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Management of Earnings and Analysts' Forecasts to Achieve Zero and Small Positive Earnings Surprises

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Abstract: This paper corroborates the finding of prior studies that managers avoid reporting earnings lower than analyst forecasts (i.e., negative earnings surprises) and provides new evidence of actions contributing to this phenomenon. Specifically, we provide empirical evidence of both (1) upward management of reported earnings and (2) downward 'management' of analysts' forecasts to achieve zero and small positive earnings surprises. Further analysis of the components of earnings management suggests that both the operating cash flow and discretionary accruals components of earnings are managed.

Keywords: earnings management, forecast management

1. INTRODUCTION

Virtually every day, headlines and articles in the financial press focus attention on instances and consequences of realized earnings that differ from forecast earnings. Skinner and Sloan (2001) and Kinney, Burgstahler and Martin (2002) show significant stock price declines associated with even small negative earnings surprises. Bartov, Givoly and Hayn (2002), DeFond and Park (2000), Kasznik and McNichols (2000) and Lopez and Rees (2000) present evidence of positive market responses to meeting or beating analyst earnings forecasts. Consequently, there is substantial interest in the factors contributing to earnings surprises and related quality of earnings issues.

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Consistent with previous research, we show that distributions of annual earnings surprises contain an unusually high frequency of zero and small positive surprises and an unusually low frequency of small negative surprises. We also provide evidence that to meet or slightly beat analyst forecasts, earnings are managed upward and forecasts are managed downward. With respect to earnings management, we document evidence that both the cash flow and discretionary accruals components of earnings are managed.

The remainder of the paper is organized as follows. The next section provides a brief discussion of earnings management and related literature, and further develops the research issues introduced here. Section 3 presents a description of the variables used in the empirical analysis and Section 4 reports results. Section 5 presents sensitivity analyses. A final section concludes with a summary and conclusions.

2. RESEARCH ISSUES

If managers engage in earnings management and forecast management to avoid negative earnings surprises, and the cost of management increases with the amount of management, we expect to observe a relative lack of observations in small negative earnings surprise intervals and a large concentration of observations at zero surprise. Despite the presumption that greater management entails greater costs, there are at least two reasons to expect management of forecasts or earnings to sometimes result in earnings that slightly exceed forecasts. First, there may be incremental benefits to beating rather than just meeting analyst forecasts. Second, because earnings outcomes are to some extent uncertain, firms may target small positive, rather than zero, earnings surprises to reduce the risk of reporting a negative earnings surprise (see Degeorge, Patel and Zeckhauser, 1999).

Previous studies support the avoidance of small negative earnings surprises. Dreman and Berry (1995) and Brown (1997) focus on forecast bias but also report that small positive earnings surprises are more common than small negative earnings surprises. Brown (2001) reports a relatively high frequency of zero quarterly earnings surprises and also documents that for profitable firms, but not for unprofitable firms, the frequency of small positive earnings surprises of x cents per share is consistently greater than the corresponding frequency of small negative earnings surprises of x cents per share. Similarly, Degeorge, Patel and Zeckhauser (1999) show that the distribution of quarterly earnings per share surprises includes a surprisingly high frequency of values at \$.00 and \$.01.

A number of studies compare discretionary accruals between observations of positive and negative earnings surprises. Payne and Robb (2000) find that when the mean of analysts' forecasts in the month preceding the annual earnings announcement is greater than premanaged earnings, discretionary accruals are significantly positive, while when premanaged earnings are above analysts' forecasts discretionary accruals are significantly negative. Matsumoto (2002) finds a greater frequency of positive discretionary accruals for firms reporting earnings that meet or exceed analysts' consensus quarterly earnings forecasts, relative to firms reporting earnings below the consensus forecast, consistent with earnings management to meet or beat the consensus forecast.

Other studies consider the possibility of anomalous discretionary accruals at and near zero earnings surprise. Roychowdhury (2002) anticipates relatively low

discretionary accruals for firms just missing the consensus forecast and relatively high discretionary accruals for firms meeting or just beating the forecast. However, scaling forecast error by total assets he finds unusually positive discretionary accruals for firms just missing the consensus forecast, and no similar evidence of unusually positive discretionary accruals for zero and small positive earnings surprises. He finds unusually low operating cash flows, unusually high cost of goods sold and, surprisingly, unusually low discretionary expenses for small negative earnings surprises.

Dechow et al. (2000) find that firms with zero annual earnings surprise have significantly higher discretionary accruals than other firms. However, they note that in order to argue that firms are manipulating accruals to meet the forecast benchmark, it is necessary to show that firms that meet the forecast have higher discretionary accruals than firms that just miss the benchmark. If discretionary accruals for small negative surprises are at least as great as discretionary accruals for zero and small positive surprises, it is hard to argue that firms are manipulating accruals to beat the forecast. Interestingly, while they show that discretionary accruals are greater for zero earnings surprises than for non-zero surprise firms, they find discretionary accruals are greater, though not significantly, for firms with a negative surprise of one cent per share, than for firms with zero earnings surprise.[1]

We view earnings management as encompassing both actions that increase current earnings without decreasing future earnings and actions that increase current earnings at the expense of future earnings. Recognizing that both forms contribute to altering current reported earnings, for simplicity we refer to the former as business management and the latter as reporting management, and use the term earnings management to encompass the combination of both business management and reporting management.[2]

Regarding downward management of forecasts, Matsumoto (2002) constructs a measure of expected earnings based on previous earnings change and prior returns, and finds a greater frequency of consensus forecasts less than this expectation for firms that meet or exceed the consensus forecast than for firms that do not. She interprets this as evidence of firms managing analysts' forecasts downward to achieve positive earnings surprises. Bartov et al. (2002) find fewer negative surprises for forecasts issued late in the quarter as opposed to early forecasts, and interpret this as evidence of downward forecast management to meet or beat analysts' forecasts at the earnings announcement.

Consistent with previous research that managers avoid negative earnings surprises, we present distributional evidence of an unusually low frequency of small negative annual earnings surprises and an unusually high frequency of zero and small positive earnings surprises at several forecast horizons. More importantly, consistent with Dechow et al.'s arguments regarding differential management and small earnings surprises and unlike much of the previous literature we compare small negative, zero, and small positive earnings surprise categories and consider management to obtain

1 In related research, Dechow et al. (2003) consider earnings management to avoid small losses and find no difference in discretionary accruals or the proportion of positive discretionary accruals for small profit and small loss firms. They conclude that their results are inconsistent with the joint hypothesis that their discretionary accruals model detects earnings management and the kink observed in the earnings distribution at zero earnings is caused by earnings management.

2 Note that it is common in the literature (e.g., Burgstahler and Eames, 2003; and Dechow et al., 2003) to contrast 'bookkeeping' and 'real' actions that impact earnings.

zero and small positive earnings surprises, rather than positive earnings surprises in general. We surmise that factors such as big baths, earnings persistence, and excess mean regression in analysts' forecasts (Eames, Glover and Stice, 2001) contribute to difficulties when comparing positive and negative surprises in general.

We are the first to directly compare small negative, zero, and small positive earnings surprises and obtain evidence of upward earnings management and downward forecast management in association with zero and small positive earnings surprises. Further analysis provides evidence of both business management and reporting management in association with these same earnings surprises. Specifically, we find unusually positive changes in operating cash flows, our proxy for business management, and discretionary accruals, our proxy for reporting management, in association with zero and small positive surprises. Additionally, we find significant evidence of unusually negative changes in forecasts, our proxy for forecast management, in association with zero and small positive earnings surprises, suggesting that zero and small positive surprises are sometimes achieved through downward management of forecasts.

3. DATA

We obtain actual and forecast annual EPS values for the years 1986 through 2000 from the Zacks Investment Research database.[3] This database includes both forecast and actual EPS values in conformance with Zacks' proprietary definition of operating earnings-per-share before extraordinary and non-recurring items. To obtain annual earnings estimates and realizations we multiply Zacks EPS values by the number of shares used to calculate EPS and a factor to adjust the COMPUSTAT reported number of shares for stock splits and stock dividends (COMPUSTAT annual item #27).[4] To insure comparability of forecast and 'actual' earnings, all comparisons are based on the forecast and actual numbers reported by Zacks.

Consistent with the decision in Burgstahler and Dichev (1997) to eliminate firms subject to more complex earnings management incentives associated with their regulatory environment, we exclude both financial and utility firms from our analyses. Since the data comprise a broad range of firm sizes, we scale our variables by beginning-of-the-year market value of common equity for year t (i.e., the market value at the end of year $t-1$), computed as common shares outstanding (COMPUSTAT annual item #25) times the price per share (COMPUSTAT annual item #199), both at the end of year $t-1$.

We categorize forecasts into four forecast horizons, respectively defined as 1 to 90, 91 to 180, 181 to 270, and 271 to 360 days prior to the *Wall Street Journal* annual

3 Each annual EPS forecast record in the Zacks database represents either an analyst's first estimate of earnings for a fiscal year, a change in the analyst's estimate (from a previously reported estimate), or an update of an analyst's estimate when the previous estimate is more than 120 days old.

4 Prior to 1998, Zacks actual and forecast EPS values are presented on a primary basis. For these periods we multiply EPS values by the number of shares (COMPUSTAT item #54) used to calculate primary EPS. In response to changes in reporting per share values mandated by *FASB Statement 128*, and to maintain, in so far as possible, consistency in reporting across time, for subsequent periods Zacks reports EPS on a diluted bases, rather than basic EPS. For these periods we multiply by the number of shares (Compustat item #171) used to calculate diluted EPS. Although pre 1998 primary EPS and post 1997 diluted EPS are not strictly comparable, our methodology yields earnings, which we assume is comparable across the time periods.

earnings release date reported by COMPUSTAT. To provide results that are not heavily dependent on a single choice of forecast metric, we calculate results for two types of 'composite' forecasts – the last individual forecast and the median forecast in a period.

Table 1, Panel A, presents the number of composite forecasts available for each of the four 90 day intervals preceding the earnings announcement date, and shows that forecasts are commonly available at all horizons. Panel B, presents the distribution of observations by year. The number of firm-year observations increases substantially over the years of our sample period. An exception to the overall trend is a drop in the number of observations for 1995 when Zack's forecast disclosure policies were amended, reducing the availability of data, after which growth resumed again. Panel C, presents the distribution of industries for our sample. As is expected, the sample is dominated by manufacturing firms.

4. ANALYSIS AND RESULTS

(i) Avoidance of Small Negative Earnings Surprises

Figure 1 presents distributions of annual earnings surprises scaled by the beginning market value of common equity, where earnings surprise is defined as realized earnings minus the earnings forecast. Figure 1 groups earnings surprises into intervals of 0.0002 width and plots the observations from −0.004 to 0.004. Each interval is defined to include its lower boundary and exclude its upper boundary. For most intervals inclusion of the lower boundary has no impact because there are no scaled earnings surprise observations exactly equal to the boundary.

However, in one interval, the first interval to the right of zero extending from 0 to 0.0002, there is a large number of observations exactly equal to the lower boundary of zero, because unscaled earnings per share surprises equal to zero (which occur frequently) translate into scaled surprises equal to zero. Therefore, in the interval immediately to the right of zero, zero surprises and nonzero surprises are shown in separate stacked bars, with the zero surprises represented by the taller, upper bar. Panel A, Figure 1, shows the distribution of earnings surprises defined with respect to the last individual analyst forecast for the year, and Panels B, C and D present the distributions of earnings surprises defined with respect to median composite forecasts over 1 to 90, 91 to 180, and 271 to 360 day forecast horizons.

In each panel we observe relatively few small negative surprises and relatively many zero surprises. We assess the significance of the relative absence of small negative earnings surprises using the standardized difference statistic, defined as the difference between the observed and expected number of observations in an interval, divided by the estimated standard deviation of the difference (Burgstahler and Dichev, 1997), for the first interval to the left of zero.[5] For each of our forecast horizons, we

5 Assume there are N observations and denote the proportion of observations in interval i by p_i. For a smooth probability distribution, the expected number of observations in interval i is approximately the average of the numbers in the adjacent intervals, $N((p_{i-1} + p_{i+1})/2)$, and the variance of the difference between the observed and expected number of observations for interval i is approximately $Np_i(1 - p_i) + (1/4)N(p_{i-1} + p_{i+1})(1 - (p_{i-1} + p_{i+1}))$. Burgstahler and Dichev (1997) and Burgstahler and Eames (2002) use this statistic to test for avoidance of small losses and earnings decreases, and analysts' anticipation of such behavior, respectively.

Table 1

Number of Firm-Year Observations by Forecast Horizon, Year, and Industry

Panel A: Distribution of Firm-Year Observations by Forecast Horizon	
Forecast Horizon in Days before Earnings Announcement	*Observations*
1 to 90	22,475
91 to 180	24,069
181 to 270	24,246
271 to 360	24,226
1 to 360	25,951

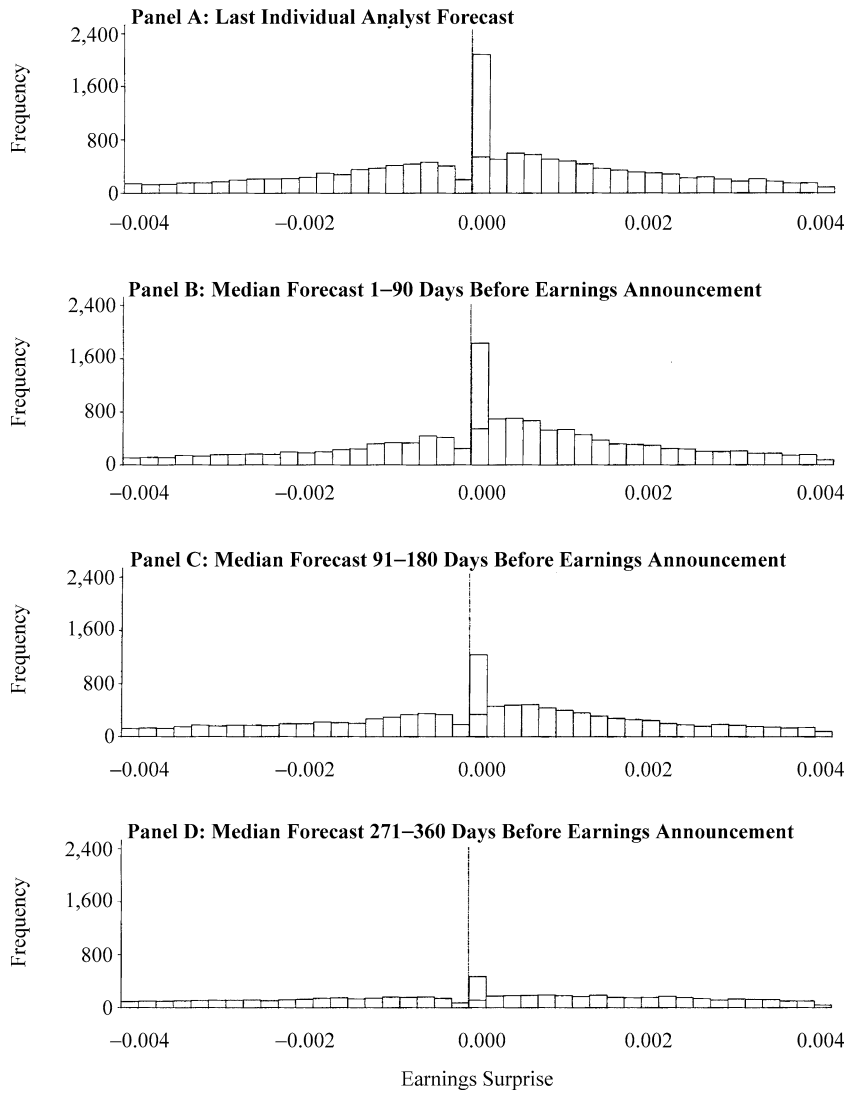
Panel B: Distribution of Firm-Year Observations by Year	
Year	*Observations*
1986	621
1987	941
1988	1252
1989	1392
1990	1483
1991	1601
1992	1675
1993	1823
1994	2178
1995	1584
1996	1647
1997	1822
1998	2541
1999	2541
2000	2850

Panel C: Distribution of Firm-Year Observations by Industry	
Industry	*Observations*
Agriculture, Forestry	102
Mining	1,276
Construction	431
Manufacturing	15,220
Transportation, Communications	407
Wholesale Trade	1,223
Retail Trade	2,268
Real Estate	108
Services	3,734
Other	1,182
Total	25,951

consider tests based on grouped zero and small positive earnings surprises as well as tests based on zero and small positive earnings surprises considered separately. All standardized differences are highly significant and consistent with management

Figure 1

Earnings Surprise (Realized − Forecast) Scaled by Market Value (Upper portion of bar for interval [0, .0002] represents exact zero surprises)



to avoid negative earnings surprises. Specifically, when the zero observations are included with non-zero surprises in the first interval right of zero, the standardized differences for the first intervals to the left of zero in Panels A, B, C and D are −43.84, −36.87, −31.47 and −18.57, respectively. When the zero observations are excluded from the first interval right of zero, the standardized differences are −20.29, −16.05, −14.75 and −7.97. When only zero earnings surprises are included in the first interval to the right of zero, the standardized differences are −35.56, −27.96,

−24.71 and −15.12, respectively. All of these test statistics are significant at the 0.0001 level.[6]

The visual and statistical evidence of management to avoid negative earnings surprises becomes progressively weaker moving from Figure 1, Panel A (for individual forecasts issued close to the earnings announcement date) to Panel D (for composite forecasts issued from 271 to 360 days before the earnings announcement date). In Section 4(*ii*)(b) we consider this observed trend in avoidance of negative earnings surprises as evidence of forecast management.

(ii) Earnings Management and Forecast Management

Our tests in the preceding section do not distinguish among the potential means for avoiding negative earnings surprises, i.e., business management, reporting management, and forecast management. Without further testing the substantial number of exact zero surprises might just as well be ascribed to analyst skill as to management of earnings and forecasts. The analyses below focus on the various forms of management in relation to zero and small positive earnings surprises. We initially consider proxies for earnings management and its components, and present evidence regarding the contributions of business management and reporting management to zero and small positive earnings surprises.

Many of our tests focus on observable differences in the distributions of our management proxies across levels of earnings surprise in the vicinity of zero. For example, to assess earnings management we compare distributions of earnings management proxies across earnings surprise levels near zero. Our tests focus on comparisons of percentiles of the distributions of the proxies and, as explained in the next few paragraphs, we expect to observe the largest effects in the higher percentiles of the proxies for earnings management and in the lower percentiles of the proxies for forecast management.

The best test for earnings or forecast management is dictated by the anticipated pattern of realizations of management. For example, if we anticipate a constant amount of management among all of the zero earnings surprise observations, then we would test for a shift across the entire distribution of the management proxy. Under the constant amount of management scenario we would expect entire distributions of the earnings management proxies to be shifted higher by the constant amount of earnings management and we would expect entire distributions of the forecast management proxies to be shifted lower by the constant amount of management. Alternatively, and arguably more descriptive of what we expect for earnings and forecast management to achieve zero surprises, if we anticipate substantial management for only a small portion of the zero and small positive earnings surprise observations, then we would test for effects concentrated in the higher percentiles of the earnings management distribution because we expect only the higher end of the distribution of the earnings management proxy to be noticeably shifted by this pattern of earnings management. Similarly, we would test for effects concentrated in the lower percentiles of the forecast management proxies.

6 We find the same pattern of a relatively low frequency of small negative earnings surprise and high frequency of zero and small positive earnings surprise for both profitable and unprofitable firms. Brown (1991) does not find similar evidence for loss firms.

To see why we might expect effects to be concentrated at one end of the distribution, consider the case of forecast management. Assume that only 10% of forecasts are subject to forecast management and that these observations are drawn randomly from the population of unmanaged forecasts. For simplicity, assume the amount of downward management is large enough to reduce the forecast management proxy to levels below the lowest levels that it would achieve in the absence of any forecast management. The observable effects of this low rate of large downward forecast management on the distribution of the forecast management proxies will become progressively more pronounced as we move down through the percentiles of the distribution of the forecast management proxies. Starting at the upper percentiles, consider the upper quartile of pre-managed observations of our forecast management proxies. If only 10% of this group is subject to forecast management then of the original 25% at the top quartile of pre-managed observations, only 2.5% will be changed by forecast management. Therefore, the 77.5 (= 100 − (0.9 * 25)) percentile of the post-managed forecast management proxy will correspond to the 75th percentile for the pre-managed proxy. Thus, in the upper percentiles of the distribution the effect of management will result in no more than a slight shift between the pre-managed and post-managed values of the forecast management proxy. Moving down to the median of the distribution, the effect of management on the distribution of the forecast management proxy will be larger but still relatively minor − the 55th percentile of the post-managed proxy will correspond to the 50th percentile of the pre-managed proxy. At the lower quartile, the effects become more substantial − the 32.5 percentile of the post-managed proxy will correspond to the 25th percentile of the pre-managed proxy. Although we do not expect the pattern of forecast management to achieve zero and small positive earnings surprises to be so clear-cut as the above example, we do expect to observe little or no impact at the upper percentiles of the proxy distribution and a progressively more pronounced impact at the lower percentiles of the distribution of the forecast management proxy.

We examine earnings and forecast management via comparison of the distributions of our earnings and forecast management proxies for earnings intervals at and near zero. For this purpose we focus on the comparison of quartile values for the proxy variables across levels of earnings surprise. For the earnings management proxies, we expect to see the strongest effect on the highest quartile, less significant effects on the median, and still smaller (or negligible) effects on the lowest quartile.[7] For the forecast management proxies, the expectations are reversed. Instances of downward forecast management to achieve zero and small positive earnings surprises are expected to have the strongest effect on the lowest quartiles of the forecast management proxies, with progressively smaller effects for the medians and higher quartiles, respectively.

(a) Earnings Management

We employ scaled annual change in earnings as our first proxy for earnings management. This proxy implicitly relies on the assumption that unmanaged earnings is

7 Results similar to those reported here are obtained when we focus on the10th and 90th percentiles as descriptors of the extreme percentiles.

on average equal to the previous year's earnings, consistent with a simple time-series random walk model of expected earnings. We recognize that earnings change reflects both business and reporting management, and interpret earnings change as a noisy measure of earnings management, where the noise represents elements of earnings change not systematically related to either business or reporting management to avoid small negative earnings surprises.

To distinguish business and reporting management, we develop individual proxies for each. We anticipate that business management activities such as increases in productive effort and cost cutting measures will impact operating cash flow as well as earnings. Thus, we proxy business management by scaled annual change in cash flow from operations. This proxy is based on a simple time-series random walk model of expected cash flow from operations. We proxy reporting management by discretionary accruals derived from the Jones' (1991) model. We obtain discretionary accruals by estimating the following accruals regression in cross-section for all firms in each two digit SIC code and year combination in our sample,

$$\mathrm{TAC}_{it}/\mathrm{TA}_{it-1} = a_1(1/\mathrm{TA}_{it-1}) + a_2(\Delta\mathrm{REW}_{it}/\mathrm{TA}_{it-1}) + a_3(\mathrm{PPE}_{it}/\mathrm{TA}_{it-1}) + e_{it}$$

where:

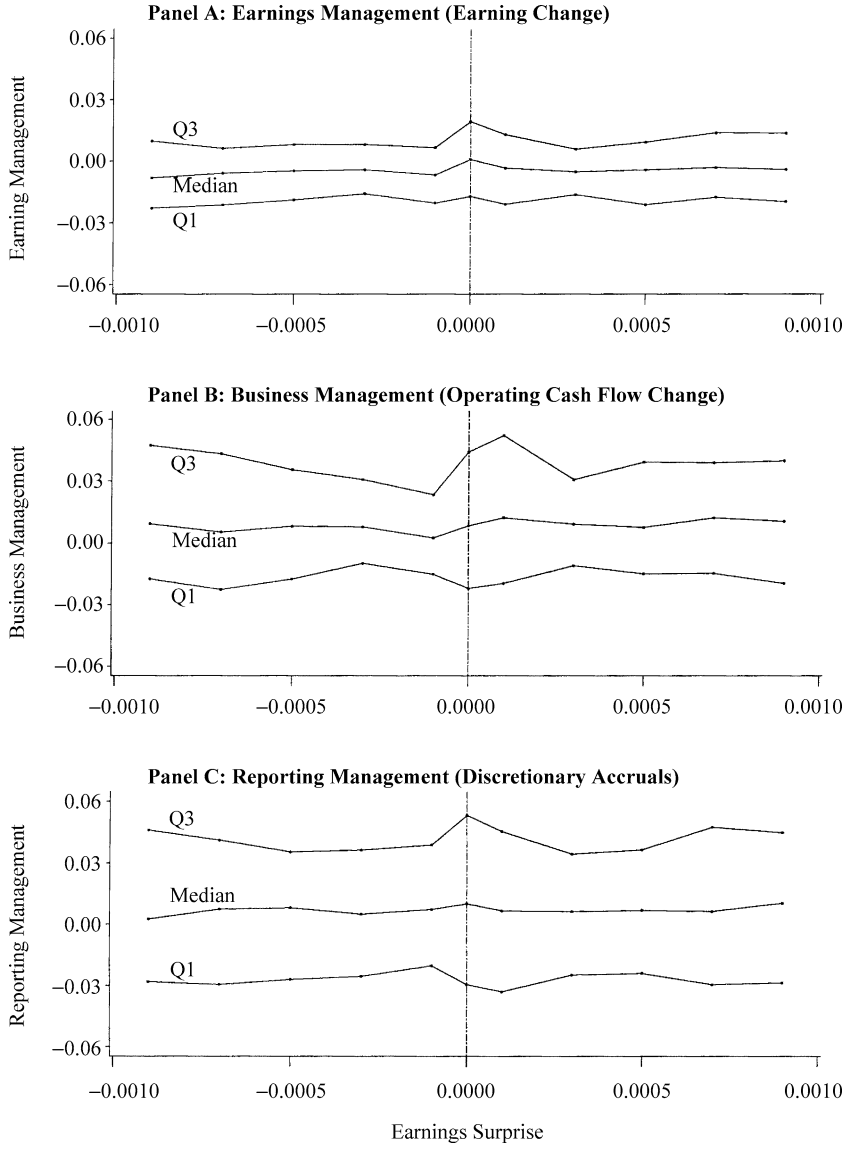
TAC_{it} = Earnings before extraordinary items – Cash from operations (COMPUSTAT item #18 – COMPUSTAT item #308)[8]
TA_{it-1} = Total assets (COMPUSTAT item #6)
$\Delta\mathrm{REV}_{it}$ = Change in revenue (Change in COMPUSTAT item #12)
PPE_{it} = Property plant and equipment (COMPUSTAT item #7)

and the subscripts refer to year i and time t. The residuals from the regression represent estimates of discretionary accruals. To maintain consistency in scaling across all our forecast and earnings management proxies, the estimated discretionary accruals obtained from the regression are subsequently re-scaled by beginning market value of common equity.

Figure 2 present plots of the quartiles of the distributions of our earnings management proxies for earnings surprise intervals near zero. For these figures we define earnings surprise as realized earnings less the last forecast of earnings before the earnings release date. As for Figure 1, with the exception of zero surprises we employ an earnings surprise interval width of 0.0002 and define each interval to include its lower boundary and exclude its upper boundary. Zero surprises are grouped separately into a single category. The quartiles of the proxy distributions are plotted at the midpoint of each earnings surprise interval. The plotted quartiles in Figure 2 reveal systematic shifts in the distributions of the management proxies across levels of earnings surprise.

8 Collins and Hribar (2000) point out how total accruals estimates based on the Statement of Cash Flows avoid the measurement error inherent with a balance sheet based estimate when non-articulating events such as mergers, acquisitions, and divestitures occur.

Figure 2
Quartiles of Earnings Managements Components by Earnings Surprise Category



Notes:
Earnings Surprise = (Realized Earnings − Last Forecast)/Beginning Market Value.
All managment proxies are scaled by beginning market value.
All changes annual.

We test the significance of the observed anomalies in the quartile values at zero and small positive earnings surprises using two methodologies. First, we compare quartiles for zero and small positive earnings surprise levels with the average of the two corresponding quartile values for the two closest surprise levels excluding zero

and small positive surprises (i.e., the ranges −0.0002 to 0 and 0.0002 to 0.0004, where each interval excludes its upper boundary). Second, we make a similar but broader comparison with the two corresponding quartile values for the earnings surprise intervals −0.001 to 0 and 0.0002 to 0.001, which with the exclusion of zero and small positive earnings surprises cover the full range of earnings surprises plotted in Figure 2. The first test provides a stronger control for any systematic change in quartile values across surprise levels that is unrelated to forecast and earnings management at zero and small positive earnings surprises. On the other hand, if there are no systematic changes in quartile values for earnings surprises from −0.001 to 0.001, other than management to achieve zero and small positive surprises, the second test benefits from the larger comparison sample size. Because the two tests provide similar results, we limit reported results to the first test only.

The difference between a quartile value for the zero or small positive earnings surprise categories and the average of the related quartiles for the comparison categories is referred to as the quartile difference test statistic, QD_i, where $i = 1$, 2, or 3 to denote comparisons of the first, second, or third quartiles, respectively. Under the null hypothesis of no unusual earnings management at zero and small positive earnings levels the QD_i statistics have an expected value of zero. Focusing on predictions for the zero surprise category, if the distribution of the management proxy for zero surprise does not differ systematically from the composite value from the two comparison surprise categories, the quartile difference statistic for the zero surprise category has an expected value of zero. On the other hand, under the alternative hypothesis that the zero earnings surprise category contains a disproportionate number of large positive values of the earnings management proxy, the test statistic will tend to take on large positive values for the earnings management proxy.

Because it is impossible to derive the null hypothesis distributions of these test statistics without relying on additional assumptions about the underlying distributions of the proxies, we employ approximate randomization tests (Noreen, 1989). Randomization tests assess significance by comparing the observed values of the test statistics to a reference distribution generated under conditions where the null hypothesis holds by construction. This reference distribution is generated for each surprise category by randomly reassigning observations in the surprise category being tested and the two comparison categories to three pseudo-categories, with respective numbers of observations corresponding to the tested category and two comparison categories. Random assignment assures that all three pseudo-categories are drawn from the same pooled distribution of the earnings management proxy, i.e., random assignment assures that there are no differences in management proxy distributions across earnings surprise categories. The test statistics are then recomputed for the randomly assigned pseudo-categories. This process is repeated 999 times, generating a reference distribution of the test statistic under the null hypothesis. The significance level of the actual observed value of QD_i using a one-tailed test is assessed as (1+ number of randomly generated pseudo-quartile differences more extreme than the original observed QD_i)/(1 + 999). For example, if the original observed value of QD_i for the earnings management proxy is greater than all of the 999 generated values of the randomized quartile difference statistics, the significance level of the observed QD_i is assessed as 0.001, indicating that it is highly unlikely that the actual observed test statistic would have been observed by chance under the null hypothesis.

Figure 2, Panel A, displays quartiles of the distributions of our proxy for earnings management, the annual change in earnings, by category of earnings surprise. For zero and small positive earnings surprises, Figure 2, Panel A, exhibits substantial upward shifts in the top quartiles of our earnings management proxy, lesser upward shifts in the medians, and mixed results for the lowest quartiles. Randomization tests comparing our earnings management proxy at zero earnings surprise with small negative (−0.0002 to 0) and modest positive (0.0002 to 0.0004) earnings surprises yield QD_i statistic significance levels of 0.001, 0.001 and 0.373 for the upper, median and lower quartiles, respectively. For small positive surprises, tests yield significance levels of 0.001, 0.110 and 0.859, respectively. Thus, consistent with predictions, there are significant upward shifts in the upper quartiles for both zero and small positive earnings surprises. At zero earnings surprise the upward shift in the median is also significant. For small positive surprises only the upward shift in the upper quartile is significant. In sum, the evidence is consistent with the proposition that earnings are sometimes managed upward to avoid negative earnings surprises.

We proxy business management by the market value scaled change in operating cash flows. Figure 2, Panel B, displays quartiles of the distributions of this proxy. We find upward shifts in the upper and median quartiles of change in cash flow, with no similar shifts in the first quartiles for zero and small positive earnings surprise. For zero earnings surprise, relative to the intervals −0.0002 to 0 and 0.0002 to 0.0004, tests yield significance levels of 0.001, 0.169 and 0.995 for the upper, median and lower quartiles, respectively. For small positive earnings surprises, corresponding significance levels are 0.001, 0.018 and 0.951, respectively. Thus, the upward shift in the upper quartile of the distribution of the change in cash flow from operations proxy for business management at zero earnings surprise is statistically significant, while the evidence at the median is somewhat mixed, with clear significance for small positive earnings surprises and at best modest significance for zero earnings surprises. We interpret these results as consistent with the proposition that operating decisions reflected in cash flow from operations are used to manage earnings upward to avoid a negative earnings surprise.[9]

Figure 2, Panel C, displays quartiles of the distributions of our reporting management proxy, discretionary accruals. We observe an upward shift in the upper quartile of discretionary accruals for zero and small positive surprises, a lesser upward shift for the median for zero earnings surprises but not for small positive surprises, and no upward movement for zero or small positive surprises at the lower quartiles. For zero earnings surprises and the comparison intervals −0.0002 to 0 and 0.0002 to 0.0004, tests yield one-tailed significance levels of 0.001, 0.156 and 0.915, for the upper quartile, median, and lower quartile, respectively. For small positive earnings surprises and the same comparison intervals the respective significance levels are 0.076, 0.566 and 0.965. These results suggest that reporting management plays a significant role in earnings management to obtain zero and small positive earnings surprise. While we lack statistical tests to compare the relative importance of business versus reporting management,

9 The above significance levels for the bottom quartile of change in operating cash flows can be reinterpreted as 0.005 and 0.049 significance levels for tests of obtaining a lower quartile value than the observed value. An explanation consistent with this empirical evidence is that when firm earnings substantially exceed the forecast managers alter their productive efforts to only meet or slightly beat the forecast.

the relative levels of significance suggest that business management plays the more important role.[10]

(b) Forecast Management

We consider two types of evidence related to forecast management: (1) analysis of the shift in relative frequencies of small non-zero positive and small negative earnings surprises across forecast horizons and (2) analysis of two alternative forecast management proxies across levels of earnings surprise. For the first approach, the panels of Figure 1 present distributions of earnings surprise for various intervals preceding the earnings announcement date. Noting that forecast errors at all horizons are relative to the same earnings values, and consequently subject to the same levels of earnings management, any differences in the distributions of earnings surprises across horizons must reflect factors other than earnings management, such as forecast management and informative disclosures across time. While we presume that informative disclosures play a leading role in zero earnings surprises, we see no reason to presume a difference in informative disclosures between small negative $(-0.0002, 0)$ and non-zero small positive $(0, 0.0002)$ surprises. Consequently, we compare the relative frequencies of small negative and small non-zero positive surprises across the panels to test for forecast management. Small positive surprises represent 72%, 77%, 77% and 83% of the total of small negative and small positive observations in Figure 1, Panels D, C, B and A, respectively. Classifying the small negative and small positive earnings surprises as 0 and 1, respectively, and regressing this variable on an ordered value for the time horizon we find the trend of increasing relative frequency of small positive observations over time is significant ($t = 3.57$, d.f. $= 2241$, $p = 0.001$) and consistent with forecast management to avoid small negative surprises as well as to obtain small positive earnings surprises.

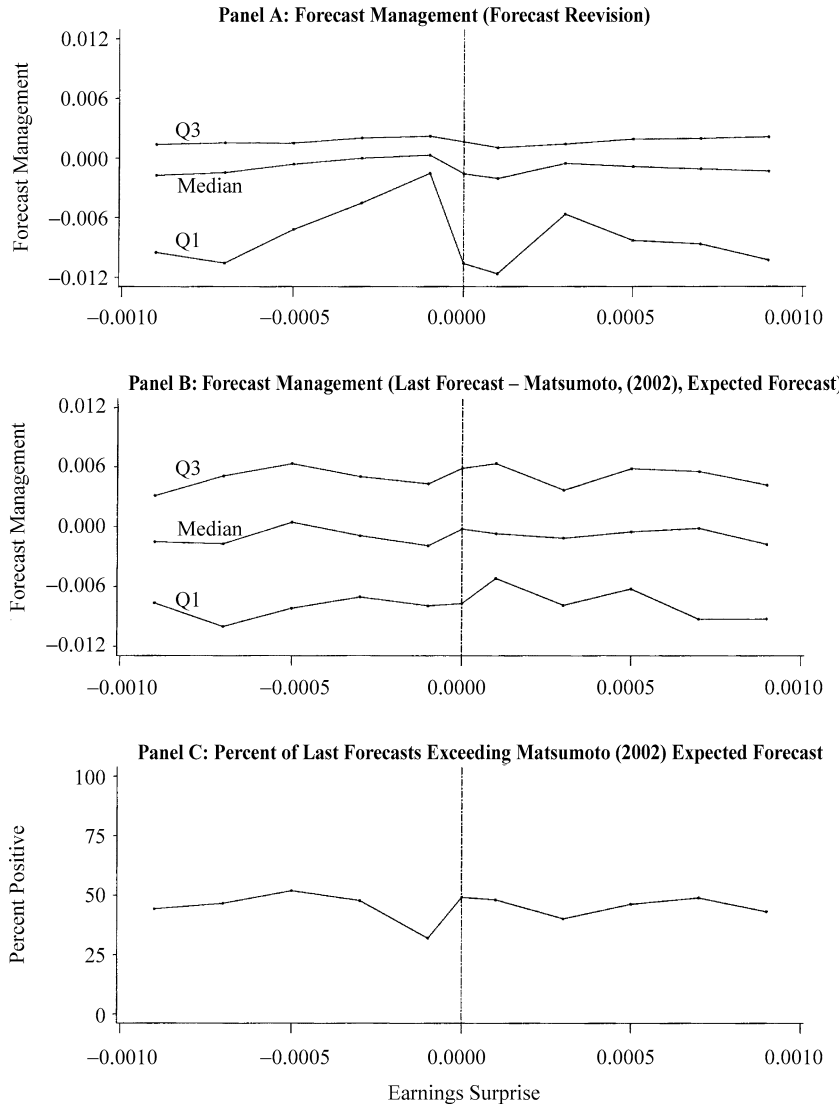
While we cannot observe forecasts that exclude the effects of management, we can observe forecasts that exclude forecast management occurring during the latter part of the year, namely forecasts issued early in the fiscal year. The difference between the forecast late in the year and the forecast early in the year serves as a proxy for forecast management occurring between the early and late forecast periods. Thus, our first proxy for forecast management, the difference in median forecasts between our last and first forecast horizons captures forecast management occurring between the periods.

Figure 3, Panel A, plots quartiles of the distributions of our first forecast management proxy, by categories of earnings surprise. Forecast revisions reflect both forecast management and informative disclosures. Assuming that the impact of informative disclosures is likely similar across adjacent intervals of earnings surprises, differences in forecast revisions across adjacent intervals reflect differences in forecast management. Comparing the quartile values of the forecast management proxy for the zero and small positive surprise observations with the quartiles for the surrounding intervals, there are pronounced downward shifts in the lower quartiles, smaller downward shifts in the

10 Significance levels for the bottom quartile suggest 0.085 and 0.035 significance levels for tests of obtaining a lower value than observed. An explanation consistent with the evidence is that firms employ discretionary accruals to avoid substantially exceeding analysts' forecasts, and thus bank such accruals for the future.

Figure 3

Quartiles of Forecast Management and Percent Forecasts Exceeding Expectation



Notes:
Panel A:
Forecast Revision = (Median 1 to 90 − Median 271 to 360 Day Forecast)/Beginning Market Value.
Earnings Surprise = (Realized Earnings − Last Forecast)/Begining Market Value.

medians, and modest or no downward shifts in the upper quartiles of the distribution. These results are consistent with the predicted progressively stronger effects of forecast management on progressively lower percentiles of the distribution of the forecast management proxy, and the assertion that forecast management contributes to the avoidance of small negative surprises and the large number of zero and small positive surprises observed in Figure 1.

Randomization tests confirm the statistical significance of the visual evidence in Panel A of Figure 3. Based on a comparison with small negative surprises and surprises in the range from 0.0002 to 0.0004, the computed one-tailed significance levels for the observed QD_i at zero earnings surprise for the lower, median and upper quartiles of the forecast management proxy are 0.001, 0.001 and 0.339, respectively. Corresponding values for the significance of quartile differences for small positive surprises are 0.001, 0.001 and 0.041, respectively. Thus, there is evidence of a highly significant downward shift in our forecast management proxy at zero and small positive earnings surprises. The evidence is significant at the 0.1% level for the bottom and median quartiles at zero and small positive earnings, and at the 5% level for the upper quartile at small positive earnings. Overall, the evidence from the distributions of the forecast management proxy is consistent with the proposition that forecasts are managed downward to achieve zero and small positive earnings surprises.[11]

As a second proxy for forecast management, we use the Matsumoto (2002) method to determine fourth quarter expected earnings. Matsumoto models the change in quarterly earnings as:

$$\Delta E_{ijtq}/MV_{ijtq-4} = b_{0ij} + b_{1ijt}(\Delta E_{ijtq-1}/MV_{ijtq-5}) + b_{2jt}(CRET)_{ijtq}$$

where:
subscripts refer to firm i, four digit SIC code j, quarter q, and year t, and

ΔE_{ijtq} = earnings change between the current quarter and four quarters prior,
MV_{ijtq} = market value of common equity, and
$CRET_{ijtq}$ = cumulative daily excess returns from three days after the four quarters prior earnings announcement to 20 days before the current quarter earnings announcement.

As in Matsumoto, we (1) estimate the model for each firm-year using all firm quarters in the year with the same four-digit SIC code, except those from the firm for which we estimate the parameters, (2) include only firm-years with 10 or more firm-quarters of data in the same industry, and (3) delete observations with variable values in the top and bottom half percent of the respective distributions to mitigate the impact of extreme values on the parameter estimates. We then use parameter estimates obtained for the prior firm year to determine the expected change in earnings:

$$E(\Delta E_{ijtq}) = b_{0ij-1} + b_{1ijt-1}(\Delta E_{ijtq-1}/MV_{ijtq-5}) + b_{2ij-1}(CRET)_{ijtq})MV_{ijtq-4},$$

and add this expected change to earnings from the same quarter in the prior year to obtain the expected forecast F_{ijtq} of the current quarter's earnings:

$$E(F_{ijtq}) = E_{ijtq-4} + E(\Delta E_{ijtq}).$$

11 To consider the possibility that the lowest quartile of our forecast management proxy is capturing large post-first-quarter earnings shocks, related losses and corresponding forecast revisions, and consistent with the separate analysis of profit and loss firms (Brown, 2001), we consider our forecast management proxy for the population of loss firms. As for the full sample, for the population of loss firms we obtain evidence of downward forecast management to achieve zero and small positive earnings surprises.

While Matsumoto focuses on quarterly earnings and obtains expected quarterly forecasts, our analyses are of annual earnings and forecasts.[12] Consequently, to obtain the expected forecast of annual earnings, we estimate fourth quarter expected earnings and add the prior three quarters of earnings realizations. While Matsumoto measures the unexpected portion of analysts' forecasts as the last published consensus forecast reported by Zacks less the expected forecast based on the model, to avoid the possibility of stale forecasts impacting our results we consider the difference between the last Zack's reported analyst forecast issued within 30 days of the earnings announcement and the model derived expected forecast. Matsumoto considers only the sign of the quarterly version of her proxy for the unexpected portion of analysts' forecasts, and compares the relative frequencies of positive and negative proxy observations for two broad categories of earnings surprises; earnings that meet or beat the forecast vs. those that do not. While we consider the sign of our proxy for the unexpected portion of analysts' forecasts, we also consider the magnitude of the proxy. In Figure 3, Panel B, we consider quartiles of the distributions of this proxy for the same earnings surprise categories employed in Panel A. In Panel C of Figure 3 we plot the percent of positive observations of our proxy for the same surprise categories.

We anticipate relatively lower values for this forecast management proxy in instances of downward forecast management. In neither panel do we find evidence consistent with downward management of forecasts to achieve zero and small positive earnings surprises. In Panel B at all quartiles, the proxy values at zero and small positive earnings are greater than the corresponding quartile values for the adjacent surprise categories, and thus no statistical tests are warranted. In Panel C we see that last forecasts tend to exceed the expected forecast at least as frequently for zero and small positive earnings surprises as for other surprise levels, results inconsistent with forecast management to achieve zero and small earnings surprises. It is unclear why our results with Matsumoto's proxy are not supportive of her findings. The most likely source of difference is our focus on relatively narrow earnings surprise categories in the vicinity of zero, as suggested by Dechow et al. (2000), as opposed to the two large surprise intervals employed by Matsumoto.

5. SENSITIVITY ANALYSES

Although our primary analyses focus on earnings surprises and earnings and forecast measures scaled by beginning of the year market values, we also consider analyses of per share values.[13] While a strength of the Zack's data is its presentation of definitionally-comparable numbers for actual and estimated earning per share, Zacks presents these values on a cumulative split-adjusted basis. This creates difficulties for subsequent analysis of earnings surprise management on a per share basis, for with splits relatively large per share earnings surprises can be subsequently reported as small per share

12 We anticipate that incentives for positive annual surprises are at least as great as for positive quarterly surprises, and that the evidence of management with annual data should be greater.

13 Durtschi and Easton (2005) contend that deflating earnings by market capitalization can induce particular difficulties in interpreting any discontinuity in the distribution of earnings at zero as evidence of earnings management. They do not raise the same deflation issue regarding the distribution of forecast errors. They present a distribution of forecast errors in dollars per share that broadly mimics our results in Figure 1 and explain their results by the relative magnitudes of optimistic and pessimistic forecasts rather than earnings management.

values and rounding of reported values can induce error when attempting to adjust for splits. Our response is to limit our analyses to observations not impacted by splits. This reduces power by restricting our sample size and limits generalizability of the results. Furthermore, stock splits are likely associated with superior firm performance and consequently those firms facing the strongest incentives for managing earnings surprises.

Plotting the distributions of earnings per share surprises over one cent intervals for the same forecast horizons employed earlier, we find a dramatic increase in the number of observations between a negative one cent and zero earnings surprise per share. Above zero earnings surprise the number of observations declines only modestly with each one cent increase in the earnings surprise. Standardized difference values based on comparisons of negative one cent surprises with zero and negative two cent surprises are 5.84, 6.45, 3.35 and 1.36, respectively across our four reported forecast horizons. All but the last value are significant at the 0.001 level, while the last is significant at the 10% level.

Replicating on a per share basis the earnings and forecast management analyses presented earlier, we compute quartile difference statistics based on comparisons of zero earnings per share surprises with one cent per share positive and negative surprises. For our first earnings management proxy, earnings change, we obtain significance levels of 0.068, 0.015 and 0.022, for the first, second, and third quartiles, respectively. For our second earnings management proxy, operating cash flow change, we obtain significance levels of 0.670, 0.258 and 0.025, respectively. For our third earnings management proxy, discretionary accruals, we obtain significance levels of 0.725, 0.221 and 0.296, respectively. Collectively, these results are consistent with earnings management in the form of real business activities, but not in the form of accruals management to achieve zero earnings surprises.

Considering forecast management, for our forecast management proxy, forecast revision, we find positive quartile difference statistics at zero earnings surprise for all quartiles and thus no evidence consistent with the downward management of forecasts to obtain positive earnings surprises. For the Matsumoto (2002) forecast management proxy we obtain negative quartile difference statistics at zero earnings surprise for the second and third quartiles only. Significance levels for these quartile difference statistics are 0.447, 0.156 and 0.071, respectively. Finally, comparing the percent of last forecasts exceeding Matsumoto's (2002) expected forecasts, we find no significant decrease at zero earnings surprise relative to small positive and negative surprise values.

Collectively, the above results provide modest support for earnings management and forecast management to avoid small negative earnings surprises. While we find support based on analysis of earnings change, operating earnings change, and Matsumoto's (2002) expected forecasts, we find no evidence based on discretionary accruals and forecast revisions.

Conclusions based on these findings must be tempered by the data restrictions relating to share splits and related firm performance.

6. CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH

Evidence in this paper supports assertions by SEC Chairman Levitt and others that managers take actions to avoid negative earnings surprises, as distributions of earnings surprises contain an unusually high frequency of zero and small positive surprises

and an unusually low frequency of small negative surprises. More importantly, we present evidence that supports the conjecture that these actions include *both* (1) upward earnings management, and (2) downward forecast management, and are able to obtain this evidence by considering earnings surprises in the vicinity of zero. Our results suggest that both 'real' operating actions, reflected in cash from operations, and actions of a 'bookkeeping' nature, reflected in discretionary accruals, contribute to earnings management to achieve zero earning surprises.

The results contribute to the previous literature examining earnings management in response to a variety of incentives. The results also contribute to the literature on forecasts, providing evidence of forecast management in response to incentives. The issue of how incentives induce firms to choose among forecast management, earnings management and the simultaneous use of both forms of management as the preferred means for avoiding a negative earnings surprise remains a topic for future research.

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