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Abstract

Anecdotal evidence shows that managers have plenty of discretion to manage the timing of write-offs to take action related to earnings management. In this paper, I examine whether write-offs are recorded in a timely manner. 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 of write offs. The result suggest that write-offs are recorded in a less timely manner compared to other components of earnings.

Key words: Write-off, Aggregate earnings, aggregate return, Timeliness of earnings , earnings management

JEL classification: M40, M41, M49

1 Introduction

This paper examines the timeliness of accounting recognition of write-offs by investigating the association between earnings with negative special items and security markets.[1] Managers, investors, academics, and regulators have been interested in the increasing prevalence of write-off metrics of long-lived assets since they have a great impact on earnings, book values of assets, and security prices.[2] 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 the Generally Accepted Accounting Principles (GAAP) allow firms great discretion 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 finally 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

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

[2] Clifford(2001) reports:

> *"In recent years it has seemed that no earnings statement is complete without them," writes Warren Buffett in Berkshire Hathaway's 2000 annual report.*

asset write-offs should reflect contemporaneous information. Hence, the recent issuance 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.[3] 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-off.

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.[4] In other words, the studies have tried to determine the security

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[3]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.

[4]See Alciatore, Dee, Easton, and Spear (1998) for a extensive review of the write-off studies.

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 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 improvement. This line of study finds 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)). Overall, 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 study 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 to the market, many 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)).[5]

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[5]Easton, 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

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 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-off and nondiscretionary write-off is vague. Managers are allowed considerable discretion in reporting nondiscretionary write-offs, as in announcement magnitude and timing. In addition, many firms announce asset impairment and/or restructuring simultaneously with other announcements.[6]

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-off 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 write-off summarizes value relevant events of the past, the contemporaneous write-off should be significantly correlated with past returns. 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, Harris, and Ohlson (1992) and Warfield and Wild (1992) suggest that timing errors in aggregate earnings become relatively less im-

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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.

[6]For 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 the study.

portant as the aggregation periods increase. 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 value relevant for the current period (EBS_t^c) and the earnings before special items value relevant for prior periods ($\sum_{\tau=-\infty}^{t-1} EBS_\tau^c$). Similarly, SI_t can be defined as the sum of the special items value relevant for the current period (SI_t^c) and the special items value relevant for prior periods ($\sum_{\tau=-\infty}^{t-1} SI_\tau^c$).

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

Therefore, the association between returns and earnings is modeled as

$$r_t \propto EBS_t^c + \sum_{\tau=-\infty}^{t-1} EBS_\tau^c + SI_t^c + \sum_{\tau=-\infty}^{t-1} SI_\tau^c.$$

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 (i.e., $\sum_{\tau=-\infty}^{t-1} SI_\tau^c = 0$). 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, 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.[7]

Alternatively, 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 (i.e., $\sum_{\tau=-\infty}^{t-1} SI_{\tau}^{c} \neq 0$). 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.

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 is 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.

Hayn (1995) and Basu (1997) demonstrated 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 impacts 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 the investors expect firms to take a big bath and subsequently report improved performance, the association between the contemporaneous return and the special item will

[7]See Figure 1. The time line of the research illustrates the pre-write-off and post-write-off periods.

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.[8] The extant literature provides evidence that less uncertainty in earnings announcement results in greater earnings response coefficients.[9] Thus, if the investors have higher uncertainty about the reported earnings figures 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. When firms report large write-offs, the investors may have higher uncertainty about the future earnings figures and wait until the arrival of new earnings information. If those 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 a small amount of write-offs, the correlations between lagged returns and special item are higher than the correlation between contemporaneous return and special item. This result is more prevalent when the firms report large write-offs (i.e., big bath), 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. In addition, the loss firms show write-offs that are significantly negatively correlated with future returns while the profit firms show no significant association. Thses findings seem to

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[8]For example, Bleakley (1995) provided anecdotal evidence of positive market reaction to write-off announcement.

[9]For example, Pincus (1983), Lipe (1990), Imhoff and Lobo (1992), and Subramanyam (1996)

lend support to prior literature in the sense that the loss firms can boost future profits and substantially increase the future returns by cleaning up the balance sheet.[10]

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 show positive (negative) association. Thus, the result suggests 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 pre-write-off period. Taken together, the write-off summarizes value relevant events of the past instead of providing strong information content for the future performance.

Finally, the result shows that the earnings response coefficient is negative with respect to one time large write-off firms (i.e., big bath). This suggests that the market interprets large negative earnings surprise 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, the firms taking big bath 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 evidences that a significant portion of the write-offs is not recorded in a timely manner and the security market over the years

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[10]For 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.

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 paper is organized as follows. The next section reviews the literature related to this study. The model of aggregation is described in Section 3. Data and summary statistics are presented in Section 4. The empirical results are examined in Section 5. A summary is provided in Section 6.

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 120 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. They 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 the significantly large write-offs that are defined as negative special items exceeding 1% of total assets. They focused on the discretionary write-off. Twenty one percent the of total 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), they found a significantly lower market return 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 the 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 the investor for security return over the period. 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. Recently, Collins and Henning (2000) tested

whether the 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.

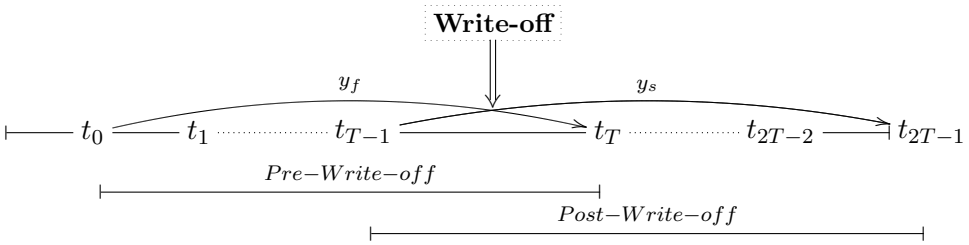
Bartov, Lindahl, and Ricks (1998) examined both short-term and long-term returns surrounding write-off announcement. In the event study context, they conclude that the market's response to asset write-offs is significantly negative compared to the response to the write-off related to operation decisions. They also document that the average cumulative market-adjusted returns for the two years preceding the write-off announcement for asset write-off and operation decisions are -34% and -21%, respectively. Wilson (1996) found that managers are allowed considerable discretion in reporting nondiscretionary write-offs such decisions as announcement magnitude and timing. 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 opportunistical 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 Research Design

3.1 Time Line

Figure 1 shows the time-line of the aggregation. 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.

Figure 1: Time line



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".

3.2 Annual Returns, Earnings, and Special Items

First, in order to examine whether the write-off is recorded in a timely manner, the annual stock returns are regressed on the components of earnings. 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:

$$\boxed{\begin{aligned} r_{ti} &= \alpha^1 + \beta^1 \cdot x_{ti} + \varepsilon^1_{ti} \\ r_{ti} &= \alpha^2 + \beta^2 \cdot z_{ti} + \gamma^2 \cdot s_{ti} + \varepsilon^2_{ti} \end{aligned}} \tag{1}$$

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 γ^2 captures the extent to which the increment to the write-off explains annual stock returns.[11] 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 the return of the same period.

3.3 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 of aggregation is to align accounting number and market value. I want to test the effect of a one-time large write-off on the market. Prior studies indicate that the announcement of a write-off decision shows mixed reactions in the market, partly due to lack of timeliness. I will 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 items is less significant due to the discrepancy in recognition timing and measurement errors. I hypothesize that as the test interval increases, the value relevant events are more likely to be captured in the aggregate return.

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[11] We use the beginning stock price as a proper deflator for per-share independent variables to avoid the scale effect (See Easton and Sommers (1999) and Brown, Lo, and Lys (1999)).

To examine the hypothesis, I extend the model suggested by Easton, Harris, and Ohlson (1992). The aggregate earnings are decomposed into the aggregate earnings before special items (henceforth: aggregate earnings) and the aggregate special items.[12]

$$\frac{P_T + FVS(d_1, \ldots, d_T) - P_0}{P_0} = \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T)}{P_0} + \frac{\sum_{t=1}^{T} s_t}{P_0} + \frac{\Delta g_T}{P_0} \quad (2)$$

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

Pre-write-off:

$$\boxed{\begin{aligned} y_{fi} &= \alpha_f^1 + \beta_f^1 \cdot z_{fi} + \varepsilon_{fi}^1 \\ y_{fi} &= \alpha_f^2 + \beta_f^2 \cdot z_{fi}^a + \gamma_f^2 \cdot s_{fi} + \varepsilon_{fi}^2 \end{aligned}} \quad (3)$$

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_{fi}^a 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 γ_f^2 captures the incremental explanatory power of aggregate write-off to aggregate earnings for the pre-write-off period. If the coefficient γ^2 in the regression model (1) 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.

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[12] See Appendix A for details.

Post-write-off:

$$\boxed{\begin{aligned} y_{si} &= \alpha_s^1 + \beta_s^1 \cdot z_{si} + \varepsilon_{si}^1 \\ y_{si} &= \alpha_s^2 + \beta_s^2 \cdot z_{si}^a + \gamma_s^2 \cdot s_{si} + \varepsilon_{si}^2 \end{aligned}} \tag{4}$$

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 γ_s^2 captures the incremental explanatory power of aggregate write-offs in relation 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 aggregation of special items and the aggregation of returns for the post-write-off period should not be as strong as that of past aggregation.

4 Data, sample selection and descriptive statistics

The sample data consist of annual earnings from 1961-1999. Earnings before extraordinary items (COMPUSTAT #18), number of shares (COMPUSTAT #25), special items (COMPUSTAT #17), dividends (COMPUSTAT #26), number of shares (COMPUSTAT #27), total assets (COMPUSTAT #6) and prices (COMPUSTAT #199) are obtained from the COMPUSTAT 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. I have a sample of 2,402 firm-years. The sample selection rule requires 6 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.[13] I eliminate the firm years if the firms 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 since the research focus of this study is the one-time large write-off.[14] 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: $-0.01 \leq \frac{SI_t}{TA_{t-1}} < 0$; Large write-off: $\frac{SI_t}{TA_{t-1}} < -0.01$).

Table 1 shows the distribution of the sample by year. I include the firm years with write-off 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.

In addition, I partition the 5 years into two 3-year subperiods with the current year overlapping. Panel A of Table 2 reports the descriptive statistics of variables for three years before write-off (pre-write-off), and Panel B of Table 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 consis-

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[13]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.*

[14]Elliott and Hanna (1996) found that 27% of firms reported consecutive big bath. Similarly, 24.5% of our sample show another large write-off in the next year given a large write-off in the current year.

tently positive aggregate earnings (z_f), Panel B reports four cases of negative aggregate earnings (z_s). The firms seem to perform well after a big bath. Firms that engage in write-off 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_s) are lowest at -0.232 in 1976.

The descriptive statistics for variables used in subsequent regressions are reported in Table 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, 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 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 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 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.

5 Empirical Results

5.1 Test of Association between Annual Returns and Special Items

First, following the prior literature, I examine the partial rank correlation among annual returns, special items, and earnings before special item.[15] In Table 4, two sets of correlation matrices are estimated. The first set of correlation employs 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 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.[16] This result is consistent with prior studies in the sense that some decline in asset value recorded in the current period 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 in the two periods preceding the write-off is significant (0.207).[17] These findings suggest that although the small write-off is correlated with contemporaneous return, significant portions of 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 I expected, earnings before special items are strongly correlated with contemporaneous return.

In contrast, Panel B of Table 4 shows that the correlation between contemporaneous return and special item for large write-off firms is not statistically significant. The

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[15] Alciatore, Easton, and Spear (2000) also used the partial rank correlation because parametric correlations were very sensitive to a few outliers in their sample.

[16] Alciatore et al. (2000) find that the correlation between contemporaneous annual return and annual write-off is higher than the correlation between quarterly return and quarterly write-off. In the same vein, we expect the special item is less significantly associated with return if we use quarterly data.

[17] Heflin and Warfield (1997) also report that write-off may be delayed up to three years.

correlations between returns of prior years and special items are stronger compared to those for the small write-off sample. The correlation between lagged return and special item 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 enough, 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 big bath.

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

Similarly, in Table 5, two sets of regressions are estimated. One question to be addressed is whether the inclusion of the write-off amounts in the earnings figure provides a better summary of information to investors, that is, whether the association between returns, earnings, and write-offs can evaluate the value relevance of write-off over the fiscal period.

If the market anticipates the write-off due to the prior year's poor performance, the association 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 the poor performance of the current year and the write-off summarizes the poor performance, the association would be significant at some level. 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 will show higher adjusted R^2. In addition, the coefficient on the special item should be statistically significant from zero.

Table 5 presents the association between the annual market return and special items for a negative special item sample. Panel A of Table 5 tests the association between annual stock returns and components of earnings when the special items are small negative value. Contrary to the finding of Alciatore, Easton, and Spear (2000), I find that the small negative special item is not significantly associated with annual return.[18] The special item is negatively associated with 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 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 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, the negative special items are partially value relevant to explain annual returns.

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[18] 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 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."

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 price because there is a noncontemporaneous association between return and write-off, 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 sometime in prior years. As a result, I find a weak association between contemporaneous return and write-off. If the market anticipated the write-off sometime during last three years due to the declining value of assets over the same period, the efficient market would not show strong association between contemporaneous write-off and return. That is, the price already incorporated the decline in asset values years before the delayed write-off. For example, Heflin and Warfield (1997) find that write-off 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 return and write-off 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 6 shows the regression results for the pre-write-off period. Panel A of Table 6 tests 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 (γ_f^4) is significantly negative. Panel A of Table 6 shows the association between aggregate returns (y_f) and aggregate earnings (z_f^a) 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 annual regression, this result seems to imply that small negative special items are less likely to be delayed and more informative to the market. This seems to be inconsistent with the argument that earnings are more informative about annual stock returns than special items. The adjusted R^2 is slightly improved when the special item variable is included (19.8% vs 20.5%).

Panel B of Table 6 shows the association between aggregate stock returns and aggregate earnings when the special items are materially large 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 sometime 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 sometime 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 5, Panel A of Table 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. Panel B of Table 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 Alciatore, Easton, and Spear (2000) in the context

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. By the aggregation, the association between the market returns and the write-offs are synchronized.

Panels C and D of Table 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 information content of the write-off. If the contemporaneous write-off has information content of future value, the association between the aggregate return and the aggregate special item should be statistically significant. Panel C of Table 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 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 enough, 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 R^2 is higher when the special item variable is included (20.8% vs 24.0%). Panel B of Table 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 R^2 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.

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 further conduct the analysis 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 was 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 R^2's are consistent with those of prior studies.[19]

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 iIn Table 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 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

[19]For example, Hayn (1995) reports the coefficient on earnings for profit firms is 2.62 and that for loss firms is 0.01.

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.

Panel B of of Table 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 the 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 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 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 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 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 9 documents the association between aggregate returns and aggregate components of earnings for profit firms and loss firms. Panel A of Table 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 8, Table 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 those 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 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 2 and Figure 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 4 and Figure 5 cover profit firms. Interestingly, large write-off firms have greater mean EBS in the write-off year than in the previous two years ($0 < EBS_1 < EBS_2 < EBS_3$). EBS decreases in the following year and sharply increases from year 5. Figure 5 shows that EBS increases monotonically up to year 4 and EBS decreases sharply in year 5. Similarly, Figure 6 and Figure 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 ($0 > EBS_1 > EBS_2 > EBS_3$). EBS increases sharply in the following years ($EBS_3 < EBS_4 < 0 < EBS_5$). These graphs seem to support the conventional argument in the sense that a company's profit improves sharply after large write-offs.[20] Figure 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 already incorporated the expected write-offs in the security price.

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[20]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.*

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.

Francis, Hanna, and Vincent (1997) observed that write-off disclosures may convey three kinds of information to the market.[21] 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. 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 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

[21]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.

increases the level of uncertainty in the future earnings numbers. Thus, if the market interprets firms' 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.[22] 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 by 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 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 1 computes earnings response coefficients for the current period while regression 2 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.

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[22] In this study, I do not attempt to distinguish the impact of two factors on the earnings response coefficient.

Regression 1:

$$CAR_{jt} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt} + \beta_1 \cdot D_1 \cdot es_{jt} + \beta_2 \cdot D_2 \cdot es_{jt} + \varepsilon_{jt} \quad (5)$$

Regression 2:

$$CAR_{jt+1} = \alpha_0 + D_1 + D_2 + \beta_0 \cdot es_{jt+1} + \beta_1 \cdot D_1 \cdot es_{jt+1} + \beta_2 \cdot D_2 \cdot es_{jt+1} + \varepsilon_{jt+1} \quad (6)$$

where:

es_{jt} = Earnings surprise at time t;

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

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

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

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

The results of the regression analysis are reported in Table 10 and Table 11.

First, Table 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 β_1 and β_2 should be insignificant from zero. β_1 (0.066) shows that firms that are expected to take repetitive write-off in the next period have higher earnings response coefficients. The negative earnings response coefficient on β_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 11 summarizes the earnings response coefficients for the following period. If the earnings surprise resolves the uncertainty for the firms with 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 (β_2=1.405). In contrast to Table 10, the insignificant β_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.[23] The market anticipates that the write-off firms will increase future profits by cleaning up bad performance of the past. In addition, the firms taking big bath have greater earnings response coefficients in the following period. The market appears to reinterpret 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.[24]

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

[24]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 footnote 13 and 14.

6 Summary

The main purpose of this study is to assess 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. 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.

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 period perceived by the market over the same period while the majority of the decline has been incorporated in the stock prices in 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 8 and 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 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.[25] 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 recent the 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 the security market returns. By aggregating the components of earnings, I was able to significantly increase 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 not recorded in a timely manner and that contemporaneous write-offs summarize underlying economic events of the past.

[25]See Burgstahler and Dichev (1997), Collins, Pincus, and Xie (1999), and Kothari and Zimmerman (1995) , etc.

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Table 1: Descriptive Statistics for Variables by Year

			r_t		z_t		s_t	
Year	No.	%	Mean	Median	Mean	Median	Mean	Median
1963	1	0.04	-0.367	-0.367	0.059	0.059	-0.009	-0.009
1964	1	0.04	0.357	0.357	0.143	0.143	-0.012	-0.012
1965	1	0.04	0.093	0.093	0.046	0.046	-0.006	-0.006
1966	5	0.21	0.316	0.101	0.097	0.106	-0.002	-0.001
1967	2	0.08	-0.204	-0.204	0.091	0.091	-0.001	-0.001
1968	7	0.30	0.542	0.394	0.076	0.070	-0.006	-0.004
1969	19	0.80	0.275	0.169	0.053	0.050	-0.008	-0.003
1970	21	0.89	-0.308	-0.443	0.049	0.041	-0.021	-0.004
1971	27	1.14	-0.212	-0.161	-0.017	0.007	-0.041	-0.010
1972	25	1.05	0.173	0.140	0.055	0.062	-0.040	-0.010
1973	22	0.93	-0.118	-0.129	0.061	0.074	-0.071	-0.022
1974	36	1.52	-0.414	-0.484	0.053	0.101	-0.045	-0.025
1975	79	3.33	-0.311	-0.385	0.123	0.143	-0.157	-0.076
1976	91	3.84	0.359	0.331	0.038	0.153	-0.217	-0.102
1977	59	2.49	0.198	0.166	0.065	0.136	-0.097	-0.041
1978	72	3.04	0.122	0.092	0.142	0.135	-0.101	-0.051
1979	74	3.12	0.199	0.072	0.091	0.136	-0.075	-0.032
1980	66	2.78	0.099	0.000	0.083	0.141	-0.108	-0.034
1981	46	1.94	0.264	0.081	0.133	0.124	-0.083	-0.027
1982	47	1.98	-0.093	-0.108	0.063	0.100	-0.069	-0.035
1983	64	2.70	0.123	0.063	0.051	0.061	-0.089	-0.041
1984	72	3.04	0.430	0.319	-0.006	0.052	-0.066	-0.022
1985	63	2.66	-0.110	-0.082	0.057	0.063	-0.074	-0.024
1986	94	3.96	0.099	0.058	-0.032	0.067	-0.120	-0.033
1987	95	4.01	-0.006	0.006	-0.033	0.054	-0.065	-0.018
1988	102	4.30	-0.080	-0.125	0.039	0.060	-0.051	-0.022
1989	81	3.42	0.134	0.068	-0.004	0.055	-0.062	-0.019
1990	114	4.81	0.044	-0.006	0.029	0.066	-0.051	-0.020
1991	133	5.61	-0.180	-0.256	0.006	0.060	-0.044	-0.014
1992	122	5.15	0.248	0.048	0.002	0.055	-0.082	-0.029
1993	126	5.31	0.169	0.043	0.016	0.050	-0.061	-0.018
1994	136	5.74	0.116	0.010	0.013	0.053	-0.061	-0.019
1995	134	5.65	-0.060	-0.110	0.019	0.050	-0.059	-0.019
1996	166	7.00	0.219	0.146	0.043	0.068	-0.060	-0.020
1997	168	7.09	0.177	0.156	0.047	0.071	-0.032	-0.013

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

Table 2: Descriptive Statistics for Variables by Year

Panel A: Pre-write-off

	y_f		z_f		z_f^a		s_f	
Year	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1963	-0.258	-0.258	0.177	0.177	0.189	0.189	-0.012	-0.012
1964	0.043	0.043	0.225	0.225	0.247	0.247	-0.021	-0.021
1965	-0.021	-0.021	0.107	0.107	0.112	0.112	-0.005	-0.005
1966	0.668	0.548	0.274	0.243	0.280	0.263	-0.006	-0.003
1967	0.657	0.657	0.500	0.500	0.503	0.503	-0.003	-0.003
1968	1.831	1.986	0.340	0.263	0.353	0.298	-0.013	-0.012
1969	1.243	0.595	0.230	0.248	0.245	0.257	-0.015	-0.010
1970	0.769	0.715	0.240	0.217	0.273	0.299	-0.033	-0.010
1971	-0.227	-0.208	0.069	0.049	0.094	0.070	-0.025	-0.013
1972	-0.270	-0.486	0.072	0.062	0.093	0.089	-0.021	-0.006
1973	-0.158	-0.349	0.069	0.119	0.109	0.155	-0.041	-0.017
1974	-0.307	-0.405	0.208	0.232	0.250	0.261	-0.042	-0.024
1975	-0.521	-0.636	0.174	0.180	0.249	0.231	-0.075	-0.039
1976	-0.368	-0.500	0.158	0.144	0.232	0.222	-0.074	-0.032
1977	0.322	0.253	0.257	0.329	0.362	0.361	-0.104	-0.051
1978	0.878	0.711	0.433	0.485	0.590	0.521	-0.157	-0.060
1979	1.344	0.514	0.397	0.446	0.494	0.497	-0.098	-0.046
1980	0.683	0.328	0.196	0.381	0.343	0.490	-0.147	-0.055
1981	0.984	0.411	0.422	0.427	0.518	0.528	-0.096	-0.039
1982	0.511	0.188	0.313	0.384	0.394	0.414	-0.081	-0.037
1983	0.344	0.230	0.243	0.270	0.347	0.311	-0.104	-0.038
1984	1.062	0.411	0.139	0.145	0.218	0.170	-0.078	-0.021
1985	0.476	0.271	0.125	0.153	0.227	0.252	-0.101	-0.033
1986	0.297	0.156	0.052	0.120	0.159	0.174	-0.108	-0.033
1987	0.198	0.078	0.135	0.147	0.181	0.188	-0.046	-0.021
1988	0.467	0.332	0.217	0.199	0.283	0.230	-0.066	-0.027
1989	0.360	0.179	0.163	0.173	0.224	0.181	-0.061	-0.023
1990	0.488	0.128	0.146	0.169	0.221	0.201	-0.075	-0.023
1991	0.042	-0.072	0.152	0.201	0.197	0.227	-0.046	-0.020
1992	0.369	0.064	0.080	0.145	0.142	0.191	-0.062	-0.024
1993	0.687	0.124	0.070	0.139	0.132	0.179	-0.062	-0.019
1994	0.831	0.463	0.041	0.152	0.135	0.216	-0.094	-0.035
1995	0.470	0.185	0.047	0.157	0.115	0.197	-0.068	-0.026
1996	0.413	0.323	0.098	0.171	0.178	0.211	-0.080	-0.026
1997	0.517	0.341	0.188	0.189	0.225	0.228	-0.037	-0.020

where:

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^a 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.

Continued on the next page.

Table 2: continued from the previous page.
Panel B: Post-write-off

	y_s		z_s		z_s^a		s_s	
Year	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1963	-0.146	-0.146	0.217	0.217	0.233	0.233	-0.016	-0.016
1964	1.658	1.658	0.501	0.501	0.513	0.513	-0.012	-0.012
1965	1.985	1.985	0.173	0.173	0.184	0.184	-0.011	-0.011
1966	0.794	0.759	0.308	0.318	0.311	0.321	-0.002	-0.003
1967	0.768	0.768	0.299	0.299	0.301	0.301	-0.002	-0.002
1968	0.740	0.737	0.265	0.181	0.272	0.201	-0.007	-0.005
1969	-0.096	-0.211	0.165	0.171	0.176	0.174	-0.011	-0.003
1970	-0.239	-0.548	0.092	0.054	0.114	0.086	-0.023	-0.006
1971	0.252	-0.213	0.082	0.063	0.125	0.098	-0.043	-0.012
1972	-0.135	-0.378	0.146	0.173	0.187	0.206	-0.040	-0.013
1973	-0.406	-0.539	0.203	0.161	0.275	0.191	-0.071	-0.022
1974	-0.221	-0.375	0.179	0.235	0.232	0.272	-0.053	-0.026
1975	0.403	0.125	0.281	0.297	0.448	0.405	-0.167	-0.087
1976	1.315	1.136	0.233	0.519	0.465	0.690	-0.232	-0.130
1977	0.811	0.640	0.357	0.409	0.467	0.463	-0.109	-0.053
1978	1.231	0.551	0.475	0.426	0.580	0.470	-0.105	-0.053
1979	1.425	0.587	0.329	0.431	0.412	0.452	-0.083	-0.033
1980	0.403	0.236	0.062	0.331	0.174	0.402	-0.112	-0.036
1981	0.722	0.490	0.284	0.327	0.370	0.356	-0.087	-0.032
1982	0.640	0.428	0.134	0.253	0.207	0.303	-0.073	-0.037
1983	0.500	0.398	0.135	0.224	0.228	0.274	-0.094	-0.042
1984	0.518	0.207	-0.011	0.097	0.059	0.187	-0.070	-0.024
1985	0.317	0.049	0.087	0.124	0.165	0.177	-0.078	-0.029
1986	0.458	0.249	-0.138	0.125	-0.014	0.187	-0.125	-0.038
1987	0.096	0.056	-0.027	0.139	0.044	0.173	-0.071	-0.024
1988	0.160	0.047	0.323	0.159	0.381	0.193	-0.058	-0.026
1989	0.174	0.090	0.077	0.150	0.146	0.183	-0.068	-0.022
1990	0.327	0.155	0.072	0.144	0.127	0.175	-0.055	-0.025
1991	0.477	0.211	0.019	0.155	0.065	0.182	-0.046	-0.018
1992	0.806	0.351	-0.027	0.135	0.058	0.180	-0.085	-0.034
1993	0.497	0.225	0.072	0.150	0.136	0.188	-0.064	-0.021
1994	0.665	0.266	0.051	0.149	0.116	0.186	-0.064	-0.024
1995	1.009	0.272	0.062	0.158	0.125	0.191	-0.063	-0.020
1996	1.043	0.691	0.134	0.162	0.199	0.218	-0.065	-0.028
1997	0.703	0.584	0.173	0.227	0.212	0.267	-0.039	-0.021

where:

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 3: Descriptive Statistics for Variables

Panel A:

Variable	Mean	Std Dev	Q1	Median	Q3
r_t	0.081	0.555	-0.250	0.000	0.286
x_t	-0.037	0.335	-0.064	0.037	0.089
z_t	0.036	0.296	0.004	0.067	0.126
s_t	-0.074	0.140	-0.071	-0.025	-0.008
$\frac{SI_{t-2}}{TA_{t-3}}$	0.000	0.001	0.000	0.000	0.000
$\frac{SI_{t-1}}{TA_{t-2}}$	-0.001	0.002	0.000	0.000	0.000
$\frac{SI_t}{TA_{t-1}}$	-0.038	0.128	-0.037	-0.014	-0.005
$\frac{SI_{t+1}}{TA_t}$	-0.001	0.002	0.000	0.000	0.000
$\frac{SI_{t+2}}{TA_{t+1}}$	-0.001	0.002	0.000	0.000	0.000

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 #199). x_t is the annual earnings excluding extraordinary items (COMPUSTAT #18) deflated byP_{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

Variable	Mean	Std Dev	Q1	Median	Q3
y_f	0.433	1.680	-0.314	0.157	0.692
z_f	0.160	0.525	0.001	0.185	0.341
z_f^a	0.234	0.523	0.061	0.228	0.394
s_f	-0.074	0.157	-0.073	-0.027	-0.011

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

Variable	Mean	Std Dev	Q1	Median	Q3
y_s	0.602	2.195	-0.212	0.289	0.908
z_s	0.124	0.934	-0.019	0.185	0.350
z_s^a	0.203	0.919	0.051	0.224	0.407
s_s	-0.079	0.143	-0.079	-0.029	-0.010

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 4: Partial correlation of write-off amounts and annual returns.

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

	r_{t-2}	r_{t-1}	r_t	r_{t+1}	r_{t+2}	s_t
r_{t-2}		-0.014	-0.111	-0.016	0.000	0.207
		0.680	0.001	0.631	0.993	<.0001
r_{t-1}	-0.052		-0.070	-0.049	0.031	0.235
	0.118		0.034	0.140	0.353	<.0001
r_t	-0.078	-0.015		-0.032	-0.110	0.091
	0.019	0.650		0.330	0.001	0.006
r_{t+1}	-0.003	-0.024	0.061		0.010	0.022
	0.925	0.461	0.064		0.755	0.505
r_{t+2}	0.019	0.059	-0.037	0.036		-0.038
	0.562	0.076	0.265	0.280		0.249
z_t	0.087	0.148	0.459	0.199	0.125	
	0.008	<.0001	<.0001	<.0001	0.000	

Notes to Table 4:

Partial correlations conditional on $\underline{z_t}$ are reported in the upper triangular matrix and partial correlations conditional on $\underline{s_t}$ 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.

Continued on the next page.

Table 4: continued from the previous page.

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

	r_{t-2}	r_{t-1}	r_t	r_{t+1}	r_{t+2}	s_t
r_{t-2}		0.015	-0.070	-0.030	0.071	0.181
		0.578	0.009	0.264	0.008	<.0001
r_{t-1}	-0.032		-0.048	-0.172	-0.061	0.356
	0.225		0.073	<.0001	0.022	<.0001
r_t	-0.024	0.020		-0.059	-0.116	-0.007
	0.377	0.453		0.027	<.0001	0.790
r_{t+1}	0.011	-0.105	0.011		0.012	-0.112
	0.672	<.0001	0.670		0.665	<.0001
r_{t+2}	0.095	-0.023	-0.060	0.030		-0.048
	0.000	0.392	0.024	0.258		0.073
z_t	0.113	0.179	0.362	0.184	0.131	
	<.0001	<.0001	<.0001	<.0001	<.0001	

Notes to Table 4:

Partial correlations conditional on $\underline{z_t}$ are reported in the upper triangular matrix and partial correlations conditional on $\underline{s_t}$ 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 5: Regression of annual returns on annual earnings

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

n=958	α^1	β^1	α^2	β^2	γ^2	Adj.R^2
Coefficient	-0.025	1.658				0.158
t	-1.24	9.71				
$Pr > \|t\|$	0.216	<0.0001				
Coefficient			-0.022	1.662	1.997	0.157
t			-0.87	9.67	1.46	
$Pr > \|t\|$			0.382	<0.0001	0.145	

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

n=1,444	α^1	β^1	α^2	β^2	γ^2	Adj.R^2
Coefficient	0.004	0.270				0.021
t	0.26	4.75				
$Pr > \|t\|$	0.795	<0.0001				
Coefficient			-0.039	0.456	-0.095	0.036
t			-2.08	6.28	-0.90	
$Pr > \|t\|$			0.004	<0.0001	0.369	

Notes to Table 5:

$$r_{ti} = \alpha^1 + \beta^1 \cdot x_{ti} + \varepsilon^1_{ti}$$
$$r_{ti} = \alpha^2 + \beta^2 \cdot z_{ti} + \gamma^2 \cdot s_{ti} + \varepsilon^2_{ti}$$

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 6: Regression of aggregate returns on aggregate earnings

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

n=958	α_f^3	β_f^3	α_f^4	β_f^4	γ_f^4	Adj.R^2
y_{fi}	0.213	1.023				0.198
t	6.05	15.37				
$Pr > \|t\|$	<0.0001	<0.0001				
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 ($\frac{SI_t}{TA_{t-1}} < -0.01$)

n=1,444	α_f^3	β_f^3	α_f^4	β_f^4	γ_f^4	Adj.R^2
y_{fi}	0.214	1.537				0.198
t	4.93	18.89				
$Pr > \|t\|$	<0.0001	<0.0001				
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 to Table 6:

$$y_{fi} = \alpha_f^3 + \beta_f^3 \cdot z_{fi} + \varepsilon_{fi}^3$$
$$y_{fi} = \alpha_f^4 + \beta_f^4 \cdot z_{fi}^a + \gamma_f^4 \cdot s_{fi} + \varepsilon_{fi}^4$$

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_{fi}^a 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.

Continued on the next page.

Table 6: continued from the previous page.

Panel C: Post-write-off ($-0.01 \leq \frac{SI_t}{TA_{t-1}} < 0$)

n=958	α_f^3	β_f^3	α_f^4	β_f^4	γ_f^4	Adj.R^2
y_{fi}	0.385	1.107				0.208
t	9.05	15.89				
$Pr > \|t\|$	<0.0001	<0.0001				
y_{fi}			0.202	1.183	-6.968	0.240
t			3.99	17.07	-5.48	
$Pr > \|t\|$			<0.0001	<0.0001	<0.0001	

Panel D: Post-write-off ($\frac{SI_t}{TA_{t-1}} < -0.01$)

n=1,444	α_s^3	β_s^3	α_s^4	β_s^4	γ_s^4	Adj.R^2
y_{fi}	0.558	0.226				0.008
t	8.21	3.67				
$Pr > \|t\|$	<0.0001	0.0003				
y_{fi}			0.425	0.267	-0.744	0.015
t			5.33	4.26	-2.37	
$Pr > \|t\|$			<0.0001	<0.0001	0.0179	

Notes to Table 6:

$$y_{si} = \alpha_s^3 + \beta_s^3 \cdot z_{si} + \varepsilon_{si}^3$$
$$y_{si} = \alpha_s^4 + \beta_s^4 \cdot z_{si}^a + \gamma_s^4 \cdot s_{si} + \varepsilon_{si}^4$$

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_{si}^a 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 7: Partial correlation of write-off amounts and annual returns.

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

	r_{t-2}	r_{t-1}	r_t	r_{t+1}	r_{t+2}	s_t
r_{t-2}		-0.059	-0.122	-0.015	0.021	0.168
		0.105	0.001	0.679	0.555	<.0001
r_{t-1}	-0.097		-0.052	-0.040	0.047	0.163
	0.237		0.155	0.267	0.191	<.0001
r_t	-0.089	0.040		-0.053	-0.112	0.118
	0.274	0.626		0.140	0.002	0.001
r_{t+1}	-0.062	-0.188	0.032		-0.029	0.008
	0.447	0.021	0.696		0.430	0.823
r_{t+2}	-0.067	-0.091	-0.149	0.115		-0.011
	0.415	0.266	0.067	0.157		0.758
s_t	0.186	0.121	-0.042	-0.054	-0.119	
	0.022	0.137	0.610	0.509	0.146	

Notes to Table 7:

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.

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Table 7: continued from the previous page.

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

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

Notes to Table 7:

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 8: Regression of annual returns on annual earnings

Panel A: Profit Firms

	α_P	β_P	γ_P	Adj.R^2
Small	-0.062	2.185	3.363	0.160
(n=780)	(-2.06)	(8.77)	(1.97)	
Large	-0.045	1.710	1.859	0.081
(n=955)	(-3.00)	(6.80)	(3.17)	

Panel B: Loss Firms

	α_L	β_L	γ_L	Adj.R^2
Small	-0.151	0.345	-2.319	0.377
(n=144)	(-2.65)	(1.84)	(-2.11)	
Large	-0.163	0.031	-0.251	0.010
(n=439)	(-5.78)	(0.34)	(-2.64)	

Notes to Table 8:

$$r_{ti} = \alpha_P + \beta_P \cdot z_{ti} + \gamma_P \cdot s_{ti} + \varepsilon_{fi}$$
$$r_{ti} = \alpha_L + \beta_L \cdot z_{ti} + \gamma_L \cdot s_{ti} + \varepsilon_{si}$$

where:

Small $-0.01 \leq \dfrac{SI_t}{TA_{t-1}} < 0$;

Large $\dfrac{SI_t}{TA_{t-1}} < -0.01$;

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

Table 9: Regression of aggregate returns on aggregate earnings

Panel A: Profit Firms

	Pre-write-off				Post-write-off			
	α_f	β_f	γ_f	Adj.R^2	α_s	β_s	γ_s	Adj.R^2
Small	-0.099	2.059	5.798	0.286	-0.069	2.369	1.672	0.330
(n=780)	(-1.95)	(17.65)	(3.88)		(-1.53)	(26.73)	(3.78)	
Large	-0.520	3.120	1.145	0.405	0.539	0.601	-0.571	0.044
(n=955)	(-8.14)	(26.16)	(3.65)		(9.52)	(9.31)	(-3.33)	

Panel B: Loss Firms

	Pre-write-off				Post-write-off			
	α_f	β_f	γ_f	Adj.R^2	α_s	β_s	γ_s	Adj.R^2
Small	-0.240	-0.116	-0.669	0.024	-0.220	-0.192	-0.043	0.081
(n=144)	(-4.27)	(-1.71)	(-3.20)		(-3.79)	(-10.23)	(-0.19)	
Large	-0.342	-0.264	-0.308	0.021	-0.288	-0.184	-0.345	0.023
(n=439)	(-9.63)	(-4.68)	(-3.13)		(-6.60)	(-3.98)	(-4.16)	

Notes to Table 9:

$$y_{fi} = \alpha_f + \beta_f \cdot z_{fi} + \gamma_f \cdot s_{fi} + \varepsilon_{fi}$$
$$y_{si} = \alpha_s + \beta_s \cdot z_{si} + \gamma_s \cdot s_{si} + \varepsilon_{si}$$

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 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**
	0.002	**0.006**	**-0.013**	**-0.019**	**0.066**	**-0.246**	**0.010**
$Pr > \|t\|$	**0.064**	**0.062**	**0.053**	**0.316**	**0.020**	**< 0.0001**	

Notes to Table 10:

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

where:

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

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

Table 11: Result of regressions of CAR_{jt+1} on es_{jt+1}

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 to Table 11:

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

where:

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

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

Figure 2: Descriptive Statistics for Large Special Item Firms

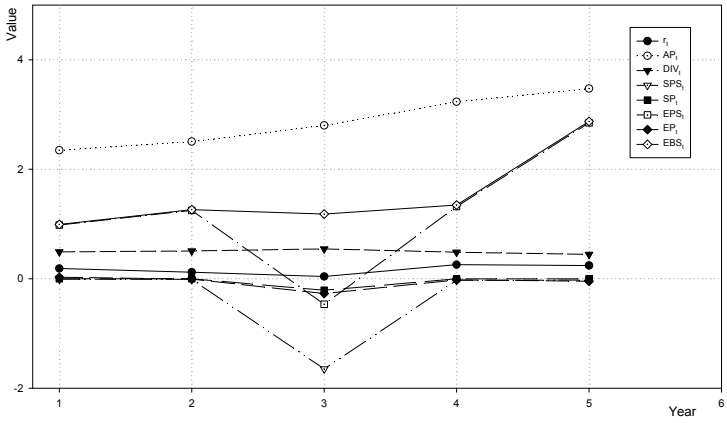
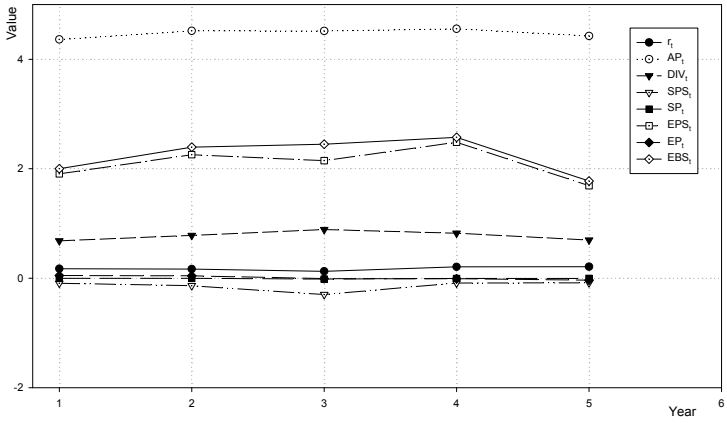


Figure 3: Descriptive Statistics for Small Special Item Firms



Notes to Figure 2 and 3:
r_t is mean annual return at time t. DIV_t is mean dividend at time t. AP_t is mean total assets deflated by price at time t. SPS_t is mean special items per share at time t. SP_t is mean special items deflated by price at time t. EPS_t is mean earnings per share at time t. EP_t is mean earnings per share deflated by price at time t. EBS_t is mean earnings before special item per share at time t.

Figure 4: Descriptive Statistics for Large Special Item Firms: Profit Firms

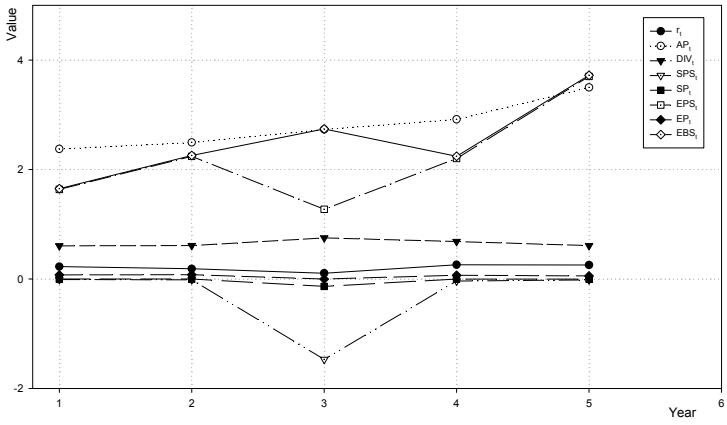
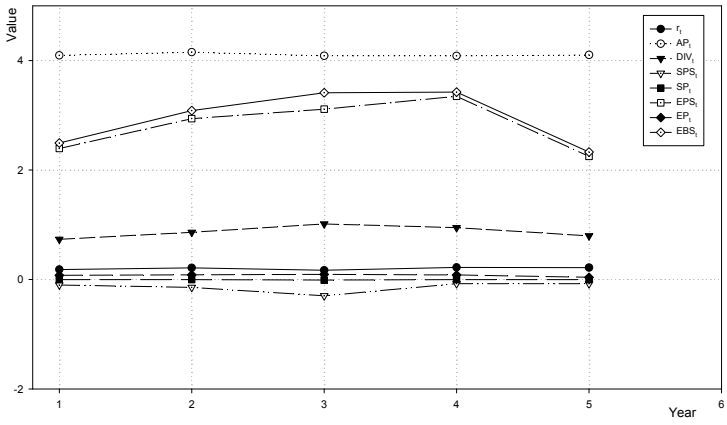


Figure 5: Descriptive Statistics for Small Special Item Firms: Profit Firms



Notes to Figure 4 and 5:
r_t is mean annual return at time t. DIV_t is mean dividend at time t. AP_t is mean total assets deflated by price at time t. SPS_t is mean special items per share at time t. SP_t is mean special items deflated by price at time t. EPS_t is mean earnings per share at time t. EP_t is mean earnings per share deflated by price at time t. EBS_t is mean earnings before special item per share at time t.

Figure 6: Descriptive Statistics for Large Special Item Firms: Loss Firms

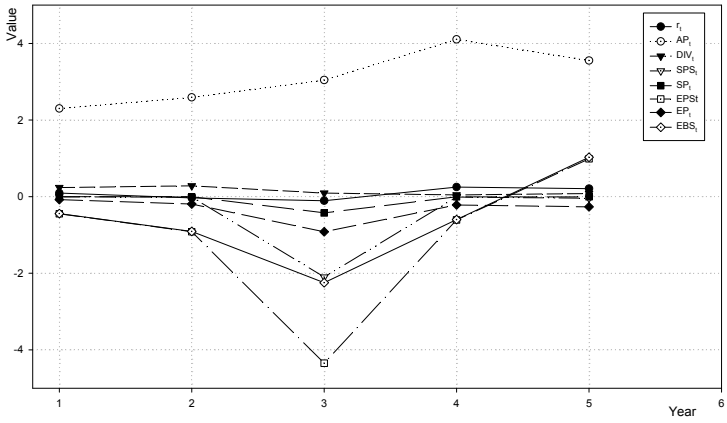
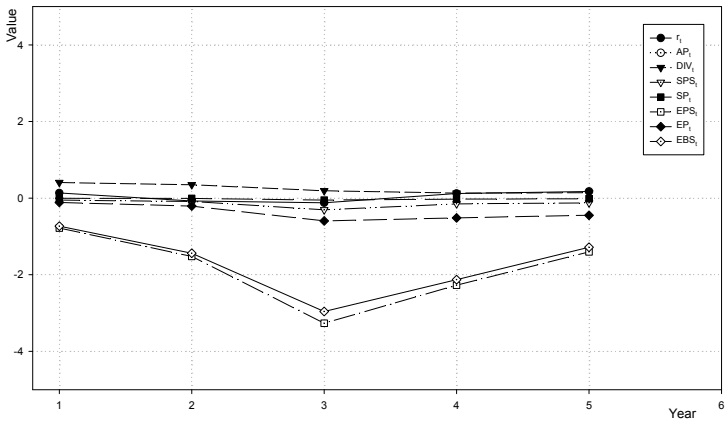
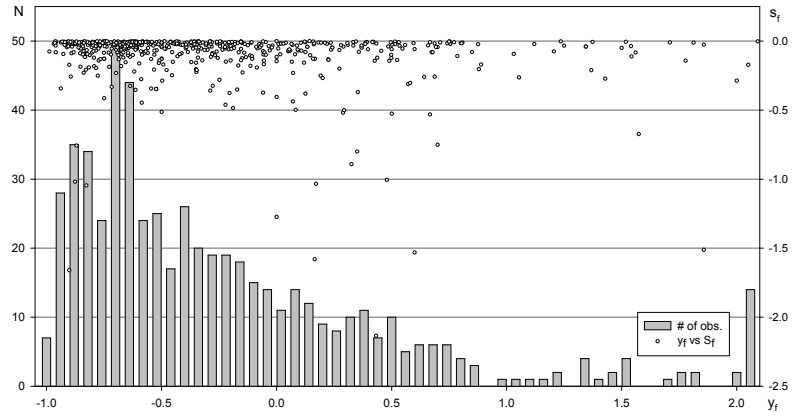


Figure 7: Descriptive Statistics for Small Special Item Firms: Loss Firms



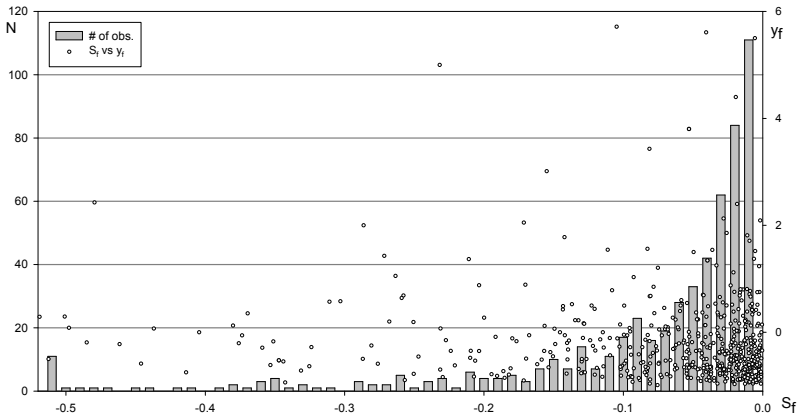
Notes to Figure 6 and 7:
r_t is mean annual return at time t. DIV_t is mean dividend at time t. AP_t is mean total assets deflated by price at time t. SPS_t is mean special items per share at time t. SP_t is mean special items deflated by price at time t. EPS_t is mean earnings per share at time t. EP_t is mean earnings per share deflated by price at time t. EBS_t is mean earnings before special item per share at time t.

Figure 8: Distribution of Aggregate Returns: Loss Firms



Notes to Figure 8:
○: Scatter plot of aggregate returns and aggregate special items for pre-write-off period.

Figure 9: Distribution of Aggregate Special Items: Loss Firms



Notes to Figure 9:
○: Scatter plot of aggregate special items and aggregate returns for pre-write-off period.

APPENDIX

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.

$$
\begin{aligned}
y_T &\equiv \frac{P_T + FVS(d_1, \ldots, d_T) - P_0}{P_0} \\
FVS(d_1, \ldots, d_T) &\equiv d_1 \cdot R_f^{T-1} + d_2 \cdot R_f^{T-2} + \cdots + d_{T-1} \cdot R_f + d_T \\
&\equiv FVS_T
\end{aligned}
$$

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 data T. The aggregate earnings and the aggregate special items are defined as follows.

$$
\begin{aligned}
z_T &\equiv \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T) + \sum_{t=1}^{T} s_t}{P_0} \\
&\equiv z_T^x + z_T^s \\
z_T^x &\equiv \frac{\sum_{t=1}^{T} x_t + FVF(d_1, \ldots, d_T)}{P_0} \\
z_T^s &\equiv \frac{\sum_{t=1}^{T} s_t}{P_0}
\end{aligned}
$$

where:

P_t = the firm's market price at t,

d_t = dividends paid at t,

x_t = earnings excluding extraordinary items and special items,

s_t = special items,

g_t = good will,

R_f = 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.

$$\begin{aligned} FVF(d_1, \ldots, d_T) \equiv d_1(R_f^{T-1} - 1) + d_2(R_f^{T-2} - 1) \\ + \cdots + d_{T-1}(R_f - 1) \equiv FVF_T \end{aligned} \tag{7}$$

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_T^x and z_T^s as $T \to \infty$.

$$P_T - P_0 = BV_T - BV_0 + g_t - g_0 \tag{8}$$

By the clean surplus relation,

$$\begin{aligned} BV_t &= BV_{t-1} + x_t + s_t - d_t \\ BV_T - BV_0 &= \sum_{t=1}^{T} x_t + \sum_{t=1}^{T} s_t - \sum_{t=1}^{T} d_t \\ &= \sum_{t=1}^{T} x_t + \sum_{t=1}^{T} s_t - FVS_T + FVF_T. \end{aligned} \tag{9}$$

Plugging equation(8) into equation(9) and deflating by begging-of-the-period price yield,

$$\begin{aligned}\frac{P_T - P_0 + FVS_T}{P_0} &= z_T^x + z_T^s + \frac{\Delta g_T}{P_0} \\ y_T &= z_T^x + z_T^s + \frac{\Delta g_T}{P_0} \\ &= z_T + \frac{\Delta g_T}{P_0}.\end{aligned}$$

As the aggregating periods increase, the measurement errors are more likely to be captured by Δg_T, and Δg_T has less effect on the aggregate returns compared to z_t^x and z_t^s.

This implies the cross-sectional regression models

$$\begin{aligned}y_{Ti} &= \alpha_T^1 + \beta_T^1 \cdot z_{Ti} + \varepsilon_{Ti}^1 \\ y_{Ti} &= \alpha_T^2 + \beta_T^2 \cdot z_{Ti}^x + \gamma_T^2 \cdot z_{Ti}^s + \varepsilon_{Ti}^2.\end{aligned}$$

Pre-write-off

$$\begin{aligned}y_f &\equiv \frac{P_T + FVS(d_1, \ldots, d_T) - P_0}{P_0} \\ FVS(d_1, \ldots, d_T) &\equiv d_1 \cdot R_f^{T-1} + d_2 \cdot R_f^{T-2} + \cdots + d_{T-1} \cdot R_f + d_T \\ &\equiv FVS_f\end{aligned}$$

$$\begin{aligned}z_{ft}^a &\equiv \frac{\sum_{t=1}^T x_t + FVF(d_1, \ldots, d_T)}{P_0} \\ s_{ft} &\equiv \frac{\sum_{t=1}^T s_t}{P_0} \\ z_{ft} &\equiv z_{ft}^a + s_{ft} \\ FVF(d_1, \ldots, d_T) &\equiv d_1(R_f^{T-1} - 1) + d_2(R_f^{T-2} - 1) \\ &\quad + \cdots + d_{T-1}(R_f - 1) \equiv FVF_f\end{aligned}$$

$$\begin{aligned}\frac{P_T - P_0 + FVS_f}{P_0} &= z^a_{ft} + s_{ft} + \frac{\Delta g_T}{P_0} \\ y_f &= z^a_{ft} + s_{ft} + \frac{\Delta g_T}{P_0} \\ &= z_{ft} + \frac{\Delta g_T}{P_0}\end{aligned}$$

This implies the cross-sectional regression models

$$\boxed{\begin{aligned} y_{fi} &= \alpha^1_f + \beta^1_f \cdot z_{fi} + \varepsilon^1_{fi} \\ y_{fi} &= \alpha^2_f + \beta^2_f \cdot z^a_{fi} + \gamma^2_f \cdot s_{fi} + \varepsilon^2_{fi}. \end{aligned}}$$

Post-write-off

$$\begin{aligned} y_s &\equiv \frac{P_{2T-1} + FVS(d_T, \ldots, d_{2T-1}) - P_{T-1}}{P_{T-1}} \\ FVS(d_T, \ldots, d_{2T-1}) &\equiv d_T \cdot R^T_f + d_{T+1} \cdot R^{T-1}_f + \cdots + d_{2T-2} \cdot R_f + d_{2T-1} \\ &\equiv FVS_s \end{aligned}$$

$$\begin{aligned} z^a_{st} &\equiv \frac{\sum_{t=T}^{2T-1} x_t + FVF(d_T, \ldots, d_{2T-1})}{P_{T-1}} \\ z^s_{st} &\equiv \frac{\sum_{t=T}^{2T-1} s_t}{P_{T-1}} \\ z_{st} &\equiv z^a_{st} + s_{st} \\ FVF(d_T, \ldots, d_{2T-1}) &\equiv d_T(R^T_f - 1) + d_{T+1}(R^{T-1}_f - 1) \\ &\quad + \cdots + d_{2T-2}(R_f - 1) \equiv FVF_s \end{aligned}$$

$$\begin{aligned}\frac{P_{2T-1} - P_{T-1} + FVS_s}{P_{T-1}} &= z^a_{st} + s_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}} \\ y_s &= z^a_{st} + s_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}} \\ &= z_{st} + \frac{\Delta g_{2T-1}}{P_{T-1}}\end{aligned}$$

This implies the cross-sectional regression models

$$\boxed{\begin{aligned} y_{si} &= \alpha_s^1 + \beta_s^1 \cdot z_{si} + \varepsilon_{si}^1 \\ y_{si} &= \alpha_s^2 + \beta_s^2 \cdot z_{si}^a + \gamma_s^2 \cdot s_{si} + \varepsilon_{si}^2. \end{aligned}}$$

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