevant events which occurred in prior periods due to the write-offs’ lack of timeliness.

I first use annual data to test the association between returns and write-offs. The intuition is that current earnings ($E_t$) can be decomposed into earnings before special items ($EBS_t$) and special items ($SI_t$),

$$E_t = EBS_t + SI_t.$$ 

In addition, $EBS_t$ can be defined as the sum of the earnings before special items associated with value changes in the current period ($EBS_t^c$) and the earnings before special items associated with value changes in prior periods ($\sum_{\tau = -\infty}^{t-1} EBS_{\tau}^c$). Similarly, $SI_t$ can be defined as the sum of the special items associated with value changes in the current period ($SI_t^c$) and the special items associated with value changes in prior periods ($\sum_{\tau = -\infty}^{t-1} SI_{\tau}^c$).

$$EBS_t = EBS_t^c + \sum_{\tau = -\infty}^{t-1} EBS_{\tau}^c + \nu_t$$

$$SI_t = SI_t^c + \sum_{\tau = -\infty}^{t-1} SI_{\tau}^c + \nu_t$$

Therefore, the association between returns and earnings is modeled as

$$r_t = f(EBS_t^c, SI_t^c)$$

$$r_\tau = f(EBS_\tau^c, SI_\tau^c) \quad \tau \in (-\infty \ldots t - 1].$$
I hypothesize that if the write-off is recorded in a timely manner, the write-off amounts should be significantly associated with annual return, and should not be significantly associated with lagged returns.

\[ \forall \tau \ 0 \approx SI^\tau_t \ \tau \in (-\infty \ldots t - 1). \]

Then

\[ SI_t \approx SI^0_t \]

\[ \forall \tau \ 0 \approx |\rho(r, SI_t)| \ll |\rho(r, SI_t)| \ \tau \in (-\infty \ldots t - 1). \quad (3.1) \]

In other words, if the write-off reflects changes that are perceived by the market during the fiscal year, this variable will have significant explanatory power for returns over the same period. As a result, I expect to observe that the association between aggregate returns and aggregate write-off does not improve significantly in the aggregation process under the timeliness hypothesis. In other words, the aggregation will not increase the association between aggregate returns and aggregate write-off because the recognition of write-offs and market returns are well aligned in each period.

\[ |\rho(r, SI_t)| \ll |\rho(\sum_{\tau=-\infty}^{t} r_{\tau}, \sum_{\tau=-\infty}^{t-1} SI_{\tau + SI_t})|. \]

---

87 The notation \(\sum r_t\) represents the aggregate return as defined in Easton, Harris, and Ohlson (1992).
In addition, the association between aggregate returns and aggregate write-off for the pre-write-off period is not expected to be significantly higher than that for the post-write-off period under the timeliness hypothesis.\footnote{See Figure 3.1. The timeline of the research illustrates the pre-write-off and post-write-off periods.}

Conversely, if the write-off amount is not recognized in a timely manner in the sense that it recognizes value relevant events known to the market in the previous periods, then the write-off should not be associated with annual return. However, the write-off amount should be significantly associated with lagged return(s) if the market was aware of the value relevant events in a prior period and incorporated them in the security prices at that time.

\[
\exists \tau \ 0 \neq SI^c_t \ \tau \in (-\infty \ldots t - 1].
\]

Then

\[
SI_t = SI^c_t + \sum_{\tau = -\infty}^{t-1} SI^c_{\tau}
\]

\[
\exists \tau \ 0 \ll |\rho(\tau, SI_t)| \ \tau \in (-\infty \ldots t - 1]. \quad (3.2)
\]

In this case, the aggregation of write-offs will synchronize with the timing difference. That is, the write-off summarizes value relevant events of the past. Therefore, the aggregate special item will provide statistically significant incremental explanatory power.
\[ |\rho(r_t, SI_t)| \ll |\rho(\sum_{\tau=-\infty}^{t} r_{\tau}, \sum_{\tau=-\infty}^{t-1} SI_{\tau} + SI_t)|. \]

If the accounting recognition of the write-offs summarizes value relevant events of the past rather than providing information content relevant to future performance, the association between aggregate returns and aggregate write-offs for the past period will be significantly higher than for the future period. I expect the association between aggregate return and aggregate write-off for the pre-write-off period to be significantly higher than that for the post-write-off period.

\[ |\rho(\sum_{\tau=-\infty}^{t} r_{\tau}, \sum_{\tau=-\infty}^{t-1} SI_{\tau} + SI_t)| \ll |\rho(\sum_{\tau=t}^{\infty} r_{\tau}, SI_t + \sum_{\tau=t+1}^{\infty} SI_{\tau})|. \quad (3.3) \]

Hayn (1995) and Basu (1997) demonstrate that the association between annual stock returns and the level of earnings per share deflated by the beginning stock price is much weaker for loss firms than for profit firms. Since the write-offs are naturally associated with negative earnings, I will investigate the impact of loss firms on the stock market association in our analysis. If the market has expected a write-off due to losses in prior periods, the association between the annual returns and the special item would be much weaker for loss firms than that for profit firms. Alternatively, if investors expect firms to take a big bath and subsequently report improved performance, the association between the contemporaneous return and the special item will be significantly negative.

Thus, in a supplemental section, I will test the information content of the earnings announcement when firms report large write-offs. Prior literature addresses the issue that the write-off disclosures may signal future improvement of firms’ performance.
If firms are actually expected to have improved future prospects after taking large write-offs, the market will react more favorably to the earnings surprise. The extant literature provides evidence that less uncertainty in earnings announcement results in greater earnings response coefficients. In a similar vein, if investors have greater uncertainty about reported earnings of the firms with large write-offs, the market reaction will be much weaker for those firms. In addition, I will examine how investors interpret new earnings information in the subsequent period by investigating the difference in the earnings response coefficients in those periods. When firms report large write-offs, investors may have greater uncertainty about future earnings, and they may wait until the arrival of new earnings information. If these firms confirm the market's expectation in the following period and thus resolve uncertainty, the market will react more significantly to the earnings announcements of large write-off firms compared to those of other firms.

In summary, I find that when firms report write-offs of small amounts, the correlations between lagged returns and special items are higher than the correlation between contemporaneous return and special items. This result is more prevalent when the firms report large write-offs (i.e., big baths), especially in loss firms.

Small write-off firms show no significant associations between special items and returns for the loss firms. For large write-off firms, the write-off amount is positively (negatively) associated with contemporaneous return for the profit (loss) firms.

---

89 For example, Bleakley (1995) provided anecdotal evidence of positive market reaction to write-off announcement. Similarly, Byrnes and Henry (2001) addressed the investors positive reaction: “part of the lure of big special charges is that investors tend to shrug them off, believing that with the bad news out in the open, the company is poised for a brighter future.”

90 For example, Pincus (1983), Lipe (1990), Imhoff and Lobo (1992), and Subramanyam (1996).
In addition, the loss firms show write-offs that are significantly negatively correlated with future returns while the profit firms show no significant association. These findings seem to lend support to prior literature in the sense that loss firms can boost future profits and substantially increase future returns by cleaning up the balance sheet.91

In the long window study, I find that the aggregate write-off is negatively associated with the aggregate return. However, the subsample of profit (loss) firms shows positive (negative) association. Thus, the results suggest that the negative association between returns and write-offs is mainly due to loss firms. Not surprisingly, the aggregate write-off amounts have statistically significant incremental explanatory power for the aggregate returns over the same period. As would be expected, the association between annual (aggregate) return and annual (aggregate) write-off is significantly higher for profit firms than for loss firms. In addition, the aggregate write-off amounts have statistically significant incremental explanatory power for the aggregate returns for profit firms. I also find that the aggregate write-off amounts have statistically significant explanatory power for the aggregate returns over the post-write-off period. However, the association is not as strong as that for the pre-write-off period. Taken together, the write-off summarizes value relevant events of the past rather than providing strong information content for the future performance.

Finally, the results show that the earnings response coefficient is negative for one time large write-off firms (i.e., big bath). Given the negative association between write-off amounts and lagged returns, market participants seem to update their beliefs

91For example, Pourciau (1993) found evidence that new executives adopt income decreasing policies including large write-offs in the incoming year to increase income in the next year.
on the basis of the information conveyed in the write-off announcement. This suggests that the market interprets large negative earnings surprises as good news in the sense “the bigger the bath, the better”. In other words, the market expects that the write-off firms will increase future profits by cleaning up bad performance of the past. In addition, firms taking big baths have greater earnings response coefficients in the following period. This result seems to suggest that the market waits for new earnings information to resolve the uncertainty with respect to the future performance of big bath firms.

Taken together, these results provide some evidence that a significant portion of the write-offs is not recorded in a timely manner and the security market over the years preceding the write-off already took into account the decline in asset value reflected in the write-off amounts. In addition, the recognition of special items is less timely than that of other components of earnings.

The remainder of the thesis is organized as follows. The next section reviews the related literature. The model of aggregation is described in Section 3.3. Data and summary statistics are presented in Section 3.4. The empirical results are examined in Section 3.5. A summary is provided in Section 3.6.

3.2 Review of Related Literature

This section summarizes previous literature related to this study. The extant literature has examined the information content of write-off disclosure.

In one of the earliest information content studies regarding asset write-offs, Strong and Meyer (1987) examined 129 write-off firms during the early 80’s. They found that the market’s reaction to anticipated write-offs is significantly positive. In turn, the
market reacts negatively over the announcement period when the magnitude of write-offs is insufficient. Strong and Meyer (1987) argue that this finding is consistent with anecdotal evidence in the sense that “the bigger the bath, the better”.

Elliott and Shaw (1988) included sample firms with significantly large write-offs, defined as negative special items exceeding 1% of total assets. They focused on the discretionary write-off. Twenty one percent their observations were deleted because the write-off did not meet their criteria for a special item, for example, write-offs related to revaluation of marketable securities, settlement of litigation, or a special allowance for facilities under construction. In contrast to the findings of Strong and Meyer (1987), Elliott and Shaw (1988) found a significantly lower market reaction for large write-offs. In addition, they found that large write-off firms suffer from significantly negative industry-adjusted returns for the six months following the write-off announcement.

Elliott and Hanna (1996) collected more complete samples for the period 1970-1994 using a definition of write-off similar to that used by Elliott and Shaw (1988). In particular, they investigated “habitual” write-off firms. In other words, they examined market reactions to earnings announcements when firms report multiple write-offs. They found that the coefficients on special items decrease as firms repeatedly take write-offs. The market participants place less weight on unexpected earnings after multiple write-offs.

Francis, Hanna, and Vincent (1997) examined various firm characteristics to determine whether the write-off decision is related to the incentives for managers to
manage earnings or to the fundamentals of the firms. They found that the market's response to a restructuring announcement is positive while the response to the inventory write-off announcement is negative.

Bunsis (1997) found that the market's response to anticipated write-offs is significantly positive. In addition, when the action of write-off is thought to increase expected future cash flows, the market adjusted return is significantly positive around the announcement date.

Hogan and Jeter (1998) show that the market's response to asset write-offs is insignificant. However, when firms have net loss and change management before the write-off announcement, the market reaction to the announcement is significantly positive.

A long window association study is another approach to investigate whether the inclusion of write-off items in income can provide a better summary of information to investors. Thus, the association studies use a longer window return as a metric to capture the value relevance of write-offs in addition to earnings.

First, Easton, Eddey, and Harris (1993) examined the value relevance of revaluation of the long-lived tangible assets of Australian firms. They found that the revaluation reserve is not significantly related to the annual return compared to longer period returns. They concluded that the revaluation is not recorded in a timely manner.

Alciatore, Easton, and Spear (2000) used quarterly data of the petroleum industry for an association study. They found that the correlation between write-off amount and contemporaneous return is not as strong as the correlation between the write-off
amount and lagged return. That is, the market has already perceived the decline in asset value and adjusted to the decline in an earlier period.\textsuperscript{92}

Recently, Collins and Henning (2000) tested whether write-offs of discontinued operations’ assets are timely. They found that the asset write-offs and the cumulative change in earnings over the previous two years are positively associated. In addition, while the market reacts positively to the delayed write-offs, the market reacts negatively to timely write-offs.

Zucca and Campbell (1992) examined 77 write-offs between 1978 and 1983. They used 120-day windows to measure market reactions to the write-off announcement. They found that 45 write-offs were recorded when earnings were below expectation (i.e., big bath) while 22 write-offs were recorded when earnings were above expectation (i.e., income smoothing). They concluded that managers use write-offs to manage earnings.

Bartov, Lindahl, and Ricks (1998) examined both short-term and long-term returns surrounding write-off announcements. In an event study context, they conclude that the market’s response to asset write-offs is significantly negative compared to the response to the write-off related to operating decisions. They also document that the average cumulative market-adjusted returns for the two years preceding the write-off announcement for asset write-off and operating decisions are -34\% and -21\%, respectively.

\textsuperscript{92}Alciatore, Easton, and Spear (2000) conducted an association study rather than short window event study by investigating the relation between accounting data and 'raw' returns. They provided two reasons: (1) they were interested in the question of whether inclusion of the write-off amount in the accounting report provides better summary of the information used by investors in setting prices; and (2) an event study requires an estimation of the unexpected portion of the write-off amount.
Wilson (1996) found that managers are allowed considerable discretion in reporting nondiscretionary write-offs. In addition, many firms announce asset impairment and/or restructuring simultaneously with other announcements.

Unlike prior studies, Rees, Gill, and Gore (1996) investigated the association between write-offs and abnormal accruals. They found that write-off firms have significantly negative abnormal accruals in the write-off year. They concluded that the write-off decision is an appropriate response to the firms' economic environment rather than opportunistically action to manipulate earnings.

Chaney, Hogan and Jeter (1999) focused on the impact of the restructuring charge on the analysts' forecast revisions and errors. They found evidence that analysts revise earnings forecasts downward, forecast accuracy declines, and analysts are optimistically biased subsequent to a restructuring charge announcement.

3.3 Research Design

3.3.1 Annual Returns, Earnings, and Special Items

First, following the prior literature, I examine the partial rank correlation among annual returns, special items, and earnings before special item.\(^93\)

\[
\rho(s_{ti}, r_{ti} | z_{ti})
\]

---

\(^93\)Alciatore, Easton, and Spear (2000) also use the partial rank correlation because parametric correlations were very sensitive to a few outliers in their sample.
where:

- $r_{ti}$ is the annual return for firm $i$ at time $t$;
- $z_{ti}$ is the earnings excluding special items for firm $i$ at time $t$ deflated by $P_{t-1i}$;
- $s_{ti}$ is the special items for firm $i$ at time $t$ deflated by $P_{t-1i}$;
- $P_{t-1i}$ is the security price for firm $i$ at time $t - 1$.

Correlation 3.4 measures the association between contemporaneous return and write-off amount after controlling for the earnings before write-offs. The partial rank correlation analysis is conducted because a significant correlation between contemporaneous return and the write-off amounts may reflect significant correlation between contemporaneous returns and earnings before write-offs.

$$
\rho(z_{ti}, r_{ti}|s_{ti}).
$$

In a similar vein, correlation 3.5 captures the association between contemporaneous returns and earnings before write-offs conditional on the write-off amount.\(^{94}\)

Next, in order to measure the extent to which the annual stock return is associated with the write-off amount, annual stock returns are regressed on components of earnings and the write-off amount. In addition, I investigate whether the inclusion of write-off amounts in earnings can provide a better summary of the information used by the security market. As in the study of Easton and Harris (1991), the return measures are used as a yardstick to evaluate the value relevance of the write-off. To examine the hypothesis, I estimate the coefficients using the following model:

\(^{94}\)I also conducted correlation analysis after controlling for a number of other variables including lagged returns. The result was very similar.
\[
\begin{align*}
    r_{ti} &= \alpha_1 + \beta_1 \cdot x_{ti} + \varepsilon_{ti}^1 \\
    r_{ti} &= \alpha_2 + \beta_2 \cdot z_{ti} + \gamma^2 \cdot s_{ti} + \varepsilon_{ti}^2
\end{align*}
\] (3.6)

where:

- \( r_{ti} \) is the annual return for firm \( i \) at time \( t \);
- \( x_{ti} \) is the earnings for firm \( i \) at time \( t \) deflated by \( P_{t-1i} \);
- \( z_{ti} \) is the earnings excluding special items for firm \( i \) at time \( t \) deflated by \( P_{t-1i} \);
- \( s_{ti} \) is the special items for firm \( i \) at time \( t \) deflated by \( P_{t-1i} \);
- \( P_{t-1i} \) is the security price for firm \( i \) at time \( t - 1 \).

The coefficient \( \gamma^2 \) captures the extent to which the increment to the write-off explains annual stock returns.\(^{95}\) If management has discretion to delay write-offs and the write-offs could already have been perceived in the market, the write-off will not necessarily have explanatory power for returns of the same period.

### 3.3.2 Aggregate Returns, Earnings, and Special Items

One important difference between this study and prior studies is the aggregation of returns, earnings, and special items. The motivation for aggregation is to align accounting data and market metrics. The aim is to examine the impact of a one-time large write-off. Prior studies suggest that the announcement of a write-off leads to mixed reactions in the market, partly due to lack of timeliness. I test whether the write-off decision is significantly related to value-relevant events occurring in prior periods. If this is the case, the association between the annual return and the special

\(^{95}\)I use the beginning stock price as a proper deflator for per-share independent variables to avoid the scale effect (See Easton and Sommers (2001) and Brown, Lo, and Lys (1999)).
items may be less significant due to the discrepancy in the timing of the recognition and measurement errors. I hypothesize that as the return interval increases, the value relevant events are more likely to be captured in the return.

To examine the hypothesis, I extend the aggregation model suggested by Easton, Harris, and Ohlson (1992). Aggregate earnings are decomposed into the aggregate earnings before special items (henceforth: aggregate earnings) and the aggregate special items.\textsuperscript{96}

\[
\frac{P_T + FV S(d_1, \ldots, d_T) - P_0}{P_0} = \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T)}{P_0} + \frac{\sum_{t=1}^{T} s_t}{P_0} + \frac{\Delta g_T}{P_0} \tag{3.7}
\]

Figure 3.1 shows the time-line for the aggregation periods. I partition the sample into pre- and post-write-off periods to test the association between aggregate returns and aggregate write-offs. The write-offs are recorded in fiscal period T.

\textbf{Figure 3.1: Timeline}

\begin{center}
\includegraphics[width=\textwidth]{timeline.png}
\end{center}

\textsuperscript{96}See Appendix B for details.
The pre-write-off period is from \( t_0 \) to \( t_T \), and the post-write-off period is from \( t_T \) and \( t_{2T-1} \). For example, I partition 5 years into two 3-year subperiods with the current year overlapping. For convenience, the aggregated data over the first three years will be called “Pre-write-off” while the aggregated sample over the last three years will be called “Post-write-off”.

Two sets of regression models are tested for pre-write-off and post-write-off.

\textbf{Pre-write-off:}

\[
\begin{align*}
y_{fi} & = \alpha^1_f + \beta^1_f \cdot z_{fi} + \varepsilon^1_{fi} \\
y_{fi} & = \alpha^2_f + \beta^2_f \cdot z^a_{fi} + \gamma^2_f \cdot s_{fi} + \varepsilon^2_{fi}
\end{align*}
\]  

(3.8)

where:

\( y_{fi} \) is the aggregate returns for firm \( i \) for the pre-write-off;

\( z_{fi} \) is the aggregate earnings for firm \( i \) for the pre-write-off;

\( z^a_{fi} \) is the aggregate earnings before special items for firm \( i \) for the pre-write-off;

\( s_{fi} \) is the aggregate special items for firm \( i \) for the pre-write-off.

The coefficient \( \gamma^2_f \) captures the incremental explanatory power of aggregate write-offs over aggregate earnings for the pre-write-off period. If the coefficient \( \gamma^2 \) in the annual regression model (3.6) is insignificant due to the lack of timeliness of the write-offs, it is plausible that the aggregate return \( (y_{fi}) \) over the longer period will capture the misalignment. If this is the case, the association between aggregate return and aggregate write-off will be significantly increased.

In addition, the association between aggregate return and aggregate special items for the post-write-off period will provide evidence to the extent that the write-off decision is related to the value relevant events in the past.
Post-write-off:

\[
\begin{align*}
y_{si} &= \alpha_{s}^{1} + \beta_{s}^{1} \cdot z_{si} + \varepsilon_{si}^{1} \\
y_{si} &= \alpha_{s}^{2} + \beta_{s}^{2} \cdot z_{si} + \gamma_{s}^{2} \cdot s_{si} + \varepsilon_{si}^{2}
\end{align*}
\] (3.9)

where:

- \( y_{si} \) is the aggregate returns for firm \( i \) for the post-write-off;
- \( z_{si} \) is the aggregate earnings for firm \( i \) for the post-write-off;
- \( z_{si}^{a} \) is the aggregate earnings before special items for firm \( i \) for the post-write-off;
- \( s_{si} \) is the aggregate special items for firm \( i \) for the post-write-off.

The coefficient \( \gamma_{s}^{2} \) captures the incremental explanatory power of aggregate write-offs relative to aggregate earnings for the post-write-off period. If the write-off decision is significantly related to the value-relevant events occurring in a prior period, the association between the aggregate special items and the aggregate returns for the post-write-off period should not be as strong as that of past aggregation.

### 3.4 Data, Sample Selection and Descriptive Statistics

The sample data consist of annual earnings from 1961-1999. Earnings before extraordinary items (COMPSTAT #18), number of shares outstanding (COMPSTAT #25), special items (COMPSTAT #17), dividends (COMPSTAT #26), number of shares (COMPSTAT #27), total assets (COMPSTAT #6) and prices (COMPSTAT #199) are obtained from the COMPSTAT Annual file. All per share variables are adjusted for stock splits and stock dividends using Compustat Adjustment factors. The sample selection criteria identify negative special items in the test year. This leads to a sample of 2,402 firm-years. The sample selection rule requires six year data. Following the convention used by prior studies (e.g., Elliott and Shaw (1988),
Elliott and Hanna (1996), etc.), I define a large write-off (big bath) to be a write-off as a special item that represents more than 1% of the assets.\textsuperscript{97} I eliminate firm-year observations if the firm has repeatedly taken large write-offs during the pre- or post-write-off period. I include the observations with large write-offs only in the test year. In other words, if an observation has consecutive large write-offs, I delete the observation. The firms repeatedly taking large write-off are excluded because the research focus of this study is the one-time large write-offs.\textsuperscript{98} I also delete firm years in the top and bottom 1% of return and special items of the write-off year. This write-off group is further partitioned into two groups: those whose special items are greater than 1% of total assets and those whose special items are less than 1% of total assets (i.e., small write-off: $-0.01 \leq \frac{S_{t}}{TA_{t-1}} < 0$ and large write-off: $\frac{S_{t}}{TA_{t-1}} < -0.01$).

Table 3.1 shows the distribution of the sample by year. I include the firm years with write-offs in the third year during the 5-year test period. The number of observations increases from a low of 1 in 1961 to a high of 168 in 1997. Consistent with prior studies, the firms reporting negative special items are increasing during the sample period. 30.8% of the observations are clustered in the 90s. Only five years of the 35 sample years show negative mean earnings before special items. The median special items are lower in the 80s than in other periods. Annual returns are distributed between a low of -0.414 in 1974 and a high of 0.542 in 1968.

\textsuperscript{97}Elliott and Shaw (1988) define a big bath as follows: “There is a write-off, reported as a special item in the financial statements, that represents more than 1% of the book value of assets.”

\textsuperscript{98}Elliott and Hanna (1996) found that 27% of firms reported consecutive big bath. Similarly, 24.5% of my sample reports another large write-off in the next year given a large write-off in the current year.
In addition, I partition the 5 years into two 3-year subperiods with the current year overlapping. Panel A of Table 3.2 reports the descriptive statistics of variables for three years before write-off (pre-write-off), and Panel B of Table 3.2 reports the descriptive statistics of variables for three years after write-off (post-write-off). Interestingly, both panels show negative aggregate returns in the early 70s. While Panel A shows consistently positive aggregate earnings ($z_f$), Panel B reports four cases of negative aggregate earnings ($z_a$). The firms seem to perform well after a big bath. Firms that engage in write-offs show positive aggregate earnings before special items. Aggregate special items are lower in the 80s than in other periods. The pre-write-off aggregate special items ($s_f$) are lowest at -0.157 in 1978. The post-write-off aggregate special items ($s_a$) are lowest at -0.232 in 1976.

The descriptive statistics for variables used in subsequent regressions are reported in Table 3.3. Not surprisingly, about 50% of the returns in the fiscal period in which the write-offs are recorded are negative. In Panel A of Table 3.3, the average annual market return ($r_t$) is around 8.1%. The mean annual earnings ($x_t$) is -0.037. The mean annual special items ($s_t$) is -0.074, and mean annual earnings before special items ($z_t$) is 0.036. Panel A of Table 3.3 also shows the ratio of annual special items to total book value of assets. The average amount of the special items in the write-off year is 3.8% of total assets while the median value of the special items is 1.4% of total assets. The median values of the ratios are zero in both pre- and post write-off periods. Panel B of Table 3.3 documents regression variables for the pre-write-off period. The median aggregate return is 43.4%. The mean aggregate earnings is 0.160 while the mean aggregate earnings before special items is 0.234. The mean aggregate special items is -0.074. Panel C of Table 3.3 documents regression variables for the
post-write-off period. On average, the firms perform well after recognizing special items. The median aggregate return is 60.2%. The mean aggregate earnings is 0.124 while the mean aggregate earnings before special items is 0.203. The mean aggregate special items is -0.079.

3.5 Empirical Results

3.5.1 Test of Association between Annual Returns and Special Items

First, I examine the partial rank correlation among annual returns, special items, and earnings before special item. In Table 3.4, two sets of correlation matrices are estimated. The first set of correlations are based on the observations with small negative special items. In the second set of correlation, the write-off is large (big bath) so that the magnitude of the write-off is considered material. Panel A of Table 3.4 shows the partial rank correlation matrices conditional on pre-write-off earnings for small write-off firms. The correlation between contemporaneous return and special item is 0.091 and significant at the 0.01 level. This result is consistent with prior studies in the sense that some decline in asset value that is recorded in the current period is perceived by the market over the same period. Consistent with my expectations, the correlations between returns of prior years and special item are significantly positive. The correlation is greatest between lagged return and special items (0.235). Interestingly, the correlation between special items and returns

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99 Alciatore et al. (2000) find that the correlation between contemporaneous annual returns and annual write-offs is higher than the correlation between quarterly returns and quarterly write-offs. In the same vein, I expect the special item will be less significantly associated with returns if I use quarterly data.
in the two periods preceding the write-off is significant (0.207). These findings suggest that although the small write-off is correlated with contemporaneous return, significant portions of the decline in asset value have already been captured in returns of previous periods. Special items are not significantly correlated with the return in the following year. As expected, earnings before special items are strongly correlated with contemporaneous return.

In contrast, Panel B of Table 3.4 shows that the correlation between contemporaneous returns and special items for large write-off firms is not statistically significant. The correlations between returns of prior years and special items are stronger compared to those for the small write-off sample. The correlation between lagged returns and special items is highest (0.356), and statistically significant at 0.01. This result seems to suggest that large write-off firms experienced poor performance in previous years and the market already incorporated the bad news in the security price. Interestingly, the correlation between current special items and returns of the following year is significantly negative (-0.112). This result supports the conclusion that firms seem to show better performance after taking a big bath.

Overall, these results suggest that (1) the small write-off is correlated with contemporaneous return; (2) significant portions of the decline in asset value have already been captured in returns of previous periods (this phenomenon is especially prevalent for big baths); and (3) big bath firms seem to have improved future performance.

Similarly, in Table 3.5, two sets of regressions are estimated. One question to be addressed is whether the inclusion of the write-off amounts in earnings provides a

\[^{100}\text{Heffin and Warfield (1997) also report that write-off may be delayed up to three years.}\]
better summary of the information that affected security returns., that is, whether the association between returns, earnings, and write-offs can evaluate the value relevance of the write-off over the fiscal period.

If the market anticipates the write-off due to the prior year’s poor performance, the association between returns, earnings, and write-offs would be poor. In other words, the write-offs are not aligned with market price since the write-off is recorded in the current period and the associated decline in the market value of assets and security price occurred in a prior period. If the write-off decision is partially caused by poor performance in the current year and the write-off summarizes the poor performance, the association will be significant. On the other hand, if the write-offs are reported in a timely manner and summarize all relevant events of the period, the coefficient on the annual special item would be statistically significant.

If the annual special item adds incremental explanatory power to earnings before the special item, the second equation (3.6 on page 98) will show higher adjusted $R^2$. In addition, the coefficient on the special item is expected to be statistically significant from zero.

Table 3.5 presents the association between the annual market return and special items for the negative special item sample. Panel A of Table 3.5 provides evidence of the association between annual stock returns and components of earnings when the special items are small and negative. Contrary to the findings of Alciatore, Easton, and Spear (2000), I find that the small negative special items are not significantly associated with annual return.\[^{101}\] The special item is negatively associated with

\[^{101}\text{Alciatore, Easton, and Spear (2000) noted: "The write-off amounts have statistically significant incremental explanatory power over pre-write-off earnings for return of the fiscal year in which the}\]
market returns although statistical significance is low. The adjusted R$^2$'s for both regressions are 15.8% and 15.7%, respectively. There is no improvement in adjusted R$^2$ for the regressions decomposing total earnings into earnings before special items and special items.

In Panel B of Table 3.5, I conduct the same test for a big bath sample. The association of the special items with respect to annual stock returns is lower than that of earnings. If the market anticipated the write-off due to the decline in the value of assets in previous years, the stock price was adjusted in previous periods. Panel B of Table 3.5 reports association between market adjusted stock returns and components of earnings when the negative special items exceed 1% of the total assets. As expected, the coefficient on the special items is not statistically significant.

This result shows evidence that the market expected the large write-off in prior years. The write-offs are not value relevant for the contemporaneous return if the write-off is previously anticipated. However, the stock market seems to reflect some of the decline in asset values in the fiscal year in which the write-off is recorded. In general, negative special items are partially value relevant (in explaining annual returns).

### 3.5.2 Test of Association between Aggregate Returns, Aggregate Earnings, and Aggregate Special Items

In the previous section, I capture the phenomenon that the write-off is not generally aligned with market prices because there is a noncontemporaneous association

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*write-off is recorded* (the ‘write-down quarter’). That is, the stock market reflects some of the decline in asset values in the fiscal period in which the write-off is recorded.”
between return and write-offs, since a write-off is likely to be recorded in the current period and the associated decline in the market value of assets and security price occurred some time in prior years. As a result, I find a weak association between contemporaneous returns and write-offs. If the market anticipated the write-off some time during the last three years due to the declining value of assets over that period, the efficient market would not show strong association between contemporaneous write-offs and returns. That is, the price would incorporate the decline in asset values years before the write-off. For example, Heflin and Warfield (1997) find that write-offs may be delayed up to three years. That is, an asset's value has declined for three years and the market already incorporated the information over the period, yet the asset write-off may be recorded in the current year.

However, the noncontemporaneous association between returns and write-offs due to the write-off's lack of timeliness will be captured by aggregating variables over the longer interval. Alciatore, Dee, Easton, and Spear (1998) suggest that long-interval analysis can be used to examine timeliness and measurement issues associated with write-offs since the value relevance of write-offs that reflect long-term declines in assets value can be captured in the return measure over the same interval. That is, the longer the interval, the more likely it is that the value relevant events can be captured in earnings, special items, and returns.

Table 3.6 shows the regression results for the pre-write-off period. Panel A of Table 3.6 examines the association between aggregate stock returns and aggregate earnings when the special items are negative. Contrary to my prediction, the coefficient on the aggregate special items ($\gamma_t^s$) is significantly negative. Panel A of Table 3.6 shows the association between aggregate returns ($y_t^s$) and aggregate earnings ($z_t^s$) and
aggregate special item \((s_f)\) when the special items are small negative. The coefficient on aggregate special item (-2.841) is much smaller than that on the aggregate earnings (1.013). Consistent with the annual regression, this result seems to imply that small negative special items are less likely to be delayed and more informative to the market. The adjusted \(R^2\) is slightly improved when the special item variable is included (19.8\% vs 20.5\%).

Panel B of Table 3.6 shows the association between aggregate stock returns and aggregate earnings when the special items are materially large and negative. Unlike the previous result, there is significant improvement in adjusted \(R^2\) for the regressions decomposing total aggregate earnings into aggregate earnings before special items and aggregate special items. More interestingly, the big bath sample shows higher adjusted \(R^2\) (20.5\% vs 24.9\%). Contrary to the association between current special items and returns, the association between aggregate special items and aggregate return is highly significant. As in the previous section, the coefficient on the special item is negative. The coefficient on the special item is significantly smaller than that on the earnings (-0.714 vs 1.719). This result implies that the market seems to have anticipated the write-off some time during last three years due to the declining value of assets over the same period. Overall, the results seem to imply that the market expected the write-off some time during the last three years and has responded favorably to the write-offs. Interestingly, the explanatory power of special items in regard to the return is remarkably improved by the aggregation, especially in the big bath sample. Compared to Panel A of Table 3.5, Panel A of Table 3.6 shows that the adjusted \(R^2\) improved from 13.0\% to 20.5\%. The ramifications of the big bath sample show notable improvement in the explanatory power. In other words, the market incorporated the
decline in assets value into the security prices in a prior period. Panel B of Table 3.6 demonstrates that the adjusted $R^2$ is significantly increased from 2.6% to 24.9%. It is clear that the big bath is not likely to be recorded in a timely manner and is not aligned with market returns.

These results are consistent with those of Alciatore, Easton, and Spear (2000) in the sense that the correlation between the write-off amounts and contemporaneous return is not as strong as the correlation between the write-off amounts and lagged returns. Therefore, the market already perceived the decline in asset value and adjusted to the decline in an earlier period. The association between the market returns and the write-offs are synchronized by the aggregation.

Panels C and D of Table 3.6 show the regression results for the post-write-off sample. The association between aggregate returns and the aggregate special items for the post-write-off period may explain the implication of the write-off to future performance of write-off firms. If the contemporaneous write-off provides implications for future value, the association between the aggregate return and the aggregate special item should be statistically significant. Panel C of Table 3.6 tests the association between aggregate stock returns and aggregate earnings when the special items are negative. The coefficient on the aggregate special items ($s_s$) is significantly negative. Panel D of Table 3.6 shows the association between aggregate returns ($y_s$) and aggregate earnings ($z_s^a$) and aggregate special item ($s_s$) when the special items are small negative. The magnitude of the coefficient on aggregate special item (-6.968) is significantly greater than that on the aggregate earnings (1.183).

Combined with the pre-write-off case, this result seems to imply that small negative write-offs are less likely to be delayed and more informative to the market.
Interestingly, the magnitude of the coefficient on the aggregate special item for the post-write-off is significantly greater than that for pre-write-off. Unlike the case of the pre-write-off, the magnitude of the coefficient on the special item is significantly greater than that on earnings (-0.744 vs 0.267). The adjusted R² is higher when the special item variable is included (20.8% vs 24.0%). Panel B of Table 3.6 shows the association between aggregate stock returns and aggregate earnings when the special items are materially large negative. Compared to the previous result, there is a significant decline in the adjusted R² for the regressions decomposing total aggregate earnings into aggregate earnings before special items and aggregate special items. The explanatory power of the pre-write-off (24.9%) is significantly greater than that of the post-write-off (1.5%). Consistent with prior literature, these results provide evidences that the large write-off (big bath) summarizes past performance. The association between aggregate special items and aggregate return is still significantly negative. The negative coefficients are discussed in the next section.

3.5.3 Test for Profit Firms and Loss Firms

Since the characteristics of the special items are naturally income decreasing, the large negative special items are likely to be related to the firms that report losses. Therefore, to refine the investigation, I continue the analysis by distinguishing between the profit and loss firms. Hayn (1995) reports that the association between annual stock returns and the level of earnings per share deflated by beginning stock price is much weaker for loss firms than for profit firms. Hayn (1995) also reports that the coefficient on earnings is almost zero for loss firms. I am interested in whether there is any difference between the market’s evaluation of the components of earnings
for profit and loss firms. Thus, I partition the sample into profit and loss firms and then test the difference between the small write-off and the large write-off. The reported coefficients and adjusted R²'s are consistent with those of prior studies.¹⁰²

I first test the partial rank correlations among annual returns, special item, and earnings before special item. As in the prior section, two sets of correlation matrices are estimated in Table 3.7. The first set employs the observations with small negative special items. In the second set, the write-off is large (big bath). Panel A of Table 3.7 shows partial rank correlation matrices conditional on earnings before special items for small write-off firms. The upper triangular matrix shows partial correlations for the firms reporting nonnegative earnings figures while the lower triangular matrix summarizes partial correlations for the firms reporting losses. The loss sample shows that the correlation between contemporaneous return and special item is not significant at the 0.01 level while the profit sample shows the correlation is significant (0.118). Consistent with my expectations, the correlations between returns of prior years and special item are higher than the correlation between contemporaneous return and special item. For the sample of profit firms, the correlation between lagged return and special item is highest (0.163). In addition, the correlation between return of the two years preceding write-off recognition and special item is statistically significant at the 0.01 level (0.168). However, the sample of loss firms shows no evidence that special items are significantly correlated with contemporaneous return and/or lagged return.

¹⁰²For example, Hayn (1995) reports the coefficient on earnings for profit firms is 2.62 and that for loss firms is 0.01.
Panel B of Table 3.7 summarizes the partial rank correlation matrices conditional on earnings before special items for large write-off firms. Both the profit and loss firms show that the correlation between lagged returns and special item is statistically significant at the 0.01 level. The correlations between the special item and lagged return for profit and loss firms are 0.262 and 0.268, respectively. Interestingly, the market seems to be aware of the decline in asset value at least two years preceding the recognition of write-offs. The correlations between the special item and return of the two years before the write-off for profit and loss firms are 0.094 and 0.191, respectively. As posited, the significant association between lagged returns and special item is more prevalent for loss samples. Taken together, these results suggest that a significant portion of decline in the value of assets, especially of the loss firms, has already been captured in the market price of prior years. In addition, the recognition of special items is less timely than that of other components of earnings.

The profit sample shows that the correlation between contemporaneous return and special item is significant (0.146) although the correlation between lagged return and special item is higher. Unlike the small write-off sample, the loss firms show that the correlation between contemporaneous return and special item is significant at the 0.01 level. Interestingly, the special items are negatively correlated with contemporaneous return (-0.149). In addition, the special items are significantly negatively correlated with returns of the following years, -0.176 and -0.093, respectively, while the profit sample shows no association between the special item and future returns. This result provides some evidence that many loss firms take write-offs for the sake of the future returns. The result of the big bath sample sheds some light on the prior findings in
the sense that the loss firms can boost future profits and substantially increase the future return by cleaning up the balance sheet.

Panel A of Table 3.8 documents the association between annual returns and components of earnings for profit firms. In Panel A, the coefficient on earnings for small write-off is greater than that for large write-off (2.185 vs 1.710). Consistent with Table 3.7, the coefficient on special item is significantly positive. The coefficient on special item is significantly greater for small write-off firms than that for large write-off firms (3.363 vs 1.859). Similarly, small write-off firms have higher adjusted $R^2$ (16.0% vs 8.1%).

Panel B of Table 3.8 shows the association between annual returns and components of earnings for loss firms. Consistent with the prior literature, the adjusted $R^2$ is much smaller for loss firms than for profit firms. For loss firms, the adjusted $R^2$ on small write-offs is greater than that on large write-offs (3.8% vs 1.0%). However, in loss firms, the magnitude of the coefficient on the special item for large write-off is significantly greater than the coefficient on small write-off. Interestingly enough, the coefficient on the special item is significantly negative for both small write-off (-2.319) and large write-off (-0.251). Further, the coefficient on earnings before the special item for small write-off (0.345) is positive, but that for large write-off (0.031) is negative. The result suggests that the special item at least reflects value relevant information to the market for loss firms.

Overall, the result explains that the negative coefficient on the special item in Panel B of Table 3.5 is mainly due to the loss firms. This is consistent with the argument in the context that managers of loss firms use special items to communicate their private value relevant information, and the market values special items. To
summarize, the special items are positively (negatively) associated with annual stock returns for profit (loss) firms.

Table 3.9 documents the association between aggregate returns and aggregate components of earnings for profit firms and loss firms. Panel A of Table 3.9 documents the association between aggregate returns and aggregate special items for profit firms.

In the pre-write-off regression, the coefficient on earnings for small write-off is smaller than that for large write-off (2.059 vs 3.120). However, the coefficient on special item is significantly greater for small write-off firms than that for large write-off firms (5.798 vs 1.145). In contrast to Table 3.8, Table 3.9 shows that large write-off firms have higher adjusted $R^2$ than small write-off firms (40.5% vs 28.6%).

However, in the post-write-off regression, the coefficient on earnings for small write-off is significantly greater than that for large write-off (2.369 vs 0.601). The coefficient on special item for large write-off firms is not only significantly smaller than that for small write-off firms but is negative (1.672 vs -0.571). Consistent with various indicators of the financial press, the investors seem to view the large write-off for profit firms positively since these firms will almost always show increased profit in the future. The small write-off sample shows greater $R^2$ for the post-write-off regression than that for the pre-write-off regression (33.0% vs 28.6%). Surprisingly, the larger write-off sample shows significantly smaller $R^2$ for the post-write-off regression than that for the pre-write-off regression (4.4% vs 40.5%). This result is consistent with my argument in the sense that the special items reflect the underlying economic events of the past. In other words, the special items summarize the past rather than show information content of future performance.
Panel B of Table 3.9 documents the association between aggregate returns and aggregate special items for loss firms. The adjusted $R^2$ is much smaller for loss firms than for profit firms. In all partitions, the coefficients on earnings are negative. Interestingly, the coefficients on special items for all subsamples are generally significant and negative. The pre-write-off regression shows that the coefficients on special items for both small (-0.669) and large (-0.308) write-offs are negative. In the post-write-off period, only for the large write-off is the coefficient on the special item significantly negative (-0.345). This is also consistent with the result reported in Panel A. It seems that the market has already adjusted to the write-off and rewards the write-off.

Figure 3.2 and Figure 3.3 show various metrics for the entire sample, including earnings per share (EPS), special item per share (SPS), and earnings before special item per share (EBS). Figure 3.4 and Figure 3.5 cover profit firms. Interestingly, large write-off firms have greater mean EBS in the write-off year than in the previous two years ($0 < \text{EBS}_1 < \text{EBS}_2 < \text{EBS}_3$). EBS decreases in the following year and sharply increases from year 5. Figure 3.5 shows that EBS increases monotonically up to year 4 and EBS decreases sharply in year 5. Similarly, Figure 3.6 and Figure 3.7 show graphs for the loss firms. Contrary to the profit firms, the large write-off firms have smaller mean EBS in the write-off year than in the previous two years ($0 > \text{EBS}_1 > \text{EBS}_2 > \text{EBS}_3$). EBS increases sharply in the following years ($\text{EBS}_3 < \text{EBS}_4 < 0 < \text{EBS}_5$). These graphs seem to support the conventional argument in the sense that
a company's profit improves sharply after large write-offs. Figure 3.7 reveals a similar pattern, but the pattern is much weaker.

Overall, the results seem to lend support to a number of analysts who maintain that "the bigger the bath, the better". The loss firms can boost future profits and substantially increase the future return by cleaning up the balance sheet. It seems that firms disclosed the expected large write-off through various communication channels, and the market has already incorporated the expected write-offs in the security price.

3.5.4 Supplemental Test: Information Content of Earnings Announcement

This section examines the impact of earnings announcements on the relation between stock return and unexpected earnings when firms report large special items (i.e., big bath). In investigating the impact of new earnings information on stock returns, the event study is more relevant than the long window association study.

The effectiveness of earnings announcements can be measured by earnings response coefficients (ERCs). Hence, I will compare the earnings response coefficients of large write-off firms with those of small write-off firms.

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103 For example, Berton and Miller (1986) noted: "In the current bullish stock market environment, a major write-off is one of the most bullish things a company can do, says Norman Weinger, a senior vice president of Oppenheimer & Co., a securities firm. "The bigger the bath, the better," he says. "By cleaning up the balance sheet and reducing equity, a company can boost future profits and dramatically increase the future return." An example is CSX Corp., a railroad and energy company that slashed its annual depreciation expenses at least $25 million just by lowering the book value of the assets being depreciated."
Francis, Hanna, and Vincent (1997) observed that write-off disclosures may convey three kinds of information to the market. The first is decrease in asset value. The second is to signal future improvement of firm performance. The last is the firms' willingness and ability to manage earnings. However, it is unclear whether the market reacts positively or negatively to the write-off announcement. If the market expects that the firm has cleaned the table and will have higher future performance, the price reactions to the earnings announcement will be significantly positive. The market anticipates that the write-off firms will increase future profits by cleaning up bad performance of the past. Alternatively, if investors have higher uncertainty about the reported earnings figures of firms with large write-offs, the market will not react significantly to the earnings announcement. Prior studies found no clear evidence that the market reacts significantly to the earnings announcement when firms report write-offs. One potential explanation of weak reaction to the earnings announcement

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104 The majority of firms report write-offs with the earnings announcement. For example, Francis, Hanna, and Vincent (1997) found that 82% of their sample firms simultaneously announce write-offs and earnings figures.

105 Similarly, Bunsis (1997) documented the significantly positive market returns for write-off announcements that were greater than 5% of total assets.

106 A number of anecdotal evidences support positive market reaction to the big bath announcement. For example, Berton and Miller (1986) reported the profusion of write-offs: “Wall Street analysts generally favor the “big bath” in one quarter over a series of write-downs in several quarters. The bath allows a company “to wash away all of its past problems in one quarter and clear the way for a surge in profits,” one analyst says, while a lingering series of write-downs “would probably erode the company’s reputation and its stock price.”

Bleckley (1995) observed that the market positively reacts to write-off announcement because “a write-off, a one-time charge that reduces earnings, may signal a management’s intent to purge itself of money losing businesses or excessive costs.

In Cisco’s case, CNNMoney (2001) reported that Cisco Systems announced restructuring including write-off and executives changes. The market responded positively to the announcement.
would be the uncertainty of future performance of write-off firms. Thus, I first test whether investors react differently to the earnings report in a write-off period.

Easton and Zmijewski (1989) found that ERCs are a decreasing function of risk and an increasing function of earnings persistence. I suggest that a large write-off increases the level of uncertainty in the future earnings numbers. Thus, if the market interprets the firm’s confirming the expectations in the following period as a positive signal about firm specific risk and/or persistence, the market will react more significantly to the earnings announcements of write-off firms compared to those of other firms. To detect a potential shift in the earnings response coefficient, I measure earnings response coefficients of firms for the post-write-off period. The difference in ERCs measures how investors interpret the new earnings information in the next period. The earnings news may resolve uncertainty and signal future improvement of firm performance. I expect that less uncertainty implies a greater reaction to the new earnings information. Thus, this study tests whether the market reacts to earnings surprise differently in the next period conditional on the presence of large special items and no special items.

In this section, I estimate regression 1 and regression 2 using OLS regression. Market adjusted returns ($CAR_{jt}$ and $CAR_{jt+1}$) are returns subtracted from value weighted market return. All returns are compounded over the three-day window surrounding the earnings announcement dates ($EAD_{jt}$ and $EAD_{jt+1}$). $D_i$'s are dummy variables that capture the difference in the slope coefficients of SI and NSI. I partition the SI variable into two parts (zero special item and special item $> -1\%$). To

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107 In this study, I do not attempt to distinguish the impact of the two factors on the earnings response coefficient.
check whether the market reacts differently to the earnings information depending on whether firms have a small special item or no special item in period t+1 (i.e., a one time big bath).

Regression 3.10 computes earnings response coefficients for the current period while regression 3.11 measures earnings response coefficients for the following period. The dummy variables $D_1$ and $D_1$ are set to zero when a firm has zero SI on Compustat in period t and t+1, $D_1 = 1$ when a firm has large SI in period t and small SI in period t+1, and $D_2 = 1$ when a firm has large SI in period t and zero SI in period t+1.

**Regression 3.10:**

$$CAR_{jt} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt} + \beta_1 \cdot D_1 \cdot es_{jt} + \beta_2 \cdot D_2 \cdot es_{jt} + \epsilon_{jt} \quad (3.10)$$

**Regression 3.11:**

$$CAR_{jt+1} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt+1} + \beta_1 \cdot D_1 \cdot es_{jt+1} + \beta_2 \cdot D_2 \cdot es_{jt+1} + \epsilon_{jt+1} \quad (3.11)$$

where:

$es_{jt} =$ Earnings surprise at time t;

$es_{jt+1} =$ Earnings surprise at time t + 1;

$D_i =$ Dummy variable $\forall i = 1,2,3$

$$D_1 = \begin{cases} 0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\ 1 & \text{if } SI_{jt} \leq -1\% \text{ and } -1\% < SI_{jt+1} < 0. \end{cases}$$

$$D_2 = \begin{cases} 0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\ 1 & \text{if } SI_{jt} \leq -1\% \text{ and } SI_{jt+1} = 0. \end{cases}$$

The results of the regression analysis are reported in Table 3.10 and Table 3.11.

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First, Table 3.10 presents estimates of the coefficients from the regression of abnormal returns on the contemporaneous earnings surprise. The slope coefficients on the earnings surprise with large special items are statistically significant at the 0.05 level or better while the slope coefficient with zero special item is not statistically significant. The intercept coefficients are significant at the 0.1 level. The evidence indicates that, for the firms that have SI in the current period, the market reacts differently against the same amount of earnings surprise. If market participants had unbiased expectations of earnings surprise, the coefficients $\beta_1$ and $\beta_2$ should be insignificant from zero. $\beta_1$ (0.066) shows that firms that are expected to take a repetitive write-off in the next period have higher earnings response coefficients. The negative earnings response coefficient on $\beta_2$ (-0.246) suggests that the market interprets large negative earnings surprise as good news. In other words, the market expects that the write-off firms will increase future profits by cleaning up the balance sheet.

Table 3.11 summarizes the earnings response coefficients for the following period. If the earnings surprise resolves the uncertainty for the firms with a big bath in the previous period, the market will react more strongly to the same amount of earnings surprise. As posited, the result provides evidence that the earnings surprise of SI firms with zero special item in the following year (i.e., a one time big bath) is more highly associated with the market adjusted return ($\beta_2=1.405$). In contrast to Table 3.10, the insignificant $\beta_1$ suggests that the market does not differentiate the firms with a small write-off again in the following period from non-write-off firms. The adjusted $R^2$ of 0.021 for the cross-sectional regression is reasonable for this analysis.

Taken together, the result shows that the earnings response coefficient is negative with respect to firms with a one time large write-off. This suggests that the market
interprets large negative earnings surprise as good news. In addition, the firms taking big bath have greater earnings response coefficients in the following period. The market appears to reinterpret earnings news at the time of the earnings announcement with informational asymmetry. This result suggests that the market appears to wait for new earnings information to resolve the uncertainty with respect to the future performance of big bath firms. Overall, the results are consistent with prior literature in the sense that the big bath firms can boost future profits and substantially increase future returns by eliminating potential future loss.108

3.6 Summary

The main purpose of this study is to assess whether the association of asset write-offs and security market returns is well aligned. That is, I investigate whether write-offs are recorded in a timely manner. FASB statement No. 144. requires that asset write-off should reflect contemporaneous information. I have demonstrated that write-offs’ lack of timeliness is an important contributor to the low contemporaneous association between returns and earnings for write-off firms.

It is well known that the association between earnings and returns is nonlinear around zero. Thus, unlike prior studies, I partitioned the sample into profit firms and loss firms. For profit firms, the special items are positively correlated with contemporaneous return although the special items are more strongly correlated with lagged returns. This result is consistent with the findings of prior studies in the sense that some decline in asset value recorded in current the period is perceived by the market

108 Elliott and Shaw (1988) list extant examples from the financial press that provide anecdotal evidence of positive share price reaction to write-off announcements. See footnotes 13 and 14.
over the same period while the majority of the decline has been incorporated in the stock prices in the previous periods. Interestingly, the correlations between special item and future (lagged) returns are negative (positive) for loss firms. The negative correlation between special item and future return is more prevalent for large write-off firms. These evidences suggest that loss firms can boost future profits and substantially increase future returns by cleaning up the balance sheet. In a supplemental event study, the negative earnings response coefficients suggest that the market interprets large one time write-offs as good news. The market seems to expect that the write-off firms will increase future profits by cleaning up bad performance of the past. This result also supports anecdotal evidence that "the bigger the bath, the better".

In addition, I find that the associations between the annual (aggregate) special items and the annual (aggregate) returns are negative due to the effects of loss firms. That is, the association between returns and special items is positive (negative) for profit (loss) firms. Not surprisingly, the aggregate write-off amounts have statistically significant incremental explanatory power for the aggregate returns over the same period. Especially, as demonstrated by the subsamples of profit firms and loss firms, the aggregate write-off amounts have statistically significant incremental explanatory power for the aggregate returns of profit firms. I also find that the aggregate write-off amounts have statistically significant explanatory power for the aggregate returns over the future period at some level.

Figures 3.8 and 3.9 show distribution of aggregate returns and aggregate special items, and scatter plots of aggregate returns and aggregate special items for the pre-write-off period. Figure 3.8 reveals that roughly 50% of loss firms have lost 50% of the price during the pre-write-off period. This result is consistent with prior studies in
the sense that they found significantly negative price-earnings associations for large loss firms. One possible explanation is that the large negative value of special items may be associated with management decisions which will be taken in the following years while the implications of the decisions are already reflected in prior prices.

Given the recent pronouncement of FASB statement No. 144, this study supplements the existing literature on the relation between the stock market and write-offs. The study has examined the impact of write-offs on the stock market in various contexts from a short window event study to a long interval association test. The results suggest that write-offs are not well aligned with underlying economic events and with security market returns. Aggregating the components of earnings significantly increases the explanatory power of the components of earnings with respect to the security market returns. Therefore, it can be concluded that the write-offs are recorded in a less timely manner and that contemporaneous write-offs summarize underlying economic events of the past. In addition, loss firms seem to signal future performance by taking large write-offs. This is consistent with the market viewing the big bath as a signal of improved future performance.

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$r_t$ is the annual market return. $s_t$ is the annual special items (COMPSTAT #17) deflated by $P_{t-1}$. $z_t$ is the annual earnings excluding special items (COMPSTAT #18-COMPSTAT #17) deflated by $P_{t-1}$. All variables are per share variables deflated by price and adjusted for stock splits and stock dividends.

Table 3.1: Descriptive Statistics for Variables by Year

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Panel A: Pre-write-off

<table>
<thead>
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<th>Year</th>
<th>$y_f$ Mean</th>
<th>$y_f$ Median</th>
<th>$z_f$ Mean</th>
<th>$z_f$ Median</th>
<th>$z_f^2$ Mean</th>
<th>$z_f^2$ Median</th>
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<th>$s_f$ Median</th>
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Note:

$y_f$ is the aggregate return for firm $i$ for the pre-write-off;
$z_f$ is the aggregate earnings for firm $i$ for the pre-write-off;
$z_f^2$ is the aggregate earnings excluding aggregate special items for firm $i$ for the pre-write-off;
$s_f$ is the aggregate special items for firm $i$ for the pre-write-off.

Table 3.2: Descriptive Statistics for Variables by Year

Continued
Continued

Panel B: Post-write-off

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<th>Year</th>
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<th>$z_s$</th>
<th>Median</th>
<th>$z_s^a$</th>
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<td>0.097</td>
<td>0.059</td>
<td>0.187</td>
<td>-0.070</td>
<td>-0.024</td>
</tr>
<tr>
<td>1985</td>
<td>0.317</td>
<td>0.049</td>
<td>0.087</td>
<td>0.124</td>
<td>0.165</td>
<td>0.177</td>
<td>-0.078</td>
<td>-0.029</td>
</tr>
<tr>
<td>1986</td>
<td>0.458</td>
<td>0.249</td>
<td>-0.138</td>
<td>0.125</td>
<td>-0.014</td>
<td>0.187</td>
<td>-0.125</td>
<td>-0.038</td>
</tr>
<tr>
<td>1987</td>
<td>0.096</td>
<td>0.056</td>
<td>-0.027</td>
<td>0.139</td>
<td>0.044</td>
<td>0.173</td>
<td>-0.071</td>
<td>-0.024</td>
</tr>
<tr>
<td>1988</td>
<td>0.160</td>
<td>0.047</td>
<td>0.323</td>
<td>0.159</td>
<td>0.381</td>
<td>0.193</td>
<td>-0.058</td>
<td>-0.026</td>
</tr>
<tr>
<td>1989</td>
<td>0.174</td>
<td>0.090</td>
<td>0.077</td>
<td>0.150</td>
<td>0.146</td>
<td>0.183</td>
<td>-0.068</td>
<td>-0.022</td>
</tr>
<tr>
<td>1990</td>
<td>0.327</td>
<td>0.155</td>
<td>0.072</td>
<td>0.144</td>
<td>0.127</td>
<td>0.175</td>
<td>-0.055</td>
<td>-0.025</td>
</tr>
<tr>
<td>1991</td>
<td>0.477</td>
<td>0.211</td>
<td>0.019</td>
<td>0.155</td>
<td>0.065</td>
<td>0.182</td>
<td>-0.046</td>
<td>-0.018</td>
</tr>
<tr>
<td>1992</td>
<td>0.806</td>
<td>0.351</td>
<td>-0.027</td>
<td>0.135</td>
<td>0.058</td>
<td>0.180</td>
<td>-0.085</td>
<td>-0.034</td>
</tr>
<tr>
<td>1993</td>
<td>0.497</td>
<td>0.225</td>
<td>0.072</td>
<td>0.150</td>
<td>0.136</td>
<td>0.188</td>
<td>-0.064</td>
<td>-0.021</td>
</tr>
<tr>
<td>1994</td>
<td>0.665</td>
<td>0.266</td>
<td>0.051</td>
<td>0.149</td>
<td>0.116</td>
<td>0.186</td>
<td>-0.064</td>
<td>-0.024</td>
</tr>
<tr>
<td>1995</td>
<td>1.009</td>
<td>0.272</td>
<td>0.062</td>
<td>0.158</td>
<td>0.125</td>
<td>0.191</td>
<td>-0.063</td>
<td>-0.020</td>
</tr>
<tr>
<td>1996</td>
<td>1.043</td>
<td>0.691</td>
<td>0.134</td>
<td>0.162</td>
<td>0.199</td>
<td>0.218</td>
<td>-0.055</td>
<td>-0.028</td>
</tr>
<tr>
<td>1997</td>
<td>0.703</td>
<td>0.584</td>
<td>0.173</td>
<td>0.227</td>
<td>0.212</td>
<td>0.267</td>
<td>-0.039</td>
<td>-0.021</td>
</tr>
</tbody>
</table>

Note:

- $y_s$ is the aggregate return for firm $i$ for the post-write-off;
- $z_s$ is the aggregate earnings for firm $i$ for the post-write-off;
- $z_s^a$ is the aggregate earnings excluding aggregate special items for firm $i$ for the post-write-off;
- $s_s$ is the aggregate special items for firm $i$ for the post-write-off.

Table 2.9: Firm Characteristics
Panel A:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r_t$</td>
<td>0.081</td>
<td>0.555</td>
<td>-0.250</td>
<td>0.000</td>
<td>0.286</td>
</tr>
<tr>
<td>$x_t$</td>
<td>-0.037</td>
<td>0.335</td>
<td>-0.064</td>
<td>0.037</td>
<td>0.089</td>
</tr>
<tr>
<td>$z_t$</td>
<td>0.036</td>
<td>0.296</td>
<td>0.004</td>
<td>0.067</td>
<td>0.126</td>
</tr>
<tr>
<td>$s_t$</td>
<td>0.074</td>
<td>0.140</td>
<td>-0.071</td>
<td>-0.025</td>
<td>-0.068</td>
</tr>
<tr>
<td>$\frac{S_{It-2}}{TA_{t-3}}$</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$\frac{S_{It-1}}{TA_{t-2}}$</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$\frac{S_{It}}{TA_{t-1}}$</td>
<td>-0.038</td>
<td>0.128</td>
<td>-0.037</td>
<td>-0.014</td>
<td>-0.005</td>
</tr>
<tr>
<td>$\frac{S_{It+1}}{TA_{t}}$</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>$\frac{S_{It+2}}{TA_{t+1}}$</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

$r_t$ is contemporaneous market return calculated as $r_t = \frac{P_{t+d_t} - P_{t-1}}{P_{t-1}}$ where $P_t$ is the fiscal year end price (COMPUSTAT #190). $x_t$ is the annual earnings excluding extraordinary items (COMPUSTAT #18) deflated by $P_{t-1}$. $SI$ is the annual special items (COMPUSTAT #17). $s_t$ is $SI_t$ deflated by $P_{t-1}$.

Panel B: Pre-write-off

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_f$</td>
<td>0.433</td>
<td>1.680</td>
<td>-0.314</td>
<td>0.157</td>
<td>0.692</td>
</tr>
<tr>
<td>$z_f$</td>
<td>0.160</td>
<td>0.525</td>
<td>0.001</td>
<td>0.185</td>
<td>0.341</td>
</tr>
<tr>
<td>$z_f^a$</td>
<td>0.234</td>
<td>0.523</td>
<td>0.061</td>
<td>0.228</td>
<td>0.394</td>
</tr>
<tr>
<td>$s_f$</td>
<td>-0.074</td>
<td>0.157</td>
<td>-0.073</td>
<td>-0.027</td>
<td>-0.011</td>
</tr>
</tbody>
</table>

$z_f$ is the aggregate earnings including aggregate special items. $z_f^a$ is the aggregate earnings excluding aggregate special items. $s_f$ is the aggregate special items. All variables are per share variables deflated by the beginning-of-the-period price and adjusted for stock splits and stock dividends.

Panel C: Post-write-off

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_s$</td>
<td>0.602</td>
<td>2.195</td>
<td>-0.212</td>
<td>0.289</td>
<td>0.908</td>
</tr>
<tr>
<td>$z_s$</td>
<td>0.124</td>
<td>0.934</td>
<td>-0.019</td>
<td>0.185</td>
<td>0.350</td>
</tr>
<tr>
<td>$z_s^a$</td>
<td>0.203</td>
<td>0.919</td>
<td>0.051</td>
<td>0.224</td>
<td>0.407</td>
</tr>
<tr>
<td>$s_s$</td>
<td>-0.079</td>
<td>0.143</td>
<td>-0.079</td>
<td>-0.029</td>
<td>-0.010</td>
</tr>
</tbody>
</table>

$y_s$ is the aggregate market return. $z_s$ is the aggregate earnings including aggregate special items. $z_s^a$ is the aggregate earnings excluding aggregate special items. $s_s$ is the aggregate special items. All variables are per share variables deflated by the beginning-of-the-period price and adjusted for stock splits and stock dividends.

Table 3.3: Descriptive Statistics for Variables

128
## Panel A: $-0.01 \leq \frac{S_t}{TA_{t-1}} < 0$

<table>
<thead>
<tr>
<th></th>
<th>$r_{t-2}$</th>
<th>$r_{t-1}$</th>
<th>$r_t$</th>
<th>$r_{t+1}$</th>
<th>$r_{t+2}$</th>
<th>$s_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r_{t-2}$</td>
<td>-0.014</td>
<td>-0.111</td>
<td>-0.016</td>
<td>0.000</td>
<td>0.207</td>
<td></td>
</tr>
<tr>
<td>$r_{t-1}$</td>
<td>0.680</td>
<td>0.001</td>
<td>0.631</td>
<td>0.993</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>$r_t$</td>
<td>-0.052</td>
<td>-0.070</td>
<td>-0.049</td>
<td>0.031</td>
<td>0.235</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.118</td>
<td>0.034</td>
<td>0.140</td>
<td>0.353</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>$r_{t+1}$</td>
<td>-0.078</td>
<td>-0.015</td>
<td>-0.032</td>
<td>-0.110</td>
<td>0.091</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.019</td>
<td>0.650</td>
<td>0.330</td>
<td>0.001</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>$r_{t+2}$</td>
<td>-0.003</td>
<td>-0.024</td>
<td>0.061</td>
<td>0.010</td>
<td>0.022</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.925</td>
<td>0.461</td>
<td>0.064</td>
<td>0.755</td>
<td>0.505</td>
<td></td>
</tr>
<tr>
<td>$z_t$</td>
<td>-0.019</td>
<td>0.059</td>
<td>-0.037</td>
<td>0.036</td>
<td>-0.038</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.562</td>
<td>0.076</td>
<td>0.265</td>
<td>0.280</td>
<td>0.249</td>
<td></td>
</tr>
<tr>
<td>$s_t$</td>
<td>0.087</td>
<td>0.148</td>
<td>0.459</td>
<td>0.199</td>
<td>0.125</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Partial correlations conditional on $z_t$ are reported in the upper triangular matrix and partial correlations conditional on $s_t$ are reported in the lower triangular matrix.

- $r_t$ is the annual return for firm $i$ at time $t$;
- $z_t$ is the earnings excluding special item for firm $i$ at time $t$ deflated by $P_{t-1}$;
- $s_t$ is the special items for firm $i$ at time $t$ deflated by $P_{t-1}$;
- $P_{t-1}$ is the security price for firm $i$ at time $t - 1$.

All correlations are partial Spearman rank correlations.

### Table 3.4: Partial Correlation of Write-off Amounts and Annual Returns.
Continued

**Panel B:** $\frac{S_{t-1}}{T_{A,t-1}} < -0.01$

<table>
<thead>
<tr>
<th></th>
<th>$r_{t-2}$</th>
<th>$r_{t-1}$</th>
<th>$r_t$</th>
<th>$r_{t+1}$</th>
<th>$r_{t+2}$</th>
<th>$s_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r_{t-2}$</td>
<td>0.015</td>
<td>-0.070</td>
<td>-0.030</td>
<td>0.071</td>
<td>0.181</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.578</td>
<td>0.009</td>
<td>0.264</td>
<td>0.008</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>$r_{t-1}$</td>
<td>-0.032</td>
<td>-0.048</td>
<td>-0.172</td>
<td>-0.061</td>
<td>0.356</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.225</td>
<td>0.073</td>
<td>&lt;.0001</td>
<td>0.022</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>$r_t$</td>
<td>-0.024</td>
<td>0.020</td>
<td>-0.059</td>
<td>-0.116</td>
<td>-0.007</td>
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</tr>
<tr>
<td></td>
<td>0.377</td>
<td>0.453</td>
<td>0.027</td>
<td>&lt;.0001</td>
<td>0.790</td>
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</tr>
<tr>
<td>$r_{t+1}$</td>
<td>0.011</td>
<td>-0.105</td>
<td>0.011</td>
<td>0.012</td>
<td>-0.112</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.672</td>
<td>&lt;.0001</td>
<td>0.670</td>
<td>0.665</td>
<td>&lt;.0001</td>
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</tr>
<tr>
<td>$r_{t+2}$</td>
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<td>-0.023</td>
<td>-0.060</td>
<td>0.030</td>
<td>-0.048</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.392</td>
<td>0.024</td>
<td>0.258</td>
<td>0.073</td>
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</tr>
<tr>
<td>$z_t$</td>
<td>0.113</td>
<td>0.179</td>
<td>0.362</td>
<td>0.184</td>
<td>0.131</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Partial correlations conditional on $z_t$ are reported in the upper triangular matrix and partial correlations conditional on $s_t$ are reported in the lower triangular matrix.

$r_t$ is the annual return for firm $i$ at time $t$;
$z_t$ is the earnings excluding special item for firm $i$ at time $t$ deflated by $P_{t-1}$;
$s_t$ is the special items for firm $i$ at time $t$ deflated by $P_{t-1}$;
$P_{t-1}$ is the security price for firm $i$ at time $t - 1$.

All correlations are partial Spearman rank correlations.

**Table 3.4: Partial Correlation of Write-Off Amounts and Annual Returns.**
Panel A: $-0.01 \leq \frac{SL_{t}} {TA_{t-1}} < 0$

<table>
<thead>
<tr>
<th>n=958</th>
<th>$\alpha^1$</th>
<th>$\beta^1$</th>
<th>$\alpha^2$</th>
<th>$\beta^2$</th>
<th>$\gamma^2$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-0.025</td>
<td>1.658</td>
<td></td>
<td></td>
<td></td>
<td>0.158</td>
</tr>
<tr>
<td>$t$</td>
<td>-1.24</td>
<td>9.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>0.216</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>n=958</th>
<th>$\alpha^1$</th>
<th>$\beta^1$</th>
<th>$\alpha^2$</th>
<th>$\beta^2$</th>
<th>$\gamma^2$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-0.022</td>
<td>1.662</td>
<td>1.997</td>
<td></td>
<td></td>
<td>0.157</td>
</tr>
<tr>
<td>$t$</td>
<td>-0.87</td>
<td>9.67</td>
<td></td>
<td></td>
<td></td>
<td>1.46</td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>0.382</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B: $\frac{SL_{t}} {TA_{t-1}} < -0.01$

<table>
<thead>
<tr>
<th>n=1,444</th>
<th>$\alpha^1$</th>
<th>$\beta^1$</th>
<th>$\alpha^2$</th>
<th>$\beta^2$</th>
<th>$\gamma^2$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>0.004</td>
<td>0.270</td>
<td></td>
<td></td>
<td></td>
<td>0.021</td>
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<tr>
<td>$t$</td>
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<td>4.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>0.795</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>$\alpha^1$</th>
<th>$\beta^1$</th>
<th>$\alpha^2$</th>
<th>$\beta^2$</th>
<th>$\gamma^2$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-0.039</td>
<td>0.456</td>
<td>-0.995</td>
<td></td>
<td>0.036</td>
<td></td>
</tr>
<tr>
<td>$t$</td>
<td>-2.08</td>
<td>6.28</td>
<td>-0.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>0.004</td>
<td>&lt;0.0001</td>
<td>0.369</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

$r_{ti} = \alpha^1 + \beta^1 \cdot x_{ti} + \varepsilon_{ti}^1$

$r_{ti} = \alpha^2 + \beta^2 \cdot z_{ti} + \gamma^2 \cdot s_{ti} + \varepsilon_{ti}^2$

Where:

$r_{ti}$ is the annual return for firm $i$ at time $t$;

$x_{ti}$ is the earnings for firm $i$ at time $t$ deflated by $P_{t-1i}$;

$z_{ti}$ is the earnings excluding special item for firm $i$ at time $t$ deflated by $P_{t-1i}$;

$s_{ti}$ is the special items for firm $i$ at time $t$ deflated by $P_{t-1i}$;

$P_{t-1i}$ is the security price for firm $i$ at time $t - 1$.

Table 3.5: Regression of Annual Returns on Annual Earnings

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Panel A: Pre-write-off ($-0.01 \leq \frac{S_h}{TA_{t-1}} < 0$)

<table>
<thead>
<tr>
<th>n=958</th>
<th>$\alpha^3_f$</th>
<th>$\beta^3_f$</th>
<th>$\alpha^4_f$</th>
<th>$\beta^4_f$</th>
<th>$\gamma^4_f$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{fi}$</td>
<td>0.213</td>
<td>1.023</td>
<td></td>
<td></td>
<td></td>
<td>0.198</td>
</tr>
<tr>
<td>$t$</td>
<td>6.05</td>
<td>15.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| y$_{fi}$ | 0.141 | 1.013 | -2.841 | 0.205 |
| $t$ | 3.4 | 15.29 | -2.4 | |
| $Pr > |t|$ | 0.0007 | <0.0001 | 0.0168 | |

Panel B: Pre-write-off ($\frac{S_h}{TA_{t-1}} < -0.01$)

<table>
<thead>
<tr>
<th>n=1,444</th>
<th>$\alpha^3_f$</th>
<th>$\beta^3_f$</th>
<th>$\alpha^4_f$</th>
<th>$\beta^4_f$</th>
<th>$\gamma^4_f$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{fi}$</td>
<td>0.214</td>
<td>1.537</td>
<td></td>
<td></td>
<td></td>
<td>0.198</td>
</tr>
<tr>
<td>$t$</td>
<td>4.93</td>
<td>18.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$Pr &gt;</td>
<td>t</td>
<td>$</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| y$_{fi}$ | -0.070 | 1.719 | -0.714 | 0.249 |
| $t$ | -1.38 | 21.27 | -2.99 | |
| $Pr > |t|$ | 0.1667 | <0.0001 | 0.0029 | |

Notes:

\[ y_{fi} = \alpha^3_f + \beta^3_f \cdot z_{fi} + \epsilon^3_{fi} \]
\[ y_{fi} = \alpha^4_f + \beta^4_f \cdot z^4_{fi} + \gamma^4_f \cdot s_{fi} + \epsilon^4_{fi} \]

Where:

- $y_{fi}$ is the aggregate return for firm $i$ for the pre-write-off;
- $z_{fi}$ is the aggregate earnings for firm $i$ for the pre-write-off;
- $z^4_{fi}$ is the aggregate earnings excluding special items for firm $i$ for the pre-write-off;
- $s_{fi}$ is the aggregate special items for firm $i$ for the pre-write-off.

Table 3.6: Regression of Aggregate Returns on Aggregate Earnings

Continued
Continued

**Panel C: Post-write-off** \((-0.01 \leq \frac{s_{it}}{TA_{it-1}} < 0)\)

<table>
<thead>
<tr>
<th>()</th>
<th>(\alpha^3_i)</th>
<th>(\beta^3_i)</th>
<th>(\alpha^4_i)</th>
<th>(\beta^4_i)</th>
<th>(\gamma^4_i)</th>
<th>Adj.R(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y_{fi})</td>
<td>0.385</td>
<td>1.107</td>
<td></td>
<td></td>
<td></td>
<td>0.208</td>
</tr>
<tr>
<td>(t)</td>
<td>9.05</td>
<td>15.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Pr \geq</td>
<td>t</td>
<td>)</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| \(\)  | 0.202          | 1.183         | -6.968         | 0.240          |
| \(y_{fi}\) |                |                |                |                |
| \(t\)   | 3.99           | 17.07         | -5.48          |                |
| \(Pr \geq |t|\)  | <0.0001        | <0.0001        | <0.0001        |                |

**Panel D: Post-write-off** \((- \frac{s_{it}}{TA_{it-1}} \leq -0.01)\)

<table>
<thead>
<tr>
<th>()</th>
<th>(\alpha^3_s)</th>
<th>(\beta^3_s)</th>
<th>(\alpha^4_s)</th>
<th>(\beta^4_s)</th>
<th>(\gamma^4_s)</th>
<th>Adj.R(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y_{fi})</td>
<td>0.558</td>
<td>0.226</td>
<td></td>
<td></td>
<td></td>
<td>0.008</td>
</tr>
<tr>
<td>(t)</td>
<td>8.21</td>
<td>3.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Pr \geq</td>
<td>t</td>
<td>)</td>
<td>&lt;0.0001</td>
<td>0.0003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| \(\)  | 0.425          | 0.267         | -0.744         | 0.015          |
| \(y_{fi}\) |                |                |                |                |
| \(t\)   | 5.33           | 4.26          | -2.37          |                |
| \(Pr \geq |t|\)  | <0.0001        | <0.0001        | 0.0179         |                |

Notes:

\[ y_{si} = \alpha^3_s + \beta^3_s \cdot z_{si} + \varepsilon^3_{si} \]
\[ y_{si} = \alpha^4_s + \beta^4_s \cdot z^a_{si} + \gamma^4_s \cdot \delta_{si} + \varepsilon^4_{si} \]

Where:

\(y_{si}\) is the aggregate return for firm \(i\) for the post-write-off;
\(z_{si}\) is the aggregate earnings for firm \(i\) for the post-write-off;
\(z^a_{si}\) is the aggregate earnings excluding special items for firm \(i\) for the post-write-off;
\(s_{si}\) is the aggregate special items for firm \(i\) for the post-write-off.

**Table 3.6: Regression of Aggregate Returns on Aggregate Earnings.**
Panel A: \(-0.01 \leq \frac{S_t}{TA_{t-1}} < 0\)

<table>
<thead>
<tr>
<th></th>
<th>(r_{t-2})</th>
<th>(r_{t-1})</th>
<th>(r_t)</th>
<th>(r_{t+1})</th>
<th>(r_{t+2})</th>
<th>(s_t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(r_{t-2})</td>
<td>0.105</td>
<td>0.001</td>
<td>0.679</td>
<td>0.555</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>(r_{t-1})</td>
<td>-0.097</td>
<td>-0.052</td>
<td>-0.040</td>
<td>0.047</td>
<td>0.163</td>
<td></td>
</tr>
<tr>
<td>(r_t)</td>
<td>0.237</td>
<td>0.155</td>
<td>0.267</td>
<td>0.191</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>(r_{t+1})</td>
<td>-0.089</td>
<td>0.040</td>
<td>-0.053</td>
<td>-0.112</td>
<td>0.118</td>
<td></td>
</tr>
<tr>
<td>(r_{t+2})</td>
<td>0.274</td>
<td>0.626</td>
<td>0.140</td>
<td>0.002</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>(s_t)</td>
<td>0.447</td>
<td>0.021</td>
<td>0.696</td>
<td>0.430</td>
<td>0.823</td>
<td></td>
</tr>
<tr>
<td>(s_t)</td>
<td>-0.062</td>
<td>-0.188</td>
<td>0.032</td>
<td>-0.029</td>
<td>0.008</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
Partial correlations for **Profit Firms** are reported in the upper triangular matrix and partial correlations for **Loss Firms** are reported in the lower triangular matrix.

- \(r_t\) is the annual return for firm \(i\) at time \(t\);
- \(z_t\) is the earnings excluding special item for firm \(i\) at time \(t\) deflated by \(P_{t-1}\);
- \(s_t\) is the special items for firm \(i\) at time \(t\) deflated by \(P_{t-1}\);
- \(P_{t-1}\) is the security price for firm \(i\) at time \(t-1\).

All correlations are partial Spearman rank correlations conditional on \(z_t\).

**Table 3.7: Partial Correlation of Write-Off Amounts and Annual Returns.**

Continued
Continued

**Panel B: \( \frac{S_{It}}{TA_{t-1}} < -0.01 \)**

<table>
<thead>
<tr>
<th></th>
<th>( r_{t-2} )</th>
<th>( r_{t-1} )</th>
<th>( r_t )</th>
<th>( r_{t+1} )</th>
<th>( r_{t+2} )</th>
<th>( s_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( r_{t-2} )</td>
<td>-0.071</td>
<td>0.050</td>
<td>-0.014</td>
<td>0.071</td>
<td>0.094</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.115</td>
<td>0.267</td>
<td>0.751</td>
<td>0.115</td>
<td>0.037</td>
<td></td>
</tr>
<tr>
<td>( r_{t-1} )</td>
<td>-0.022</td>
<td>0.013</td>
<td>-0.147</td>
<td>-0.046</td>
<td>0.262</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.620</td>
<td>0.770</td>
<td>0.001</td>
<td>0.306</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>( r_t )</td>
<td>-0.118</td>
<td>-0.111</td>
<td>-0.030</td>
<td>-0.083</td>
<td>0.146</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.007</td>
<td>0.011</td>
<td>0.510</td>
<td>0.065</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>( r_{t+1} )</td>
<td>-0.024</td>
<td>-0.239</td>
<td>-0.019</td>
<td>-0.057</td>
<td>-0.018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.586</td>
<td>&lt;.0001</td>
<td>0.670</td>
<td>0.204</td>
<td>0.695</td>
<td></td>
</tr>
<tr>
<td>( r_{t+2} )</td>
<td>0.070</td>
<td>-0.023</td>
<td>-0.102</td>
<td>0.024</td>
<td>-0.029</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.109</td>
<td>0.605</td>
<td>0.020</td>
<td>0.579</td>
<td>0.515</td>
<td></td>
</tr>
<tr>
<td>( s_t )</td>
<td>0.191</td>
<td>0.268</td>
<td>-0.149</td>
<td>-0.176</td>
<td>-0.093</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>0.001</td>
<td>&lt;.0001</td>
<td>0.034</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
Partial correlations for **Profit Firms** are reported in the upper triangular matrix and partial correlations for **Loss Firms** are reported in the lower triangular matrix.

- \( r_t \) is the annual return for firm \( i \) at time \( t \);
- \( z_t \) is the earnings excluding special item for firm \( i \) at time \( t \) deflated by \( P_{t-1} \);
- \( s_t \) is the special items for firm \( i \) at time \( t \) deflated by \( P_{t-1} \);
- \( P_{t-1} \) is the security price for firm \( i \) at time \( t - 1 \).

All correlations are partial Spearman rank correlations conditional on \( z_t \).

**Table 3.7: Partial Correlation of Write-Off Amounts and Annual Returns.**
### Panel A: Profit Firms

<table>
<thead>
<tr>
<th></th>
<th>$\alpha_P$</th>
<th>$\beta_P$</th>
<th>$\gamma_P$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>-0.062</td>
<td>2.185</td>
<td>3.363</td>
<td>0.160</td>
</tr>
<tr>
<td>(n=780)</td>
<td>(-2.06)</td>
<td>(8.77)</td>
<td>(1.97)</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>-0.045</td>
<td>1.710</td>
<td>1.859</td>
<td>0.081</td>
</tr>
<tr>
<td>(n=955)</td>
<td>(-3.00)</td>
<td>(6.80)</td>
<td>(3.17)</td>
<td></td>
</tr>
</tbody>
</table>

### Panel B: Loss Firms

<table>
<thead>
<tr>
<th></th>
<th>$\alpha_L$</th>
<th>$\beta_L$</th>
<th>$\gamma_L$</th>
<th>Adj.R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>-0.151</td>
<td>0.345</td>
<td>-2.319</td>
<td>0.377</td>
</tr>
<tr>
<td>(n=144)</td>
<td>(-2.65)</td>
<td>(1.84)</td>
<td>(-2.11)</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>-0.163</td>
<td>0.031</td>
<td>-0.251</td>
<td>0.010</td>
</tr>
<tr>
<td>(n=439)</td>
<td>(-5.78)</td>
<td>(0.34)</td>
<td>(-2.64)</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

\[ r_{ti} = \alpha_P + \beta_P \cdot z_{ti} + \gamma_P \cdot s_{ti} + \epsilon_{fi} \]
\[ r_{ti} = \alpha_L + \beta_L \cdot z_{ti} + \gamma_L \cdot s_{ti} + \epsilon_{si} \]

Where:

Small \[ -0.01 \leq \frac{SI_t}{TA_{t-1}} < 0; \]
Large \[ \frac{SI_t}{TA_{t-1}} < -0.01; \]
\[ r_{ti} \] is the annual return for firm $i$ at time $t$;
\[ z_{ti} \] is the earnings excluding special item for firm $i$ at time $t$ deflated by $P_{t-1}$;
\[ s_{ti} \] is the special items for firm $i$ at time $t$ deflated by $P_{t-1}$;
\[ P_{t-1} \] is the security price for firm $i$ at time $t - 1$.

**Table 3.8: Regression of Annual Returns on Annual Earnings**
Panel A: Profit Firms

<table>
<thead>
<tr>
<th></th>
<th>Pre-write-off</th>
<th>Post-write-off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\alpha_f$</td>
<td>$\beta_f$</td>
</tr>
<tr>
<td>Small</td>
<td>-0.099</td>
<td>2.059</td>
</tr>
<tr>
<td>(n=780)</td>
<td>(-1.95)</td>
<td>(17.65)</td>
</tr>
<tr>
<td>Large</td>
<td>-0.520</td>
<td>3.120</td>
</tr>
<tr>
<td>(n=955)</td>
<td>(-8.14)</td>
<td>(26.16)</td>
</tr>
</tbody>
</table>

Panel B: Loss Firms

<table>
<thead>
<tr>
<th></th>
<th>Pre-write-off</th>
<th>Post-write-off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\alpha_f$</td>
<td>$\beta_f$</td>
</tr>
<tr>
<td>Small</td>
<td>-0.240</td>
<td>-0.116</td>
</tr>
<tr>
<td>(n=144)</td>
<td>(-4.27)</td>
<td>(-1.71)</td>
</tr>
<tr>
<td>Large</td>
<td>-0.342</td>
<td>-0.264</td>
</tr>
<tr>
<td>(n=439)</td>
<td>(-9.63)</td>
<td>(-4.68)</td>
</tr>
</tbody>
</table>

Notes:

$y_{fi} = \alpha_f + \beta_f \cdot z_{fi} + \gamma_f \cdot s_{fi} + \varepsilon_{fi}$

$y_{si} = \alpha_s + \beta_s \cdot z_{si} + \gamma_s \cdot s_{si} + \varepsilon_{si}$

Where:

Small $-0.01 \leq \frac{SI_{t}}{TA_{t-1}} < 0$;

Large $\frac{SI_{t}}{TA_{t-1}} < -0.01$;

$y_{fi}$ is the aggregate return for firm $i$ for the pre-write-off;

$y_{si}$ is the aggregate return for firm $i$ for the post-write-off;

$z_{fi}$ is the aggregate earnings for firm $i$ for the pre-write-off;

$z_{si}$ is the aggregate earnings for firm $i$ for the post-write-off;

$s_{fi}$ is the aggregate special items for firm $i$ for the pre-write-off;

$s_{si}$ is the aggregate special items for firm $i$ for the post-write-off.

Table 3.9: Regression of Aggregate Returns on Aggregate Earnings
CAR between EAD\(_{-1}\) and EAD\(_{0}\)

<table>
<thead>
<tr>
<th>n=3,487</th>
<th>(\alpha_0)</th>
<th>(D_1)</th>
<th>(D_2)</th>
<th>(\beta_0)</th>
<th>(\beta_1)</th>
<th>(\beta_2)</th>
<th>Adj.R(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.002</td>
<td>0.006</td>
<td>-0.013</td>
<td>-0.019</td>
<td>0.066</td>
<td>-0.246</td>
<td>0.010</td>
</tr>
<tr>
<td>Pr &gt;</td>
<td>t</td>
<td></td>
<td>0.064</td>
<td>0.062</td>
<td>0.053</td>
<td>0.316</td>
<td>0.020</td>
</tr>
</tbody>
</table>

Notes:

\[ CAR_{jt} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt} + \beta_1 \cdot D_1 \cdot es_{jt} + \beta_2 \cdot D_2 \cdot es_{jt} + \epsilon_{jt} \]

Where:

\[ D_1 = \begin{cases} 
0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\
1 & \text{if } SI_{jt} \leq -1\% \text{ and } -1\% < SI_{jt+1} < 0.
\end{cases} \]

\[ D_2 = \begin{cases} 
0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\
1 & \text{if } SI_{jt} \leq -1\% \text{ and } SI_{jt+1} = 0.
\end{cases} \]

Table 3.10: Result of Regressions of \(CAR_{jt}\) on \(es_{jt}\)
| CAR between EAD\(_{-1}\) and EAD\(_0\) |
|-----------------|---------------|---------------|---------------|---------------|
| n=3,487         | α\(_0\)       | D\(_1\)       | D\(_2\)       | β\(_0\)       | β\(_1\)       | β\(_2\)       | Adj.R\(^2\)   |
|                 | 0.003         | 0.004         | 0.004         | 0.297         | 0.055         | 1.405         | 0.020         |
| Pr > |t|      | 0.007         | 0.290         | 0.559         | < 0.0001      | 0.834         | 0.002         |

Notes:

\[
CAR_{jt+1} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt+1} + \beta_1 \cdot D_1 \cdot es_{jt+1} + \beta_2 \cdot D_2 \cdot es_{jt+1} + \varepsilon_{jt+1}
\]

Where:

\[
D_1 = \begin{cases} 
0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\
1 & \text{if } SI_{jt} \leq -1\% \text{ and } -1\% < SI_{jt+1} < 0.
\end{cases}
\]

\[
D_2 = \begin{cases} 
0 & \text{if } SI_{jt} = 0 \text{ and } SI_{jt+1} = 0, \\
1 & \text{if } SI_{jt} \leq -1\% \text{ and } SI_{jt+1} = 0.
\end{cases}
\]

**Table 3.11: Result of Regressions of CAR\(_{jt+1}\) on es\(_{jt+1}\)**
Notes:
\( r_t \) is mean annual return at time \( t \). \( \text{DIV}_t \) is mean dividend at time \( t \). \( \text{AP}_t \) is mean total assets deflated by price at time \( t \). \( \text{SPS}_t \) is mean special items per share at time \( t \). \( \text{SP}_t \) is mean special items deflated by price at time \( t \). \( \text{EPS}_t \) is mean earnings per share at time \( t \). \( \text{EP}_t \) is mean earnings per share deflated by price at time \( t \). \( \text{EBS}_t \) is mean earnings before special item per share at time \( t \).

Figure 3.2: Descriptive Statistics for Large Special Item Firms

Notes:
\( r_t \) is mean annual return at time \( t \). \( \text{DIV}_t \) is mean dividend at time \( t \). \( \text{AP}_t \) is mean total assets deflated by price at time \( t \). \( \text{SPS}_t \) is mean special items per share at time \( t \). \( \text{SP}_t \) is mean special items deflated by price at time \( t \). \( \text{EPS}_t \) is mean earnings per share at time \( t \). \( \text{EP}_t \) is mean earnings per share deflated by price at time \( t \). \( \text{EBS}_t \) is mean earnings before special item per share at time \( t \).

Figure 3.3: Descriptive Statistics for Small Special Item Firms
Notes:
\( r_t \) is mean annual return at time \( t \). \( \text{DIV}_t \) is mean dividend at time \( t \). \( \text{AP}_t \) is mean total assets deflated by price at time \( t \). \( \text{SPS}_t \) is mean special items per share at time \( t \). \( \text{SP}_t \) is mean special items deflated by price at time \( t \). \( \text{EPS}_t \) is mean earnings per share at time \( t \). \( \text{EP}_t \) is mean earnings per share deflated by price at time \( t \). \( \text{EBS}_t \) is mean earnings before special item per share at time \( t \).

Figure 3.4: Descriptive Statistics for Large Special Item Firms: Profit Firms

Notes:
\( r_t \) is mean annual return at time \( t \). \( \text{DIV}_t \) is mean dividend at time \( t \). \( \text{AP}_t \) is mean total assets deflated by price at time \( t \). \( \text{SPS}_t \) is mean special items per share at time \( t \). \( \text{SP}_t \) is mean special items deflated by price at time \( t \). \( \text{EPS}_t \) is mean earnings per share at time \( t \). \( \text{EP}_t \) is mean earnings per share deflated by price at time \( t \). \( \text{EBS}_t \) is mean earnings before special item per share at time \( t \).

Figure 3.5: Descriptive Statistics for Small Special Item Firms: Profit Firms

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Notes:
$r_t$ is mean annual return at time $t$. $\text{DIV}_t$ is mean dividend at time $t$. $\text{AP}_t$ is mean total assets deflated by price at time $t$. $\text{SPS}_t$ is mean special items per share at time $t$. $\text{SP}_t$ is mean special items deflated by price at time $t$. $\text{EPS}_t$ is mean earnings per share at time $t$. $\text{EP}_t$ is mean earnings per share deflated by price at time $t$. $\text{EBS}_t$ is mean earnings before special item per share at time $t$.

Figure 3.6: Descriptive Statistics for Large Special Item Firms: Loss Firms

Notes:
$r_t$ is mean annual return at time $t$. $\text{DIV}_t$ is mean dividend at time $t$. $\text{AP}_t$ is mean total assets deflated by price at time $t$. $\text{SPS}_t$ is mean special items per share at time $t$. $\text{SP}_t$ is mean special items deflated by price at time $t$. $\text{EPS}_t$ is mean earnings per share at time $t$. $\text{EP}_t$ is mean earnings per share deflated by price at time $t$. $\text{EBS}_t$ is mean earnings before special item per share at time $t$.

Figure 3.7: Descriptive Statistics for Small Special Item Firms: Loss Firms
Notes:
○: Scatter plot of aggregate returns and aggregate special items for pre-write-off period.

Figure 3.8: Distribution of Aggregate Returns: Loss Firms

Notes to Figure 3.9:
○: Scatter plot of aggregate special items and aggregate returns for pre-write-off period.

Figure 3.9: Distribution of Aggregate Special Items: Loss Firms
CHAPTER 4

CONCLUSION AND FUTURE WORK

The first essay, presented in chapter 2, focuses on a sample of firms that achieved long strings of consecutive meeting or beating of quarterly analysts’ forecasts. By doing so, empirical evidence is obtained to support the hypothesis that the financial market rewards firms persistently meeting or beating the expectation. The findings provide compelling evidence that earnings response coefficients are positively associated with the length of time of meeting or beating analysts’ forecasts after controlling for the systematic portions of earnings surprise. Further, the slope coefficients on the unsystematic portion of earnings surprise are increasing almost monotonically even after controlling for the growth and persistence of earnings. The insignificant coefficients on the systematic portion of earnings surprise suggest that the market has successfully anticipated the magnitude of earnings surprise for the firms as they are repeatedly meeting or beating the analysts’ earnings forecasts.

I then examined the relations between various firm characteristics that have been suggested as risk proxies and the patterns of meeting or beating market’s expectations. I identified risk characteristics of firms that exhibit a systematic relationship to these patterns. Thus, the findings related to firm characteristics may have links to the implications of incentives 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. The inverse association between patterns of meeting or beating the market’s expectation and risk proxies suggests that firms with such patterns generally have lower firm specific risk. Finally, I find no significant evidence relating earnings response coefficients and the patterns of meeting or beating analysts’ forecasts after the original pattern is broken. This result is not surprising because it is well known that many firms preannounce bad news before the earnings announcement when they cannot meet analysts’ forecasts. The bad news might already be impounded in the price around the preannouncement date.

The findings in chapter 2 add to the existing literature along a number of dimensions. Masumoto (1999), Burgstahler and Eames (1999), and Payne and Robb (2000) all provide some evidences with respect to earnings management and/or forecast management. However, chapter 2 of this thesis focuses on a sample of firms that achieved long strings of consecutive meeting or beating of quarterly analysts’ forecasts. By doing so, I was able to link the pattern of meeting or beating analysts’ forecasts to firm specific risk by investigating the difference in the earnings response coefficients. The association between the pattern and various risk characteristics also supports the robustness of the results.

Many findings in chapter 2 confirm and extend existing literature that documents the market’s rewards associated with meeting or beating the market’s expectation. For example, the evidence concerning the market reward is in line with well known
incentives of earnings management and/or expectation management. In the future, more research is needed into the methods of earnings management and/or forecast management. While the distribution of earnings surprise associated with patterns of meeting or beating the expectation provides evidence for the existence of earnings management or forecast management to avoid negative earnings surprise, the findings concerning whether the patterns of meeting or beating the expectation exist due to earnings management or forecast management or both are perplexing.

Although it is clear from the findings of chapter 2 that the patterns of meeting or beating analysts’ forecasts are significantly associated with the risk characteristics of the firms, the causality of the association is not clear. That is, the findings show that firms persistently meeting or beating analysts’ forecasts have lower risk, and their risk is decreasing as they continue the patterns. Thus, more work is needed on how the firm specific risk is associated with the pattern.

While the short window event study framework is more relevant for chapter 2 in the context that I measure the market reaction to the earnings announcement, it will be worthwhile if the future research explores the firms’ performance over a longer interval. In particular, it will be interesting if future research extends the analysis to explore the firms’ performance over a longer interval after the first earnings shortfall. For example, it will be appropriate to examine whether persistently meeting or beating firms show better financial performance over the long period, or whether the market penalizes them after the first earnings shortfall.

On the earnings management side, another opportunity for future research could be investigation of how the pattern of meeting or beating analysts’ forecasts is associated with types of earnings management. Although I provided indirect evidence of
upward management of earnings by investigating the pattern of the implied cost of capital, further research on this issue will be worthwhile. 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.\textsuperscript{110} Thus, it will be of interest if the association between accruals and patterns of persistently meeting or beating the market's expectation is investigated.

The second essay, presented in chapter 3, assesses whether the association of asset write-offs and the security markets is well aligned. That is, I investigate whether the write-offs are recorded in a timely manner. The recently released FASB statement No. 144 requires that asset write-off should reflect contemporaneous information. I find that the special items are weakly associated with annual (aggregate) returns. This implies that the security market was already aware of information pertaining to the write-offs at some level. Not surprisingly, the aggregate write-off amounts have statistically significant incremental explanatory power for the aggregate returns over the previous years in the sense that accounting recognition of the write-off summarizes value relevant events of the past. In addition, the negative association between future returns and write-offs indicates that the loss firms can boost future profits and substantially increase the future return by taking the big bath.

In summary, chapter 3 of this thesis has examined various aspects of write-offs using different test intervals from a short event study to a longer association context. From the short event study, I provide evidence that the market appreciates big bath firms. This result seems to support prior literature in the sense that a big bath

\textsuperscript{110}See Burgstahler and Dichev (1997a) or Defond and Jiambalvo (1994).
announcement signals improved future performance of the business and/or managers’ intention of future improvement. In addition, in a longer association test, I have demonstrated that write-offs’ lack of timeliness is an important contributor to the low contemporaneous association between returns and earnings for write-off firms. Three main conclusions arise from chapter 3. First, it seems that the write-offs are recorded in a less timely manner compared to other components of earnings. Second, the contemporaneous write-offs summarize underlying economic events of the past. Finally, it appears that the large write-offs have some information content for future returns.

I believe that the findings in chapter 3 provide additional evidence for understanding the issues related to asset write-offs. I found that weak and mixed market reactions to write-off announcements are at least partly due to to the extent to which the market anticipated the write-offs in prior periods. The prior studies reported that poor association between returns and earnings is likely to be caused by lack of timeliness of earnings. However, I found that earnings excluding special items are recorded in a more timely manner compared to the recognition of special items. In addition, I investigated the extent to which asset write-offs are reported in a timely manner in a broad sense while prior studies have focused on specific types of asset write-offs.

Prior write-off studies have not considered the well known nonlinearity in return and earnings association. As a result, their findings are likely to be significantly affected by loss firms because the write-off sample is likely to have more loss firms compared to other studies. Thus, I partitioned the entire sample into profit and loss
subsamples. I found evidence against the prior studies with respect to the information content of write-off announcements.

Finally, I found that the information content of write-offs is dependent on the timing and magnitude of the write-offs as well as the sign of reported earnings (i.e. profit or loss firms). That is, given loss firms, the market prefers the announcement of true one time large write-offs.\footnote{This research is subject to potential limitations. For example, the big bath announcement may just be coincidental with executive changes. For example, Pourciau (1993) found that incoming executives manage earnings downward by taking large write-offs to increase earnings in subsequent years.}

In future study, more research is needed to investigate the link between the patterns of meeting or beating analysts' forecasts and write-offs in the context of "income smoothing" since this study focused on the one time large write-off (i.e., big bath). For example, firms may strategically take small write-offs to manage earnings downward when they have unusually high earnings before special items to insure the patterns of meeting or beating the market's expectations in the future.
APPENDIX A

SIMULTANEOUS ESTIMATION OF IMPLIED COST OF CAPITAL AND GROWTH

The no arbitrage assumption is sufficient to derive the dividend discount model.\textsuperscript{112} The price can be equated to the sum of the discounted future stream of dividends. That is,

\[ P_{r0} = \sum_{t=1}^{\infty} \frac{dps_t}{(1 + r)^t} \]  \hspace{1cm} (A.1)

where:

\[ P_t = \text{price per share at } t; \]
\[ dps_t = \text{expected dividends per share at } t; \]
\[ r = \text{implied cost of capital.} \]

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:

\textsuperscript{112}See Rubinstein (1976).
\[ 0 = y_0 + \frac{y_1 - (1 + r)y_0}{(1 + r)} + \frac{y_2 - (1 + r)y_1}{(1 + r)^2} + \ldots \]

\[ \equiv y_0 + \sum_{t=1}^{\infty} \frac{y_t - (1 + r)y_{t-1}}{(1 + r)^t} \quad \forall \ y_t \text{ s.t. } \frac{y_t}{(1 + r)^t} \xrightarrow{t \to \infty} 0. \quad (A.2) \]

The key in equation (A.2) 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 (A.1) and (A.2) yields:

\[ P_{r_0} = y_0 + \sum_{t=1}^{\infty} \frac{y_t + dps_t - (1 + r)y_{t-1}}{(1 + r)^t}. \quad (A.3) \]

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 \( t \);

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

where:

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

Equation (A.3) leads to the residual income model

\[ P_{r_0} = bv_0 + \sum_{t=1}^{\infty} \frac{bv_t + dps_t - (1 + r)bv_{t-1}}{(1 + r)^t} \]

\[ = bv_0 + \sum_{t=1}^{\infty} \frac{z_t}{(1 + r)^t} \quad (A.4) \]

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 (A.4) can be rearranged as

\[
Pr_0 = bv_0 + \frac{z_1}{r - g} = bv_0 + \frac{\text{eps}_1 - r \cdot bv_0}{r - g}. \tag{A.5}
\]

**Use of \( Pr_0 \) and \( \text{eps}_0 \)**

By definition, \( \text{eps}_1 - r \cdot bv_0 = (\text{eps}_0 - r \cdot bv_{-1}) \cdot (1 + g) \).

Then, equation (2.5) may be expressed as:

\[
Pr_0 = bv_0 + \frac{\text{eps}_0 - r \cdot bv_{-1}}{r - g} \cdot (1 + g) \tag{A.6}
\]

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 \( t - 1 \);
- \( \text{eps}_0 \) 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.
\[ \frac{\epsilon_{s0}}{bv_{-1}} = r + \frac{r - g}{1 + g} \cdot \frac{P_{r0} - bv_{0}}{bv_{-1}} \]  \hspace{1cm} (A.7)

Therefore, equation (A.7) may be expressed following the regression model\textsuperscript{113}

\[ \frac{\epsilon_{sj0}}{bv_{j-1}} = \gamma_0 + \gamma_1 \cdot \frac{P_{j0} - bv_{j0}}{bv_{j-1}} + \varepsilon_{j0} \]  \hspace{1cm} (A.8)

\[ \gamma_0 = r_1 \]

\[ \gamma_1 = \frac{r_1 - g_1}{1 + g_1} \]

The error term, \( \varepsilon_{j0} \), 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 and the growth for the firms included in the portfolio.\textsuperscript{114}

The implied cost of capital and growth are estimated as

\[ r_1 = \gamma_0 \]  \hspace{1cm} (A.9)

\[ g_1 = \frac{\gamma_0 - \gamma_1}{1 + \gamma_1} \]  \hspace{1cm} (A.10)

**Use of** \( P_{r-1} \) **and** \( \epsilon_{s0} \)

Equation (2.5) may be expressed as follows at \( t - 1 \):

\[ \text{Equation (2.5)} \]

\textsuperscript{113}I avoid the equation \( \frac{P_{r0} - bv_0}{bv_{-1}} = -r \cdot \frac{1 + r}{r - g} + \frac{1 + r}{r - g} \cdot \epsilon_{s0} \), 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.

\textsuperscript{114}Since estimated \( r \) and \( g \) are quarterly implied cost of capital and growth, Table 2.11 reports annualized numbers.
\[ Pr_{-1} = bv_{-1} + \frac{eps_0 - r \cdot bv_{-1}}{r - g} \quad (A.11) \]

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 (A.11) may be expressed as follows:

\[ \frac{eps_0}{bv_{-1}} = r + (r - g) \cdot \frac{Pr_{-1}}{bv_{-1}} \quad (A.12) \]

By the linear relation between \( \frac{eps_0}{bv_{-1}} \) and \( \frac{Pr_{-1}}{bv_{-1}} \) in equation (A.12), the average implied cost of capital and the average growth rate of the portfolio firms can be estimated using the following regression:

\[ \frac{eps_{j0}}{bv_{j-1}} = \gamma_2 + \gamma_3 \cdot \frac{P_{j-1}}{bv_{j-1}} + \varepsilon_{j0} \quad (A.13) \]

\[ \gamma_2 = g_2 \]

\[ \gamma_3 = r_2 - g_2. \]

As in the prior section, the error term, \( \varepsilon_{j0} \), 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:

\[
\begin{align*}
    r_2 &= \gamma_2 + \gamma_3 \\
    g_2 &= \gamma_2
\end{align*}
\]
APPENDIX B

AGGREGATE WRITE-OFFS

I posit that the aggregate market return is a function of the aggregate earnings and the aggregate special items.

The aggregate return is defined as follows.

\[ y_T = \frac{P_T + FVS(d_1, \ldots, d_T) - P_0}{P_0} \]

\[ FVS(d_1, \ldots, d_T) \equiv d_1 \cdot R_f^{T-1} + d_2 \cdot R_f^{T-2} + \cdots + d_{T-1} \cdot R_f + d_T \]

\[ \equiv FVS_T \]

I assume that the dividends are reinvested at a risk-free rate. Therefore, \( FVF_T \) is the total future value of dividends reinvested in risk-free assets at date \( T \). \( y_T \) is total return to the investors holding a stock between date 0 and date \( T \). The aggregate earnings and the aggregate special items are defined as follows.

\[ z_T = \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T) + \sum_{t=1}^{T} s_t}{P_0} \]

\[ \equiv z_T^x + z_T^s \]

\[ z_T^x = \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T)}{P_0} \]

\[ z_T^s = \frac{\sum_{t=1}^{T} s_t}{P_0} \]
where:

\[ P_t = \text{the firm’s market price at } t, \]
\[ d_t = \text{dividends paid at } t, \]
\[ x_t = \text{earnings excluding extraordinary items and special items}, \]
\[ s_t = \text{special items}, \]
\[ g_t = \text{good will}, \]
\[ R_f = \text{one plus the risk-free rate of return}. \]

All variables are per share basis and adjusted for stock splits and stock dividends.

To be consistent with the dependent variable (aggregate returns), the independent variable (aggregate earnings) should be adjusted for dividends. Therefore, \( FVF_T \) is the increased earnings from the investment of dividends in risk-free assets.

\[
FVF(d_1, \ldots, d_T) \equiv d_1(R_{T-1}^T - 1) + d_2(R_{T-2}^T - 1) \\
+ \cdots + d_{T-1}(R_f - 1) \equiv FVF_T \tag{B.1}
\]

Since the interest of this study is the association between the market return and asset write-off, I further decompose the aggregate earnings into the aggregate earnings before special items and the aggregate special items.

As in Easton, Harris, and Ohlson (1992), I can get perfect correlation between \( t \) and, \( z^x_T \) and \( z^s_T \) as \( T \to \infty \).

\[
P_T - P_0 = BV_T - BV_0 + g_t - g_0 \tag{B.2}
\]
By the clean surplus relation,

\[
BV_t = BV_{t-1} + x_t + s_t - d_t
\]

\[
BV_T - BV_0 = \sum_{t=1}^{T} x_t + \sum_{t=1}^{T} s_t - \sum_{t=1}^{T} d_t = \sum_{t=1}^{T} x_t + \sum_{t=1}^{T} s_t - FVS_T + FVF_T. \tag{B.3}
\]

Plugging equation (B.2) into equation (B.3) and deflating by begging-of-the-period
price yield,

\[
\frac{P_T - P_0 + FVS_T}{P_0} = z_T^x + z_T^s + \frac{\Delta g_T}{P_0}
\]

\[
y_T = z_T^x + z_T^s + \frac{\Delta g_T}{P_0}
\]

\[
y_T = z_T + \frac{\Delta g_T}{P_0}.
\]

As the aggregating periods increase, the measurement errors are more likely to be
captured by \(\Delta g_T\), and \(\Delta g_T\) has less effect on the aggregate returns compared to \(z_T^x\)
and \(z_T^s\).

This implies the cross-sectional regression models

\[
y_{Ti} = \alpha_T^1 + \beta_T^1 \cdot z_{Ti} + \varepsilon_{Ti}^1
\]

\[
y_{Ti} = \alpha_T^2 + \beta_T^2 \cdot z_{Ti}^x + \gamma_T^2 \cdot z_{Ti}^s + \varepsilon_{Ti}^2.
\]

Pre-write-off
\[ y_f = \frac{P_T + FVS(d_1, \ldots, d_T) - P_0}{P_0} \]

\[ FVS(d_1, \ldots, d_T) \equiv d_1 \cdot R_f^{T-1} + d_2 \cdot R_f^{T-2} + \cdots + d_{T-1} \cdot R_f + d_T \]

\[ \equiv FVS_f \]

\[ z_{ft}^a = \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T)}{P_0} \]

\[ s_{ft} = \frac{\sum_{t=1}^{T} s_t}{P_0} \]

\[ z_{ft} = z_{ft}^a + s_{ft} \]

\[ FVF(d_1, \ldots, d_T) \equiv d_1(R_f^{T-1} - 1) + d_2(R_f^{T-2} - 1) \]

\[ + \cdots + d_{T-1}(R_f - 1) \equiv FVF_f \]

\[ \frac{P_T - P_0 + FVS_f}{P_0} = z_{ft}^a + s_{ft} + \frac{\Delta g_t}{P_0} \]

\[ y_f = z_{ft}^a + s_{ft} + \frac{\Delta g_t}{P_0} \]

\[ = z_{ft} + \frac{\Delta g_t}{P_0} \]

This implies the cross-sectional regression models

\[
\begin{align*}
y_{fi} &= \alpha^1_f + \beta^1_f \cdot z_{fi} + \epsilon_{fi}^1 \\
y_{fi} &= \alpha^2_f + \beta^2_f \cdot z_{fi}^a + \gamma_f \cdot s_{fi} + \epsilon_{fi}^2.
\end{align*}
\]

Post-write-off

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\[ y_s = \frac{P_{2T-1} + FVS(d_T, \ldots, d_{2T-1}) - P_{T-1}}{P_{T-1}} \]

\[ FVS(d_T, \ldots, d_{2T-1}) \equiv d_T \cdot R_f^T + d_{T+1} \cdot R_f^{T-1} + \cdots + d_{2T-2} \cdot R_f + d_{2T-1} \]

\[ \equiv FVS_s \]

\[ z_{st}^a = \frac{\sum_{t=T}^{2T-1} x_t + FVF(d_T, \ldots, d_{2T-1})}{P_{T-1}} \]

\[ z_{st}^s = \frac{\sum_{t=T}^{2T-1} s_t}{P_{T-1}} \]

\[ z_{st} = z_{st}^a + s_{st} \]

\[ FVF(d_T, \ldots, d_{2T-1}) \equiv d_T(R_f^T - 1) + d_{T+1}(R_f^{T-1} - 1) \]
\[ + \cdots + d_{2T-2}(R_f - 1) \equiv FVF_s \]

\[ \frac{P_{2T-1} - P_{T-1} + FVS_s}{P_{T-1}} = z_{st}^a + s_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}} \]

\[ y_s = z_{st}^a + s_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}} \]

\[ = z_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}} \]

This implies the cross-sectional regression models

\[
\begin{align*}
    y_{si}^1 &= \alpha_s^1 + \beta_s^1 \cdot z_{si}^1 + \varepsilon_{si}^1 \\
    y_{si}^2 &= \alpha_s^2 + \beta_s^2 \cdot z_{si}^2 + \gamma_s \cdot s_{si} + \varepsilon_{si}^2.
\end{align*}
\]
BIBLIOGRAPHY


