Information Content of Earnings Management – Evidence from Managing Earnings to Exceed Thresholds

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Abstract

This paper examines whether managers signal firms' future performance by managing earnings to exceed thresholds. Because managers' reporting discretion is bounded by the accounting regulations, managing earnings to exceed current period's thresholds reduces future earnings and therefore makes future earnings thresholds harder to reach. As a result, only firms with sufficient future earnings growth benefit from doing so. I test the signaling hypothesis in three steps. I first hypothesize that firms with a higher degree of information asymmetry between the management and investors are more likely to signal performance using earnings thresholds. Consistent with the hypothesis, I find that the discontinuities in earnings distributions around thresholds are significantly more salient for information-strained firms than for firms with lower degree of information asymmetry. The second step examines the credibility of the signal. I document that firms who marginally exceed the earnings thresholds demonstrate superior future accounting performance compared with firms just missing the thresholds, and this difference in future performance increases with the degree of information asymmetry firms face. The third step of my analysis studies the market's reaction to firms' beating or missing the thresholds. My empirical results suggest that the capital market recognizes the information content of the earnings management activities and rationally incorporates it in setting prices.

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1. Introduction

The accounting literature documents significant discontinuities around zero in earnings, earnings changes, and analyst forecast errors distributions (e.g. Hayn, 1995; Burgstahler and Dichev, 1997, and Degeorge, Patel, and Zeckhauser, 1999). The discontinuities provide compelling evidence that firms manage earnings to exceed the three thresholds – zero, last period's earnings, and consensus analyst forecasts.[1] This intriguing phenomenon draws a lot of attention from both academics and regulators (see discussions in Healy and Wahlen, 1999; Dechow and Skinner, 2000).

Academics and regulators tend to interpret the earnings management activities around thresholds as driven by managers' opportunistic incentives. The explanations offered by academics are generally based on contracting or regulatory concerns. For example, Matsunaga and Park (2001) find a significant adverse effect on the CEO's cash bonuses when a firm misses the analyst consensus forecast or last period's earnings. Their findings suggest that CEO compensation contracts depend on managers meeting simple earnings benchmarks. Regulators tend to focus on the capital market consequences (see discussion in Dechow and Skinner, 2000). Regulators appear to believe that managing earnings to beat thresholds can mislead investors and therefore result in erroneous stock responses. For example, the SEC Staff Accounting Bulletin (SAB) No. 99 states that a relatively small misstatement of earnings can be material if 1) it helps a firm to exceed the three earnings thresholds – zero, last period's earnings, and consensus earnings forecasts, or 2) it may result in a significant positive or negative market reaction. I hereafter refer to the hypothesis that the discontinuities around thresholds are caused by managers' opportunistic motivations as the "opportunistic earnings manipulation hypothesis."

In this paper, I provide an alternative hypothesis for managers' motives to manage earnings around thresholds. I hypothesize that managers of firms facing severe information asymmetry signal the firms' superior future performance by managing earnings to exceed thresholds. I

[1] Recent papers by Dechow, Tuna and Richardson (2003) and Beaver, McNichols and Nelson (2003) attribute part of the discontinuities to reasons unrelated to earnings management, such as the data truncation introduced by the exchange listing requirements and asymmetric tax treatment of profit and losses. Later in this paper, I explore these alternative explanations in my research design.

hereafter refer to this hypothesis as the "signaling hypothesis." The key intuition underlying the signaling hypothesis is that firms without sufficient future earnings growth do not benefit from managing earnings to exceed thresholds. Because managers' reporting discretion is bounded by the accounting regulations, earnings management in the current period reduces future earnings and therefore makes future earnings thresholds harder to beat. As a result, only firms expecting superior future earnings growth can afford to manage earnings to exceed current periods' thresholds. Under the signaling hypothesis, earnings management conveys managers' private information about a firm's future performance and therefore helps bridge the information gap between managers and the capital market.

Summary of the testing method and results: To test the signaling hypothesis, I first examine the cross-sectional difference in managers' earnings management activities around the thresholds. Because the benefit from signaling is greater for firms facing severe information asymmetry, I expect to observe a positive association between managers' earnings management activities around thresholds and the degree of information asymmetry a firm faces. Measuring information asymmetry using firm size, analyst coverage, and a combination of the number of analyst following and the magnitude of forecast errors, I find evidence consistent with the hypothesis. My results show that, the discontinuities around thresholds in earnings-related distributions are much more salient for information-strained firms than for firms with better information environments such as higher analyst coverage. The results are also confirmed by using discretionary accruals as proxy for earnings management.

I then test the credibility of the information content in earnings management by looking at firms' accounting performance in subsequent periods. The findings are consistent with the notion that earnings management around thresholds provides real information about firms' future performance. Measuring firm performance using following three years' ROA and ROA growth, I compare the future performance of firms who marginally beat the thresholds with firms just missing the thresholds. Firms reporting small profit and small increases in earnings demonstrate superior

subsequent performance compared to firms failing to meet the thresholds. This difference in future performance becomes weaker with the improvement of firms' information environments.

The last step of the analysis examines the market reaction to firms' beating or missing the thresholds. My results reveal that, for firms facing information asymmetry, the market rewards firms reporting small profit and earnings increases with higher stock valuation compared to those firms who just miss the thresholds. After controlling for earnings levels and earnings surprises, the abnormal returns around the earnings announcement dates of firms reporting small profit or earnings increases are significantly higher than returns of firms just missing the thresholds. However, for firms with low levels of information asymmetry, the market does not react to firms' exceeding or missing the two thresholds – zero and last period's earnings.

The relation between returns and firms' beating or missing thresholds for high information asymmetry firms is unlikely to be driven by market fixation. If the market were to blindly use earnings thresholds to value firms and if managers were to succeed in misguiding the market by earnings management, we should observe a return reversal in the subsequent periods. The reversal would most likely happen around future earnings announcement dates, when firms' true performance is revealed. However, I fail to find a reversal of the abnormal returns on the earnings announcement dates one quarter and one year after the original earnings announcement dates. The higher returns awarded to firms exceeding earnings thresholds appear to be rational responses by the capital market to the information content contained in the earnings management activities.

Contributions: This paper contributes to the literature in several ways. First, this paper provides an alternative explanation for the discontinuities at thresholds in earnings distributions. In contrast to the "opportunistic manipulation" hypothesis offered by most previous studies on earnings thresholds, my analysis illustrates how managers of information strained firms manage earnings around thresholds to signal future performance. The economic rationale described in this paper is consistent with the existence of multiple earnings thresholds, making my evidence even stronger. Second, this paper recognizes the impact of information asymmetry on managers'

motivation to manage earnings, while prior research on the information content of earnings management often overlooks the effect of information asymmetry.

Third, this is the first paper providing an economic rationale underlying the capital market reactions to exceeding or missing the earnings thresholds that is consistent with the "market efficiency" theory. Previous literature provides evidence that the capital market reacts to firms' beating or missing earnings thresholds (e.g. Barth, Elliott and Finn, 1999; Bartov, Givoly and Hayn, 2002). As discussed above, regulators seem to use the findings as evidence that managers misguide the market by managing earnings to exceed thresholds. However, as pointed out by Dechow and Skinner (2000), "Academics are unlikely to view earnings management as problematic if it is observable at low cost to capital market participants." It is unconvincing that firms can mislead the capital market and trigger significant market reaction by marginally exceeding simple and highly visible benchmarks such as zero and last period's earnings. Evidence from this paper provides an explanation of these positive market reactions that is consistent with both the market and the managers behaving rationally.

This paper also has implications for standard setters. The findings from this paper challenge regulators' arguments that beating earnings thresholds is designed by managers solely to mislead the market. My empirical evidence shows that managerial reporting discretion can actually convey useful information under certain circumstances and therefore bridge the information gap between managers and users of financial reports. Because the cost of managing earnings to exceed thresholds comes from the restriction on managers' reporting discretion, an effective accounting regulatory system is the key for the signaling mechanism to work. However, an excessively strict accounting regulation reduces the value relevant information contained in earnings.

Outline of the paper: The rest of the paper is organized as follows. The next section reviews previous research and describes the economic rationale underlying the signaling hypothesis of earnings management; the third section develops the testable hypotheses; the fourth section

describes the research design; the sample selection and empirical results are presented in the fifth section; and the last section offers the concluding remarks.

2. The Signaling Hypothesis of Earnings Management around Thresholds

This section reviews previous literature regarding the signaling hypothesis of earnings management and describes the economic rational underlying the signaling hypothesis in the context of beating earnings thresholds.

2.1 Literature Review

Managers' motivation for earnings management has always been an important subject in accounting research, even before earnings thresholds became a heated topic (e.g. Guay, Kothari, and Watts; 1996). Previous literature offers supporting evidence for both of the alternative (but not necessarily mutually exclusive) hypotheses regarding managers' motives for earnings management. The opportunistic earnings manipulation hypothesis interprets earnings management as a means of managers or incumbent shareholders to obtain private benefits at the expense of other parties such as shareholders and debt holders (e.g. Healy, 1985; DeFond and Jiambalvo, 1994).

The signaling hypothesis claims that earnings management reveals managers' private information and therefore provides a more timely measure of a firm's future performance. For example, Subramanyam (1996) documents that the market rationally attaches positive value to discretionary accruals. DeFond and Park (1997) find that, concerning job security and trying to smooth earnings, managers manage earnings according to their expectation of future performance. Altamuro, Beaty and Weber (2003) examine a sample of firms that accelerated revenue recognition and were targeted by a recent SEC regulation (SAB101), and they find that these firms' revenue recognition practices are motivated by both managerial "opportunistic manipulation" incentives and providing value relevant information about the firms' future performance to shareholders.

Most prior research examining earnings management's role in conveying value relevant information uses certain discretionary accrual models. If the underlying accrual model is mis-

specified, it is difficult to draw inference from the empirical results. For example, Subramanyam (1996) acknowledges that the findings in the paper may suffer from the measurement error in the discretionary accruals proxy. DeFond and Park (1997) cannot rule out the selection bias generated in the discretionary accrual measurement process as a potential explanation of their findings. In this paper, I provide additional evidence supporting the signaling hypothesis by testing the hypothesis in the context of managers managing earnings to exceed thresholds. This way of identifying earnings management activities does not depend on any accrual model and is therefore exempt from the measurement error problems associated with almost all widely used accrual models (as discussed in Dechow, Sloan, and Sweeney, 1995; Guay, Kothari, and Watts, 1996).

2.2 The Economic Rational Underlying the Signaling Hypothesis of Earnings Management around Thresholds

The reason why managing earnings to exceed thresholds can signal superior future performance lies in the fact that firms without sufficient future growth do not benefit from doing so. Because managers' reporting discretion is limited by the accounting regulations, earnings management in the current period reduces future earnings and therefore makes future earnings thresholds harder to beat. If a firm boosts earnings by manipulating accruals upward, the higher current accruals should adversely affect future earnings. If managers manage earnings by real activities such as reducing R&D investment or selling assets, the future profitability will suffer even more than just using accrual manipulation.

The signaling mechanism can be explained using a simple repeated game framework. Let us assume that investors value firms rationally conditional on all available information, and there is no credible means of communication between managers and shareholders other than audited financial reports. Because accounting reports usually do not provide information about a firm's future performance, investors may use heuristic earnings benchmarks to judge a firm's future growth. The investors reward a firm with higher valuation if the firm exceeds an earnings threshold and punishes the firm if it misses the threshold in any period.

The investors' valuation metrics should achieve a separating equilibrium for firms whose earnings fall short of an earnings threshold – firms with promising future performance will manage earnings to exceed the threshold and firms with poor outlook will not. Since making the thresholds in one period and missing the thresholds in another will result in zero or even negative net benefit from the capital market, only firms anticipating sufficient future earnings growth have an incentive to exceed current period's threshold via earnings management. This repeated game nature distinguishes earnings thresholds from a "cheap talk" mechanism where manipulating information does not involve real costs. Therefore, being able to exceed the thresholds through earnings management indicates promising outlook of the firm's future performance.

The framework assumes that managers are not short-sighted, that is, they care about their firms' market valuation in both the current period and all future periods. This is a reasonable assumption if managers are only motivated by the capital market incentives – managers are usually compensated based on both short and long-term performance measures and managers' career concerns also provide incentives against short-sighted earnings management behavior. However, if there are other earnings-based incentives beyond stock prices, the above assumptions may not hold. In the latter scenario, managers may still manage earnings to exceed thresholds even if doing so leads to a net loss from the capital market. An example of these other incentives could be to avoid breaking earnings-based debt covenants. It is an empirical question whether these other incentives dominate and therefore erode the signaling function of earnings management around thresholds. As evidenced by my empirical results, firms exceeding thresholds via earnings management demonstrate superior future accounting performance and exceeding earnings thresholds triggers positive market responses around earnings announcement dates. The findings are in line with the signaling hypothesis, indicating that contracting concerns are unlikely to be a dominant factor motivating managers' earnings management activities around thresholds.

Examining earnings thresholds to distinguish firm quality is certainly a crude way of valuing firms. It is useful when more sophisticated ways of communication are not available or formidably

costly. When a rich set of credible information in addition to reported earnings is available, the capital market would incorporate this information in its valuation and rely less on earnings in forming expectations about firms' future performance. For example, Bhushan (1989) documents that the marginal information content of earnings announcements decreases with firm size. Because firm size is usually used as a proxy for information environment (e.g. Collins and Kothari, 1989), the finding implies that a better information environment reduces the marginal information content of earnings. With the decrease of information asymmetry between managers and the capital market, the benefit from signaling using earnings management should decrease. Consequently, we should observe less evidence supporting the signaling hypothesis in firms facing low level of information asymmetry. Without controlling for the information environment, the tests of the signaling hypothesis are likely to lack power.

Previous research on the information content of earnings management generally overlooks the impact of information environment. This paper recognizes the crucial role of information environment on managers' incentive to convey value relevant information via earnings management. I provide empirical evidence consistent with the hypothesis that firms with worse information environment are more likely to manage earnings to reach certain earnings thresholds.

Economic theory provides the rationale behind the signaling hypothesis of earnings management around thresholds, but it does not specify which earnings thresholds are the thresholds of choice. Previous literature draws inference from the psychology research, citing people's tendency to process information using reference points, and identifies three important earnings thresholds: zero, earnings increases, and analyst consensus forecast. (e.g. Burgstahler and Dichev, 1997; Degeorge et al. 1999).

Unlike the first two thresholds – positive earnings and earnings increases, analyst consensus forecast has some special characteristics. First, both earnings and the analyst forecasts are subject to manipulation. Firms' tendency to meet or beat analyst forecasts is driven by the incentives of both managers and analysts (see Lim, 2001, for a scenario of analysts' incentive affecting forecast

errors). The interaction between analysts and managers in the earnings reporting process is likely to complicate the tests of the signaling hypothesis of earnings management using analysts' forecasts as a threshold.

Second, different from the first two earnings thresholds, in the context of beating analyst forecast, information asymmetry is not likely to play a major role. For one thing, having analyst coverage is an indication of less severe information asymmetry between managers and the shareholders. In addition, guiding analyst forecasts requires frequent communication between the management and the financial analysts, which also suggests less severe information asymmetry. Matsumoto (2003) shows that, firms try to avoid negative earnings surprises by both managing earnings and guiding analyst's forecasts, and firms with higher institutional ownership are more likely to do so. Because high institutional ownership is usually associated with better information environment, her findings indicate that firms manage earnings and expectations to meet or beat analyst forecasts for reasons other than reducing information asymmetry. As discussed above, managing earnings to exceed earnings thresholds are more likely to contain value relevant information if a firm faces severe information asymmetry. Therefore, exceeding consensus analyst forecast does not look relevant in this context. Because of the above reasons, in this paper, I only use the first two earnings thresholds – positive earnings and earnings increases – to specify earnings management.

3 Development of Testable Hypotheses

I test the signaling hypothesis in three steps: First, I examine the relation between a firm's earnings management activities around the thresholds and the degree of information asymmetry it faces. Second, controlling for the level of information asymmetry, I examine whether firms who manage earnings to exceed earnings thresholds exhibit higher future accounting performance. Third, I study the market responses to firms' exceeding or missing earnings thresholds and distinguish between the hypothesis that earnings management conveys real information and the hypothesis that

the market fixates on reported earnings.

3.1 Firms' information environment and the signaling hypothesis of earnings management

Financial reporting, especially reported earnings, provides critical information to financial decision makers such as shareholders and debt holders. However, as discussed in the previous section, the importance of earnings decreases with the improvement of firms' information environments. As a result, the signaling function of earnings management should increase with the degree of information asymmetry a firm faces. We should observe a positive association between earnings management activities around threshold and the degree of information asymmetry a firm faces.

In this paper, I specify earnings management firms as firms exceeding earnings thresholds by a small amount. In an earnings histogram, the earnings management firms are firms falling in a few bins to the right of an earnings threshold. This group of firms is hereafter referred to as **TBEAT** firms. I study my research questions by comparing this group of firms with those firms who miss the thresholds by a small amount (i.e., firms falling in a few bins to the left of a threshold, hereafter referred to as **TMISS** firms). I focus on the two earnings thresholds: zero and last period's earnings. TMISS firms are good matching samples to conduct my study because these firms have earnings level very similar to TBEAT firms, and they could have exceeded the thresholds should they just manage earnings a little bit upward. A higher future performance of TBEAT firms compared with TMISS firms would provide compelling evidence for the signaling hypothesis. In addition, if I can find differential market responses to the two groups of firms after controlling for all other characteristics, under the assumption of market efficiency, there must be forward looking information contained in earnings management. What's more, according to the economic reasoning offered in the previous section, firms release a bad signal about future performance by missing earnings thresholds. Comparing TBEAT firms with TMISS firms instead of alternative matching samples increases the power of my tests.

The following hypothesis examines the relation between firms' information environments and

their tendency to manage earnings to exceed the two earnings thresholds. Using the level of discontinuity in earnings distribution as a proxy of earnings management, I develop hypothesis 1.1 to test whether firms' earnings management activity changes with cross sectional variation in information environments.

Hypothesis 1.1: The discontinuity in the earnings distribution becomes more salient when the level of information asymmetry faced by a firm increases.

Some recent papers question the significance of earnings management in explaining the discontinuity in earnings distribution. Dechow, Richardson, and Tuna (2003) show that part of the earnings discontinuity around zero is due to the exchange listing criteria concerning earnings. Beaver, McNichols, and Nelson (2003) claim that the asymmetric treatment of income taxes and special items for profit and loss firms explains a big portion of the discontinuity in the distribution of earnings. The hypothesis 1.1 also addresses these concerns. The exchange listing requirements and tax treatments do not seem to change with the level of information asymmetry a firms faces. Hence, if we observe cross-sectional variation in the magnitude of discontinuities, these discontinuities are more likely to be caused by earnings management.

In addition, I also directly address the concerns regarding earnings management's impact on the earnings distributions by examining discretionary accruals. The discretionary accruals are measured using the modified Jones model introduced by Dechow, Sloan, and Sweeney (1995). Discretionary accruals are widely used in the literature as measures of earnings management. If the discontinuities in earnings distributions are really due to earnings management, and if firms use the earnings management to signal future performance, we should observe significantly positive discretionary accruals for TBEAT firms, especially those TBEAT firms who face severe information asymmetry problem. The following hypothesis is designed to reinforce the results from hypothesis 1.1 using discretionary accruals:

Hypothesis 1.2: The discretionary accruals of TBEAT firms are significantly positive, and their magnitude increases with the level of information asymmetry a firm faces.

Dechow, Richardson, and Tuna (2003) present evidence that small profit firms use

discretionary accruals to reach the threshold zero. Hypothesis 1.2 differs from their study in the following way: I divide TBEAT firms (small profit firms included) into two groups – firms with and without severe information asymmetry problem, and contrast the two groups' earnings management behavior. I hypothesize that TBEAT firms facing severe information asymmetry problem are more likely to manage earnings to obtain the earnings thresholds compared with firms facing better information environments. Because Dechow et al. (2003) also finds significant positive discretionary accruals for small loss firms, I examine the discretionary accruals for TMISS firms as well.

3.2 Earnings management and firms' future performance

If the earnings management activities do convey managers' private information about firms' future performance, the expected future performance for firms exceeding earnings thresholds should be higher than those firms who fail to beat the thresholds. Using ex post measures of ROA and annual ROA growth as proxies for firms' expected future performance, hypothesis 2.1 is developed to test the information content in earnings management around thresholds.

Hypothesis 2.1: TBEAT firms exhibit higher ROA and ROA growth in the subsequent periods than TMISS firms.

As discussed in the previous subsection, the information content of earnings management should decrease with the improvement of firms' information environments. Going one step further than Hypothesis 2.1, Hypothesis 2.2 is designed to examine the cross-sectional variation of the information contained in earnings management.

Hypothesis 2.2: The difference of future ROA and ROA growth between TBEAT firms and TMISS firms is bigger for firms facing more severe information asymmetry problem.

3.3 Market responses to exceeding earnings thresholds by earnings management

If exceeding or missing earnings thresholds conveys value relevant information for high information asymmetry firms, an efficient market should respond around earnings announcement dates. There should be a market premium to TBEAT firms compared with TMISS firms, and this

premium should increase with the level of information asymmetry faced by a firm. However, the market premium to TBEAT firms is also consistent with the market fixating on reported earnings. If the market is not efficient and fixates on reported earnings using simple benchmarks, managers will also be motivated to engage in earnings management but this behavior does not provide any real information about the firms' future performance. Under the market fixation hypothesis, the market's responses to earning announcement should reverse in the future period when the true future performance of the firms is learned by the investors. The following two hypotheses study the market responses to earnings thresholds and distinguish between the market efficiency versus fixation hypotheses.

Hypothesis 3.1: For firms facing information asymmetry, ceteris paribus, the abnormal stock returns around earnings announcement dates are higher for TBEAT firms than TMISS firms.

Hypothesis 3.2: For firms facing information asymmetry, the higher abnormal returns experienced by TBEAT firms compared with TMISS firms do not reverse on the subsequent earnings announcement dates.

4. Research Design

4.1 Measures of information asymmetry

Three measures are used to gauge the level of information asymmetry faced by a firm: firm size, whether or not a firm has analyst coverage, and a measure based on number of analyst following and analyst forecast errors. Firm size is frequently used as a proxy for information environment (e.g. Collins and Kothari, 1989). In the empirical tests, I measure firm size using the market value at the end of the fiscal year. The group of firms with fiscal year end market value greater than US $1 billion (roughly the upper quartile) is regarded as big firms and having less information asymmetry. Firms with fiscal year end market value less than US $100 million (roughly the lower quartile) are labeled as small firms and facing more severe information asymmetry.

Because firm size is usually correlated with many other firm characteristics, I also use analyst coverage to measure information asymmetry. It has long been documented that information

intermediaries play an important role in today's capital market. Firms with analyst coverage have less severe information asymmetry problem than firms without. The second measure of information asymmetry is whether or not a firm has analyst coverage.

As stated above, there may be measurement error while using firm size as a measure of information asymmetry. Because analyst coverage is highly correlated with firm size, using analyst coverage as a measure cannot fully solve the problem. To address this concern, I rank firms into size quartiles, and compare earnings histograms of firms with versus without analyst coverage.

Even within firms having analyst coverage, the level of information asymmetry also differ. I also construct a measure based on analyst forecasts as a proxy for a firm's information environment. The first component of the measure is the number of analyst following. Firms with more analysts following are regarded as having less information asymmetry problem. For each firm year, the number of analyst following (NUMEST) is measured as the maximum number of forecasts issued by different analysts in the 12 months preceding the actual earning announcement date. The second one is the magnitude of analyst forecast errors (SFE). The bigger the absolute value of analyst forecasts errors, the worse the firm's information environment. SFE is equal to |EPS-Forecast|/|EPS|. Where "Forecast" is measured as the median of the analyst forecasts issued in the month preceding the earnings announcement. I rank firms into quartiles according to their NUMEST and SFE (independent rank). The firms in the smallest NUMEST quartile and biggest SFE quartile are labeled as "high information asymmetry" firms. Firms falling in the biggest NUMEST quartile and smallest SFE quartile are regarded as "low information asymmetry" firms.

4.2 Information asymmetry and the signaling hypothesis of earnings management

H1.1 tests the information asymmetry's impact on firms' earnings management behavior. I examine the hypothesis by examining the magnitude of the discontinuities in the earnings/earnings changes distributions. The distribution of firms with the highest level of information asymmetry is compared with the distribution of firms with the lowest level of information asymmetry. In examining the earnings and earnings changes histograms, I erase the observations with extreme

values (roughly 5% on each tail).

To form a vigorous statistical test of the difference between earnings distributions of firms facing various levels of information asymmetry, I perform a regression analysis based on the two earnings distributions (firms with high and low degree of information asymmetry) for each earnings threshold. The OLS regression analysis method is similar to the one used in Altamuro, Beatty, and Weber (2003). For each earnings measures (earnings and earnings changes), I draw histograms for the group of firms facing high level of information asymmetry and the group of firms with low information asymmetry. I then compare the magnitude of discontinuity around zero in the two histograms by estimating the following regression model:

$$Diff = \alpha + \beta_1 \, Info + \beta_2 \, Threshold + \beta_3 \, Info \bullet Threshold + e \qquad \textbf{(Model 1)}$$

The number of observations used in the regression model is equal to the total number of bins in the two histograms (high information asymmetry firms and low information asymmetry firms). Diff is calculated based on the method introduced in Burgstahler and Dichev (1997). It is defined as the difference between the actual number of observations and the expected number of observations (the average number of observations of the two neighboring bins) for each bin in the two distributions divided by the estimated standard deviation of the bins in each distribution.[2] Threshold is an indicator variable that is one for the histogram bin just above zero, -1 for the histogram bin just below zero, and zero otherwise. Info is an indicator variable that is one if the Diff value is drawn from the distribution of the high information asymmetry firms, zero otherwise. H1.1 predicts positive signs on β_3.

Hypothesis 1.2 is designed to reinforce the results from the first hypothesis. To test the hypothesis, I measure earnings management using discretionary accruals. The modified Jones model is used to estimate the discretionary accruals, and the data in the same industry-year are used to estimate the model parameters for each firm. I estimate the following regression model to

[2] As discussed in Burgstahler and Dichev (1997), the estimated variance of the difference is approximately the sum of the variances of the components of the difference. Denoting the total number of observations as N and the probability that an observation will fall into interval i by p_i, the estimated variance of difference between observed and expected number of observations for interval i is $Np_i(1-p_i)+(1/4)N(p_{i-1}+p_{i+1})(1- p_{i-1}-p_{i+1})$.

calculate nondiscretionary accruals:

$$TA_{it}/A_{t-1} = a_t\,[1/A_{it-1}] + b_{1t}\,[(\Delta REV_{it}-\Delta AR_{it})/A_{it-1}] + b_{2t}\,[PPE_{it}/A_{it-1}] + e_{it} \qquad \textbf{(Model 2)}$$

Where, for firm i at time t,
TA_{it} = total accruals, computed following Dechow et al (1995);[3]
A_{t-1} = total assets;
REV_{it} = total revenues;
AR_{it} = accounts receivable;
PPE_{it}= gross property plant and equipment;
e_{it} = error term.

The above model is estimated using cross-sectional data from firms in the same industry (same two-digit SIC code) and the same fiscal year. Discretionary accruals are estimated as the difference between a firm's total accruals and the fitted value of total accruals using coefficient estimates from the above model.

The modified Jones model treats all increase in credit sales as earnings management, and this method may show positive discretionary accruals for growth firms even if these firms have not engaged in earnings management. Because of the limitation of the modified Jones model, I also conduct the same analyses using the industry cross-sectional Jones model. The specification of Jones model is similar to the modified Jones model, except that the change in sales is not adjusted by the change of account receivable. The estimated discretionary accruals using modified Jones model is denoted as Jones, and the estimated discretionary accruals measured by a variation of original Jones model is denoted as Modjones.

Hypothesis 1.2 partitions firms into two groups according to their information environment. The hypothesis predicts that, for high information asymmetry firms, the discretionary accruals are significantly positive for firms that just exceed the earnings thresholds (TBEAT firms) and not different from zero for firms just missing the thresholds (TMISS firms). While for firms not facing information asymmetry problem, the discretionary accruals are zero for both TBEAT and TMISS firms.

[3] Total accruals should be equal to the difference between net income (compustat data172) and cash flows from operations (data308). But because cash flow data are not available before 1987, I compute the total accruals following Dechow et al (1995). TA = (ΔData4-ΔData1)-(ΔData5-ΔData34- ΔData71)-Data14.

4.3 Beating thresholds and firms' future performance

H2.1 and H2.2 examine whether exceeding earnings thresholds indicates superior future performance. I use the subsequent three years' ROA and ROA growth to measure the expected future performance and compare the future performance of TBEAT firms in the three years with that of TMISS firms. ROA is defined as net income of the year divided by total assets as of the fiscal year end. ROA growth is calculated as the difference of current year's ROA and the previous year's ROA (i.e., $ROA_t = ROA_t - ROA_{t-1}$).

4.4 Market responses to exceeding earnings thresholds by earnings management

H3.1 predicts that, TBEAT firms should on average enjoy a higher abnormal return than TMISS firms around earnings announcement dates. And this premium increases with level of information asymmetry a firm faces. I test this hypothesis by estimating the following regression model:

$$CAR = \alpha + \beta_1\, Info + \beta_2\, Pos + \beta_3\, Info \bullet Pos + \beta_4\, EARNMKT + \beta_5\, FE + \beta_6\, EARNDIFMKT + Ydummies + e \qquad \textbf{(Model 3)}$$

Where for each firm-year observation:

CAR: The three day cumulative abnormal return measured in the window [-1, +1] around the earnings announcement date. It is equal to the three day cumulative returns around the earnings announcement date minus the three day cumulative CRSP value weighted return.[4]

Info: An indicator variable that is one if the firm belongs to the group of high information asymmetry firms, zero otherwise. While using analyst coverage as measure of information asymmetry, it is equal to 1 if a firm does not have analyst following and 0 if a firm does. Using NUMEST and SFE as measures, it is equal to 1 if a firm falls in the lowest quartile of NUMEST and highest quartile of SFE, 0 otherwise.

Pos: An indicator variable that is one for the firms exceeding earnings thresholds, zero otherwise.

FE: Earnings surprises. Equal to actual EPS minus the median of the analysts' earnings forecasts issued in the month preceding the earnings announcement date. This variable is included in the regressions where analyst forecasts are available.

EARNMKT: Earnings divided by the fiscal year beginning market value of equity.

EARNDIFMKT: Earnings changes divided by the market value of equity at the beginning of the fiscal year. This variable is included in the regressions examining the

[4] I also calculate the cumulative abnormal returns using three alternative methods: size matched portfolio adjusted returns, the market model adjusted returns, and the Fama-French three factor model adjusted returns. When estimating the parameters in the market model and the Fama-French three factor model, I use the estimation window from -210 to -61 trading days relative to the event date. Consistent with the findings in Brown and Warner (1985), the empirical results using the alternative abnormal return measures are qualitatively the same as using the simple market adjusted returns.

earnings changes distributions and those regressions where analyst forecast errors are not available.

Ydummies: Year dummies controlling for the individual year effect on news contained in earnings announcements.

When whether or not a firm has analyst coverage is used as the measure of information asymmetry, the analyst forecast errors (FE) are not included in the regression analyses because they are not available for more than half of the sample. In this case, I assume that the expected earnings are equal to last period's reported earnings and use the earnings changes (EARNDIFMKT) are as a control variable in lieu of the forecast error.

H3.1 predicts significantly positive signs on both β_3 and $\beta_2 + \beta_3$.

The following regression model is used to test H3.2:

$$CAR_{t+1} = \alpha + \beta_1 Info_t + \beta_2 Pos_t + \beta_3 Info_t \bullet Pos_t + \beta_4 EARNMKT_{t+1} + Ydummies + e$$

(Model 4)

All the variable definitions are almost the same as in Model 3, except for the time period when the variables are measured. The annual earnings announcement date is denoted as t, and t+1 represents the subsequent earnings announcement dates. The information asymmetry (Info) and earnings management measures (Pos) are taken from time t, whereas the abnormal stock returns and control variables are from time t+1. Different from the regression model for H3.1, the analyst forecast error at t+1 is not included as a control variable. The reason is that inefficient market response could be reflected in inefficient analyst forecasts. If analysts are also misguided at time t and correct their mistakes at t+1, including forecast errors at time t+1 decreases the power of the test. I test H3.2 in both short window and long window. In the short window test, t+1 denotes the first quarterly earnings announcement date subsequent to the annual earnings announcement date. In the long window test, t+1 represents the annual earnings announcement date one year after t. H3.2 predicts non-negative coefficients on Pos_t and $Info_t$ x Pos_t.

5. Data and Empirical Results

In this section, I describe the sample selection and empirical results. The empirical results are

presented in three steps according to the hypotheses development. The results are generally consistent with the hypotheses. In the first step, I show that there is a positive association between the degree of information asymmetry a firm faces and its managing earnings activities around the thresholds. The second step shows that the future accounting performance of firms who just beat the earnings thresholds is higher than that of firms who just miss the thresholds. The third step studies the capital market's responses to the earnings management activities around earnings thresholds.

5.1 Sample selection and summary statistics

I examine the earnings distributions using annual earnings from fiscal years 1980 to 2001. The financial data including earnings are taken from Compustat annual industrial and research dataset. Earnings numbers used in this study are the bottom line net income (compustat data172). The return data are from CRSP. The analyst forecasts are from I/B/E/S database. Firms reporting exact zero earnings or earnings changes are scarce, and as discussed in Burgstahler and Dichev (1997), it is impossible to verify whether these data are correct in many cases. In the regression analyses for the two thresholds, I exclude firm-year observations with earnings exactly meeting the thresholds. This process reduces the sample size by less than 0.1%.

All available observations meeting the minimal data requirements for the respective test are included in the sample. For tests only requiring basic financial variables such as earnings and firm size, the sample contains 132,239 observations, with 3,866 firm-years reporting small profit (less than 1% of fiscal year beginning market value of equity) and 1,925 reporting small losses. In the same sample, there are 3,443 observations reporting small earnings increases (less than 0.25% of fiscal year beginning market value of equity) and 2,450 reporting small earnings decreases. When discretionary accruals measures are required, the sample size decreases to 108,961. In this sample, number of firm-years with small profit, losses, earnings increases and decreases is 3,298, 1,621, 2,504, and 1,846 respectively. For hypotheses requiring analyst-forecast-based measures, the

dataset shrinks to 60,365 observations, with numbers of firm-years reporting small profit, losses, earnings increases, and earnings decreases being 2,360, 1,174, 2,104 and 1,461 respectively.

Table 1 presents summary statistics of the key variables for the whole sample, the group of firms making small profit/losses, and the group of firms making small earnings increases/decreases. Because most variables are highly skewed and with extreme observations in the sample, the mean and standard deviation reported in the table are calculated after winsorizing the sample at 1% on both tails. We can see from the table that small profit/losses firms have roughly the same characteristics as the whole sample. Whereas the small earnings increases/decreases firms tend to be bigger in size and more profitable (as measured by earnings and ROA) compared with the whole sample.

Consistent with the findings from Dechow, Tuna and Richardson (2002), firms falling in the vicinity of earnings thresholds have higher discretionary accruals (Modjones) than the whole sample.[5] However, the magnitude of discretionary accruals for those who exceed the thresholds is not much bigger than those who miss the thresholds. Later in the empirical tests, we will see that only firms facing high information asymmetry would show significant difference in discretionary accruals between threshold beating and missing firms.

Table 2 reports the correlation matrix of the whole sample. Because the variables are highly skewed and have extreme outliers in the sample according to unreported analysis, in addition to the standard Pearson correlation, I also report the nonparametric Spearman correlation.

5.2 Firms' information environment and the signaling hypothesis

5.2.1 Analyses of the earnings histograms

Analyzing the earnings distributions, I find strong evidence consistent with H1.1. There is huge discontinuity around zero in the distributions for the groups of firms facing severe information

[5] Note that the mean and median discretionary accruals for the whole sample are negative. This is due to the fact that the intercept in the accrual model is forced to zero. Because discretionary accruals are defined as the residual terms in the regression model, they pick up the value of the intercept. If the model is well specified, the intercept should be equal to zero and the mean discretionary accruals for the whole sample should also be equal to zero. However, if the model does not capture all determinants of accruals, the intercept may not be equal to zero. In the sample used by this paper, the mean discretionary accruals are negative, indicating that there exists a negative intercept in the accrual model.

asymmetry. While for firms with less information asymmetry problem, the discontinuity becomes much weaker. The results from examining the earnings changes histogram are weaker while generally consistent with the hypotheses.

The test statistics used to test the null hypothesis that the distribution is smooth is the standardized difference (t statistics) used in Burgstahler and Dichev (1997). It is equal to the difference between the actual number of observations in an interval and the expected number of observations in the interval (average number of observations in its two neighboring intervals), divided by the estimated standard deviation of the difference (see footnote 1 for details about the calculation). Under the null hypothesis that a distribution is smooth, the standardized difference of each bin in the distribution should be equal to 0. If firms try to obtain positive earnings by earnings management, we should expect to see a significantly negative standardized difference for the bin left to zero and a significantly positive standardized difference for the bin right to zero.

Figure 1 shows the earnings histograms of big versus small firms (the bin width is set to 0.005). The earnings histogram for the whole sample is also provided as a reference. The discontinuity around zero is more salient for the small firm sample (fiscal year end market cap less than US $100 million). The standardized difference is -6.03 for the bin left to zero and 5.51 for the bin right to zero in the small firm histogram. But for big firms (market cap greater than US $1 billion), the discontinuity becomes much weaker (the standardized difference is equal to -2.18 for the bin left to zero and 1.55 for the bin right to zero).

Using analyst coverage, number of analyst following (NUMEST) and forecast errors (SFE) as measures for information asymmetry, figure 2 and 3 present similar results as figure 1. In figure 2, panel 1 is the earnings histogram of firms without analyst coverage, which shows much more prominent discontinuity around zero compared with the histogram in panel 2 where firms with analyst coverage are included. The standardized difference of the bin left to zero in panel 1 is -5.21 (5.45 for the bin right to zero), while in panel 2 it is -4.02 (2.61).

In figure 3, firm-years in the highest quartile of SFE and lowest quartile of NUMEST are categorized as firms facing information asymmetry. Panel 1 of figure 3 is the earnings histogram of this group. Panel 2 is the earnings histogram for firm-years in the lowest quartile of SFE and highest quartile of NUMEST. Firms with more severe information asymmetry problem show a bigger kink around zero in the earnings histogram (panel 1). The standardized difference is -8.10 for the bin left to zero in this distribution, and 4.24 for the bin right to zero. This discontinuity almost diminishes in the earnings histogram of the firms with more analysts following and less forecast errors. The standardized difference for the bin left to zero in this distribution is -2.02 (1.68 for the bin right to zero).

Earnings in the histograms are scaled by the fiscal year beginning market value. Using other variables such as end of the year market value and book value of equity to scale earnings, I find similar results. While using total assets to scale earnings, the distribution looks unusual. Although there seems to be a hunk around zero in the histogram for big firms, it is not the same discontinuity as we expect from earnings management (the test statistics is equal to -1.86 for the bin right to zero when it should be positive in the case of earnings management). In fact, the distribution for big firms looks like two close-to-normal distributions overlapping with each other. This turns out to be driven by firms in the regulated industries.[6] After taking out firms in the utilities and financial services industries, the "hunk" around zero for big firms disappears. But the discontinuity in the earnings distribution exists for small firms even after excluding regulated industries from the sample. The results for the threshold EARNDIFMKT are also not sensitive to the deflator used in the definition of the variables.

Figure 4 addresses the possible measurement error associated with using firm size to measure information asymmetry. The four panels compare histograms of firms with versus without analyst coverage in four size quartiles. We can see that even after controlling for firm size, firms without

[6] The regulations in many industries restrict firms' profitability. And financial service firms and utility companies are usually very highly leveraged. Both cause regulated firms' ROA to cluster around an unusually low level.

analyst coverage still demonstrate significantly higher level of earnings management compared with firms with analyst coverage.

Table 3 presents the results from the regression analysis testing the relation between the level of information asymmetry and smoothness of earnings distributions. Panel 1 reports the results for the earnings threshold zero. Consistent with Hypothesis 1.1, the coefficient on the interactive term "Info • Threshold" is significantly positive using all three measures of information asymmetry. The results indicate that firms facing severe information asymmetry problem are more likely to manage earnings to obtain positive profit.

Figure 5, 6 and 7 present the earnings changes histograms (the bin size is set to 0.0025). The results are much weaker than those from examining earnings histograms, but we can still see that the discontinuity around zero is more salient for small firms than for big firms. For the big firm sample, the t statistics testing the smoothness of earnings changes distributions is -2.11 for the bin left to zero (1.37 for the bin right to zero). For small firms, it is -2.38 (2.88). Using analyst coverage to measure information asymmetry, there is no significant difference. The standardized differences for the bins left to zero and right to zero are -2.00 and 2.35 in the histogram for firms with analyst coverage. And the two statistics are -2.45 and 1.88 in the histogram for firms without analyst coverage. Using analyst following and forecast errors as measures for information asymmetry, I find results consistent with the hypothesis. The t statistics for the bin left to zero is -3.16 (3.88 for the bin right to zero) for firms falling in the lowest quartile of NUMEST and highest quartile of SFE, and is -2.08 (1.48) for firms falling in the highest quartile of NUMEST and lowest quartile of SFE.

Panel 2 of Table 3 presents the regression results examining the earnings increase threshold. Three measures of information asymmetry are used in the tests: firm size, analyst coverage, and a combination of NUMEST and SFE. The coefficients on the interactive terms are positive for two out of the three regressions using different information asymmetry measures, but none of the coefficients is statistically significant.

5.2.2 Discretionary accruals for TBEAT firms and TMISS firms

H1.2 addresses the concerns that the discontinuity may be caused by reasons other than earnings management. It examines the discretionary accruals for TBEAT and TMISS firms facing different levels of information asymmetry. This hypothesis also reinforces the results from testing H1.1. The results are presented in Table 4 and 5. Because the discretionary accruals measure is highly skewed in the sample (skewness measure for the whole sample is equal to 22) and with extreme observations, I report both the mean and median discretionary accruals for each group and the test statistics testing the sign of both the mean (t test) and the median (sign test and signed rank tests). The evidence is consistent with earnings management being a main cause of the discontinuities in the earnings histogram. The findings also support the notion that firms facing higher level of information asymmetry are more likely to manage their earnings to reach the threshold, and those firms with less information asymmetry problem are likely to fall around the thresholds simply by law of probability.

From Table 4 panel 1, we can see that, for firms making small profit, the group of firms with most severe information asymmetry problem demonstrates higher discretionary accruals than firms facing low degree of information asymmetry. Both the mean and median discretionary accruals for all the three high information asymmetry groups are positive. In addition, the positive mean discretionary accruals for small firm group and no-analyst-coverage firm group are statistically significant. Considering that the mean and median discretionary accruals for the whole sample are negative, the significantly positive discretionary accruals provide stronger support for the notion that these firms achieve positive profit by managing earnings. However, for firms facing less severe information asymmetry, the median discretionary accruals are negative for all three groups and significantly negative for firms with analyst coverage and firms with high SFE and low NUMEST.

Because previous literature also finds significantly positive discretionary accruals for small loss firms, I also calculate the discretionary accruals for small loss firms (see Table 4, panel 2). In

my sample, the mean and median discretionary accruals reported by the small-loss firm groups are either not significantly different from zero or significantly negative.

Table 5 presents the discretionary accruals for firms reporting small earnings increases/decreases. The evidence from examining the earnings changes threshold is much weaker than the first threshold. However, we can still see that the magnitude of median discretionary accruals of high information asymmetry firms is higher than those of firms facing less severe information asymmetry, which indicates that, high information asymmetry firms are more likely to achieve the current earnings level by earnings management.

To address the concerns associated with using the modified Jones model to measure discretionary accruals, I also redo all the above tests using the industry cross-sectional Jones Model. The results are essentially the same.

5.3 Earnings management and firms' future performance

Table 6 reports the ROA and ROA growth in the three years following the annual earnings announcement date for the TBEAT firms and TMISS firms. Because ROA and ROA growth are highly skewed (the measures of skewness are equal to -131 and 85 respectively) and have extreme outliers, I report the median and the upper and lower quartiles. The P values of the nonparametric median test testing the difference between the medians of TBEAT firms' and TMISS firms' discretionary accruals are also reported.[7] Because small-profit firms by definition start with a higher ROA than small-loss firms, I also report the ROA at time t as a benchmark.

Consistent with Hypothesis 2.1, the results suggest that firms who manage earnings to report positive earnings and earnings increases exhibit higher performance in the future periods than firms missing these thresholds by a small amount. For both earnings thresholds, the ROA of TBEAT

[7] The nonparametric median test is the two-sample equivalent of the one-sample sign-test. Unlike the Wilcoxon signed rank test, where the two samples are assumed to have identical distributions under the null hypothesis, the median test does not depend on any assumptions other than the null hypothesis that the median of the two samples are equal. An unreported analysis of the TBEAT firms and TMISS firms reveals that the future ROA and ROA growth of TMISS firms are much more volatile than TBEAT firms. Therefore, the two samples being compared may not have similar distribution. The median test seems to be more appropriate in this context. The median test is relatively crude and insensitive compared with other tests. However, because there are so few assumptions, a statistically significant result is very convincing.

firms significantly surpasses TMISS firms in all three years. Although small-profit firms by construction start with a higher ROA than small-loss firms at time t, the ROA gap between these two groups of firms is widened in the following years. The findings are not consistent with the "opportunistic earnings manipulation hypothesis" where TBEAT firms should show lower future earnings because of the reversal of the managed portion of earnings. Comparing the subsequent annual ROA growth of TMISS and TBEAT firms, we can also observe that TBEAT firms exhibit higher performance in the subsequent years.

Table 7 reports the subsequent three years' performance for firms facing various levels of information asymmetry. Again, firm size, analyst coverage, and a combination of analyst forecast error and number of analyst following are used to measure the level of information asymmetry. The first panel reports the future ROA and ROA growth for firms with small profit and losses in various information asymmetry groups. Consistent with hypothesis 2.2, the evidence shows that the firms with higher degrees of information asymmetry report a bigger and more consistent positive difference in future accounting performance between TBEAT and TMISS firms. The positive correlation between the performance difference and the degree of information asymmetry indicates that firms facing more severe information asymmetry are more likely to signal by managing earnings to exceed thresholds. Panel 2 of Table 7 presents the results for the second threshold – last period's earnings. Using firm size and analyst coverage as information measures, I find results generally consistent with the hypothesis. However, when SFE and NUMEST are used as measures of information asymmetry, the difference of ROA and ROA growth between TBEAT and TMISS firms does not monotonically increase with the degree of information asymmetry. The results suggest that, when analyst forecasts are available, the signaling effect of the second threshold – last period's earnings – becomes much weaker.

5.4 Market responses to exceeding earnings thresholds by earnings management

After establishing the link between earnings management and future performance, I examine the market responses in this section. Table 8 presents the regression results testing Hypothesis 3.1.

Because most of the independent variables in the regression models are highly skewed and have extreme outliers, to increase the power of my test and avoid erroneous results driven by outliers, I drop all observations in the top and bottom 1% of the sample according to the value of the independent variables.[8] Panel 1 of Table 8 reports the testing results regarding the first earnings threshold – positive profit. The regression analysis is conducted twice using two measures of information asymmetry: whether or not a firm has analyst coverage and a combination of NUMEST and SFE. The second measure requires that a firm has at least one analyst following. Consistent with the hypothesis, the coefficient on the interactive term of Pos and Info is significantly positive in both regressions. Since the coefficient on Pos is not significantly different from zero, the results indicate that being able to exceed earnings threshold zero gains higher market returns only if the firm faces high level of information asymmetry.

Panel 2 of Table 8 presents the regression results regarding the second earnings threshold – positive earnings increases. Using analyst coverage as a measure of information asymmetry, I find strong evidence supporting the hypothesis – the coefficient on the interactive term of Pos and Info is significantly positive. The results become much weaker when I restrict my attention to firms with analyst following and use a combination of number of analyst following and magnitude of forecast errors to measure information asymmetry – the coefficient on the interactive term is not significantly different from zero.

If we assume that the capital market is efficient, the empirical results indicate that managing earnings to exceed threshold, especially positive profit, do convey value relevant information to the investors. In addition, the information content of earnings management increases with the level of information asymmetry a firm faces. However, the findings are also consistent with market fixating on reported earnings and the earnings fixation increases with information asymmetry. Under the market fixation hypothesis, the market's responses to earning announcement should reverse in the future period when the true earnings of the firms are learned by the investors. The hypothesis 3.2

[8] The unreported tests using the whole sample get results qualitatively the same.

distinguishes between the market efficiency and fixation hypotheses.

Table 9 presents results regarding the earnings threshold zero. Panel 1 examines the returns around the first quarterly earnings announcement date following the annual earnings announcement where the threshold is beaten. Panel 2 examines the first annual earnings announcement date following the original earnings announcement. The coefficients on the dummy variable Pos and on the interactive term are non-negative in all regressions, indicating that the positive returns enjoyed by threshold-beating firms do not reverse in the subsequent periods. The findings are consistent with the notion that the earnings management activity around zero conveys value relevant information, and the higher market returns enjoyed by the TBEAT firms are not results of market fixation.

Table 10 shows results regarding the second threshold – positive earnings increases. Consistent with my hypothesis, the tests do not find significantly negative coefficients on either the indicator variable Pos or the interactive term.

6. Conclusion

This paper finds that firms' earnings management activities around thresholds contain managers' private information about firms' future performance. Lacking other means of communication between managers and the market, investors of information-strained firms view financial earnings as a critical information source and use heuristic cutoff points to judge firms' future performance. Because earnings management in the current period reduces future earnings and therefore making future earnings thresholds harder to reach, only firms anticipating sufficient future growth benefit from managing earnings to exceed thresholds. As a result, managers can convey their private information by managing earnings to beat thresholds.

My empirical results reveal that, firms facing severe information asymmetry problem are more likely to manage earnings to exceed thresholds, and their earnings management practice also contains more information about the firms' future performance. A further study on returns shows

that, the capital market recognizes the information content of earnings management and rationally incorporates it in setting prices. The evidence from studying the zero earnings thresholds provides strong support for the hypotheses. Although the empirical results from analyzing the second earnings threshold – last period's earnings – are much weaker, they are generally consistent with the hypotheses.

The findings of this paper have implications for both the academics and the standard setters. This paper provides an economic rationale for the earnings management activities around earnings thresholds that is consistent with both the market participants and the management behaving rationally. The ability of earnings management to signal future performance does not discount the accounting regulation's role in improving the transparency of accounting information. On the contrary, appropriate accounting regulation is a key for the signaling mechanism to work. Only when managers' reporting discretion is effectively limited by accounting regulations, can earnings management become costly to firms without sufficient future earnings. The purpose of this paper is simply to point out that overly strict accounting rules can restrict the value relevant information contained in earnings.

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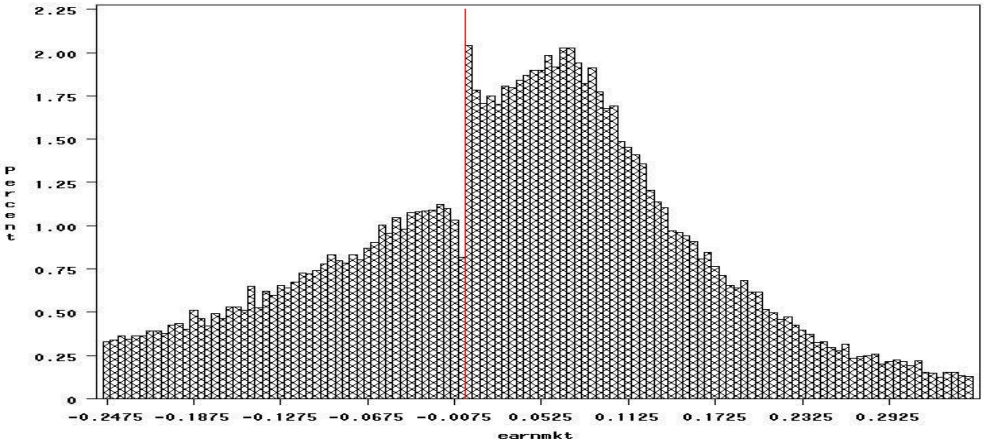
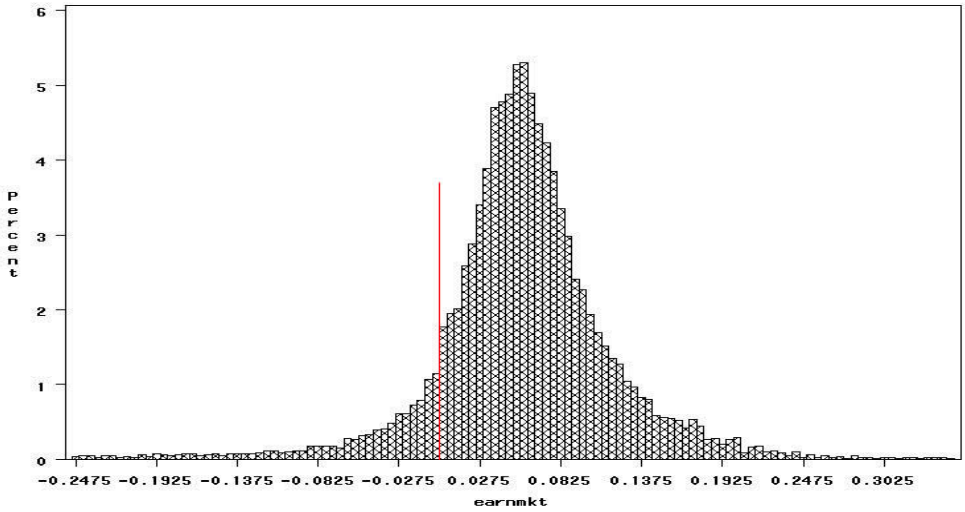
Figure 1. Earnings histograms grouped by firm size (fiscal year end market value).
Earnings are scaled by fiscal year beginning market value of equity (bin size=0.005).

Panel 1. Firm-year from 1980-2001 with fiscal year end market value less than $100 million



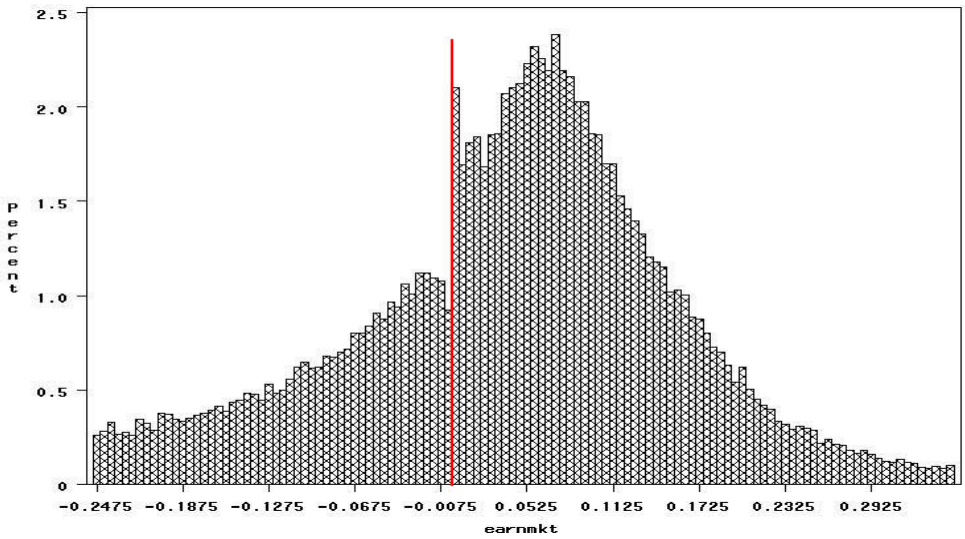
Panel 2. Firm-years from 1980-2001 with fiscal year end market value greater than $1 billion



Panel 3. All firm years from 1980-2001

Figure 2. Earnings histogram grouped by analyst coverage.
Earnings are scaled by fiscal year beginning market value of equity (bin size=0.005).

Panel 1. Firm-years with no analyst coverage



Panel 2. Firm years with analyst coverage

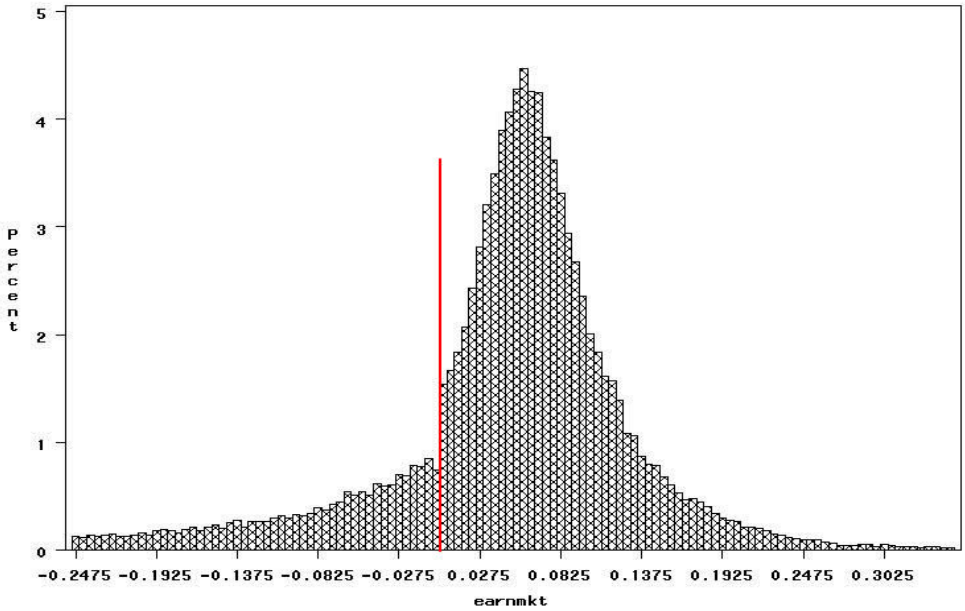
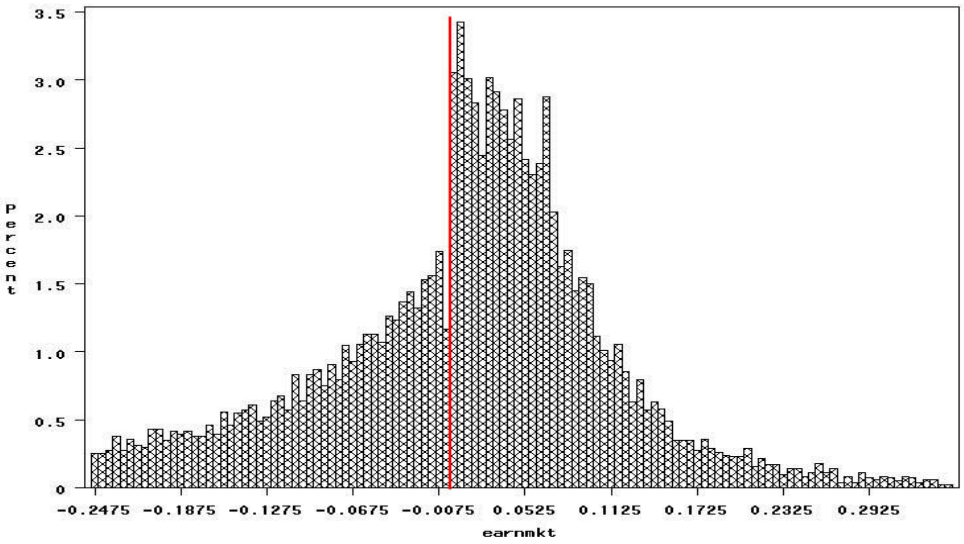


Figure 3. Earnings histograms grouped by absolute analyst forecast errors and number of analyst following.

Earnings are scaled by fiscal year beginning market value of equity (bin size=0.005).

Panel 1. Firm-years with number of analyst following in the lowest quartile and absolute analyst forecast error scaled by actual earnings in the highest quartile



Panel 2. Firm years with number of analyst following in the highest quartile and absolute analyst forecast error scaled by actual earnings in the lowest quartile

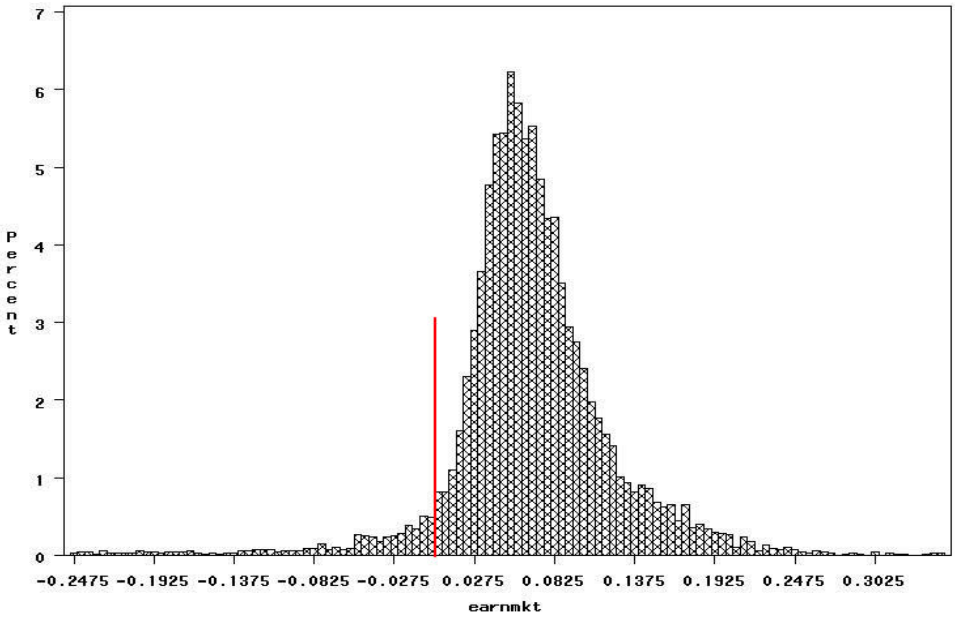
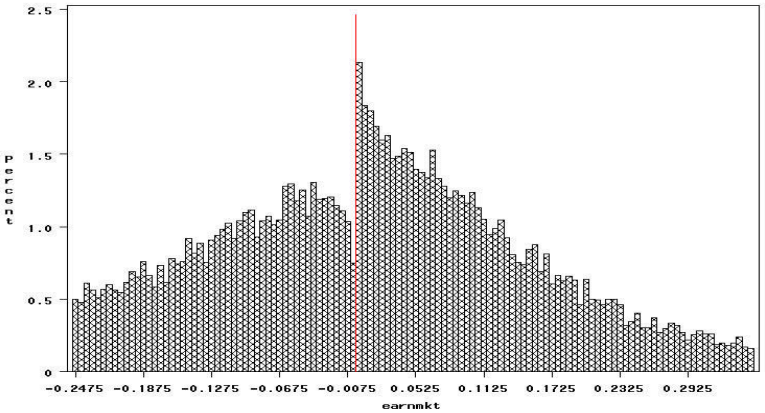


Figure 4. Earnings histograms for firms with and without analyst coverage in each size quartile.

Firms are ranked into quartiles according to the market value of equity at the fiscal year end. The t statistics for the bin immediately left to zero (immediately right to zero) testing the smoothness of the distributions are reported below each graph.

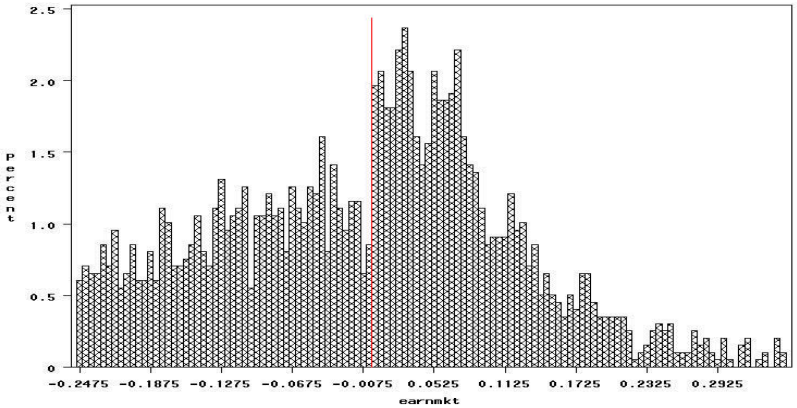
Panel 1. Bottom size quartile

Firms without analyst coverage



t = -6.68 (5.82)

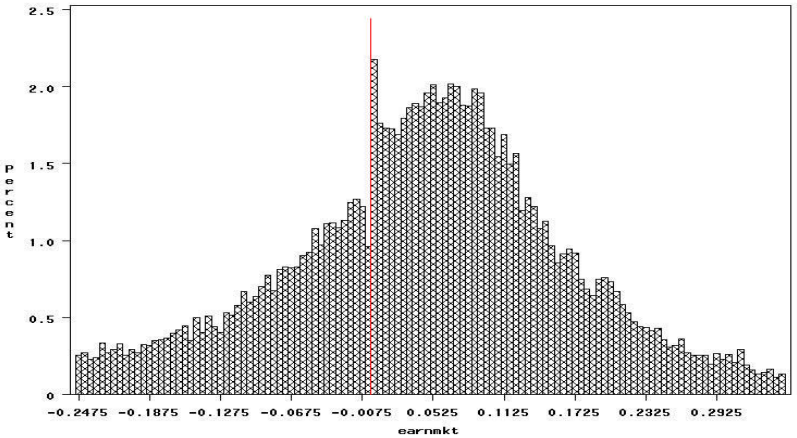
Firms with analyst coverage



t = -3.65 (3.66)

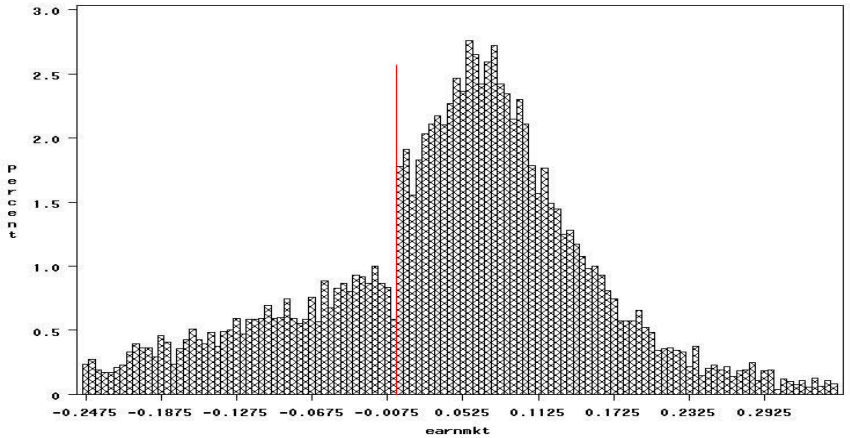
Panel 2. Second size quartile

Firms without analyst coverage



t = -5.49 (5.42)

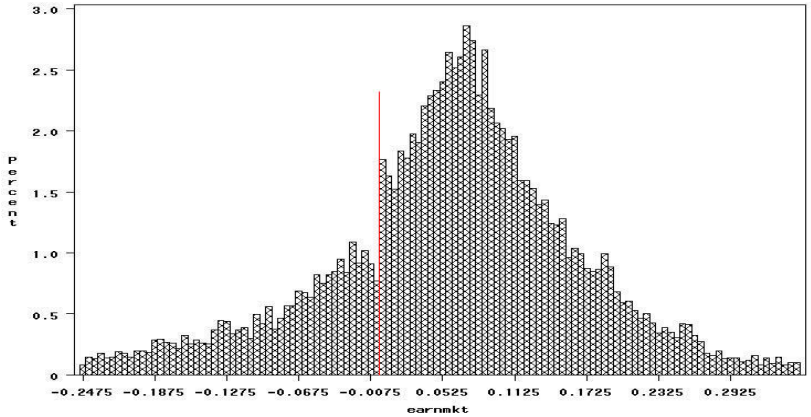
Firms with analyst coverage



t = -6.44 (3.96)

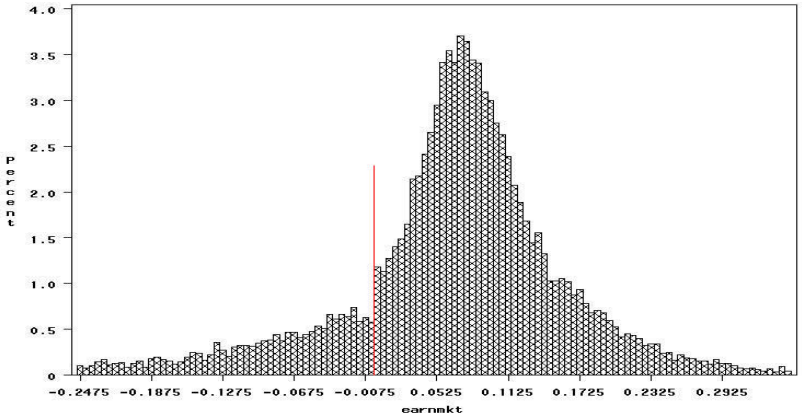
Panel 3.Third size quartile

Firms without analyst coverage



t = -4.72 (4.18)

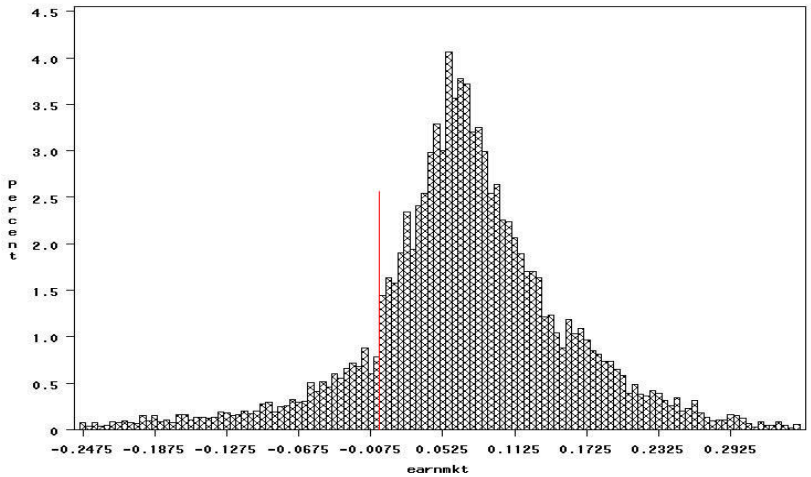
Firms with analyst coverage



t = -3.33 (2.95)

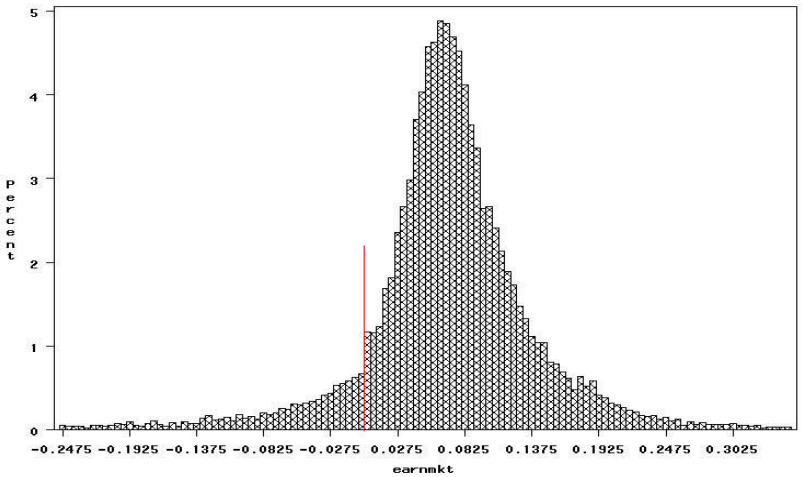
Panel 4. Top size quartile

Firms without analyst coverage



t = -2.12 (1.87)

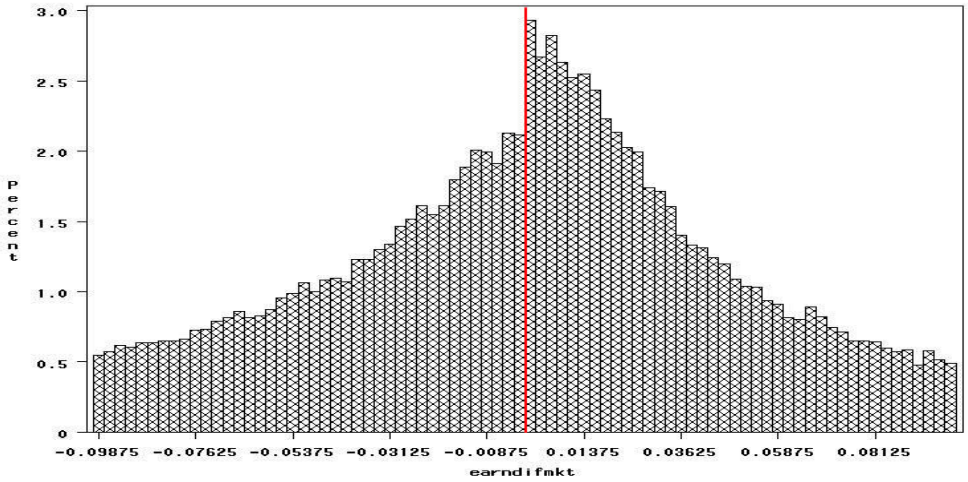
Firms with analyst coverage



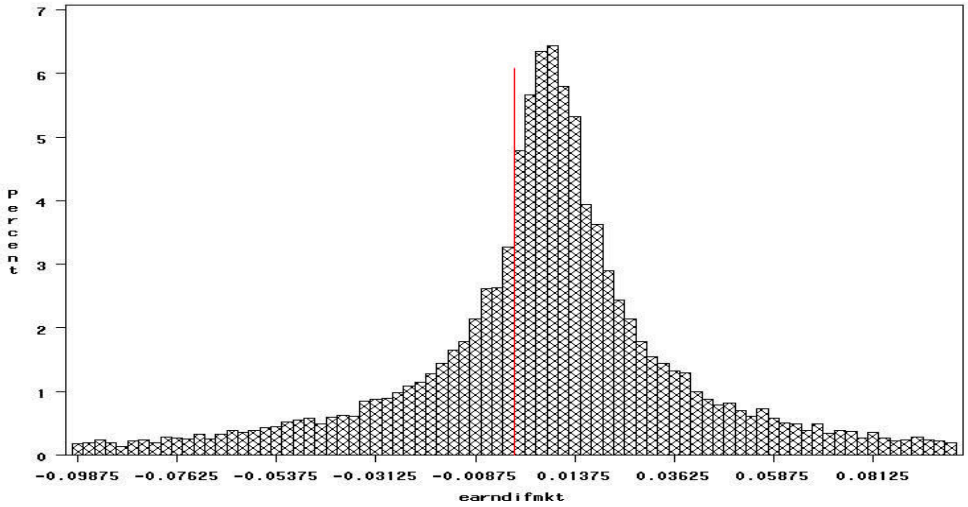
t = -2.29 (2.20)

Figure 5. Earnings changes histograms grouped by firm size.
Annual earnings changes are scaled by fiscal year beginning market value of equity (bin size=0.0025).

Panel 1. Firm-year from 1980-2001 with market value less than $100 million



Panel 2. Firm-years from 1980-2001 with market value greater than $1 billion



Panel 3. All firm years from 1980-2001

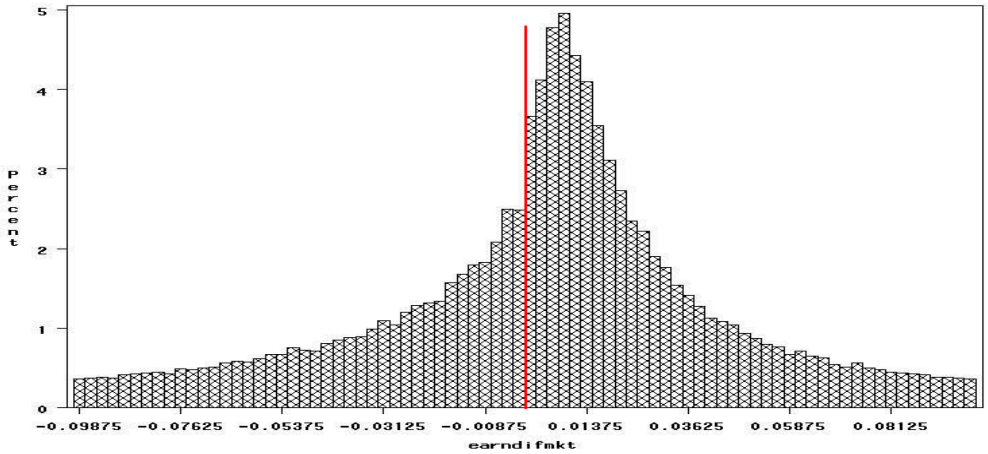
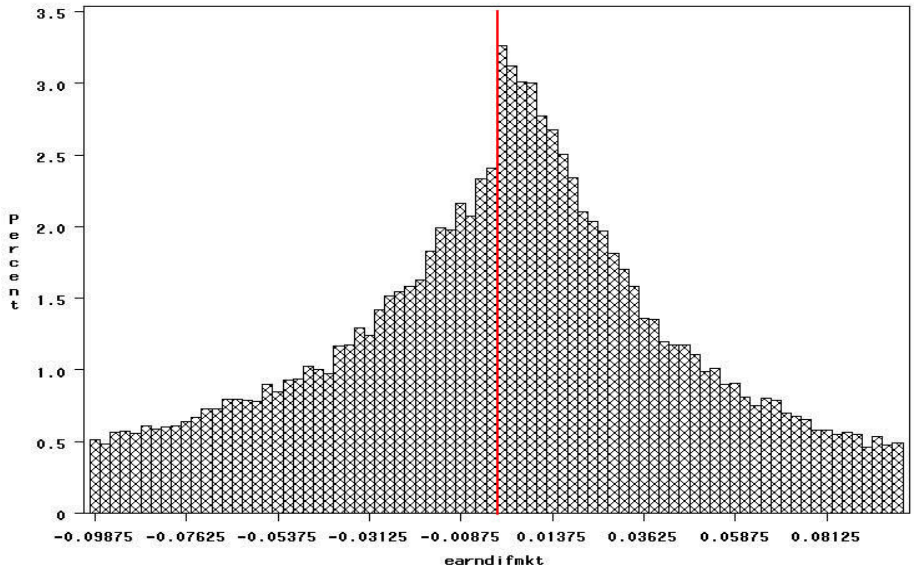


Figure 6. Earnings changes histograms grouped analyst coverage.
Annual earnings changes are scaled by fiscal year beginning market value of equity (bin size=0.0025).

Panel 1. Firm-years without analyst coverage



Panel 2. Firm-years with analyst coverage

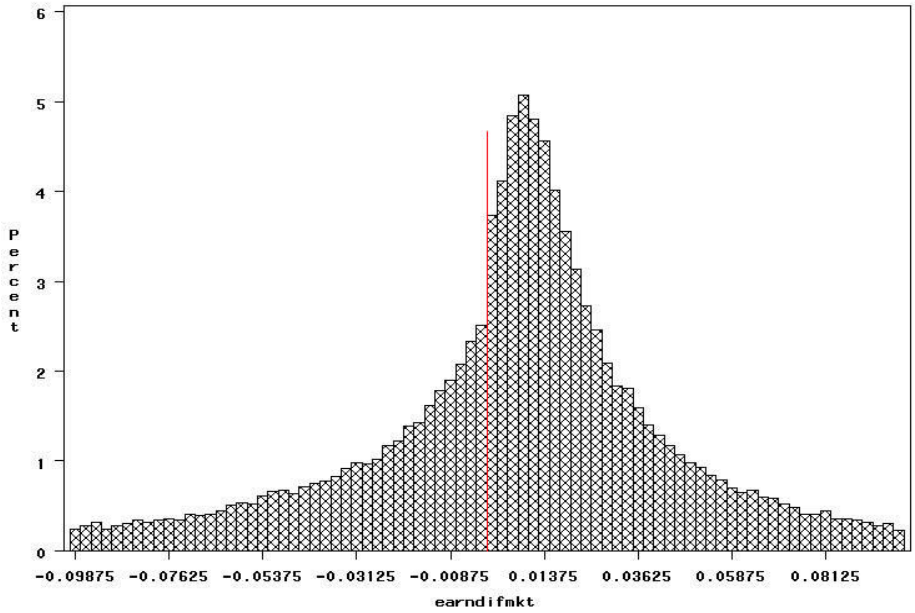
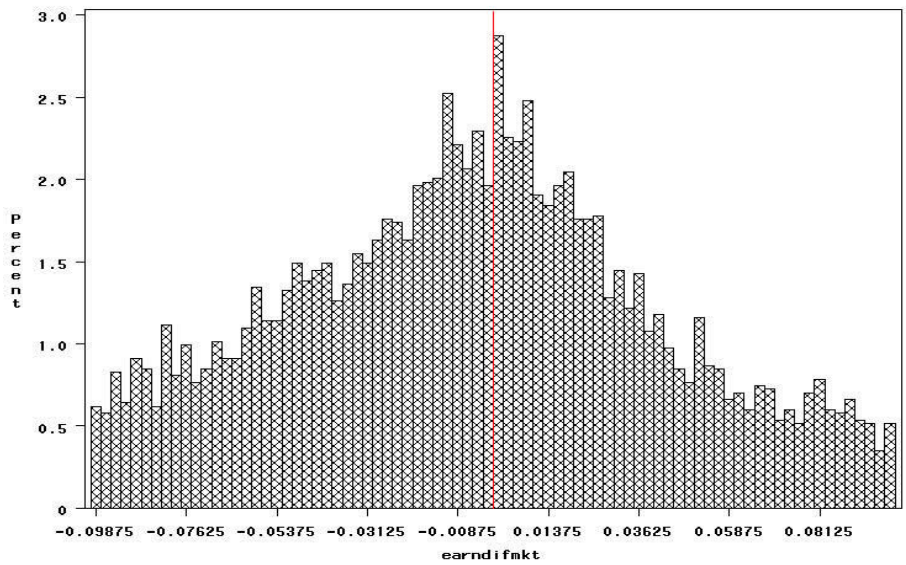


Figure 7. Earnings changes histograms grouped by analyst forecast errors and number of analyst following.

Annual earnings changes are scaled by fiscal year beginning market value of equity (bin size=0.0025).

Panel 1. Firm-years with number of analyst following in the lowest quartile and analyst forecast error scaled by actual earnings in the highest quartile



Panel 2. Firm years with number of analyst following in the highest quartile and analyst forecast error scaled by actual earnings in the lowest quartile

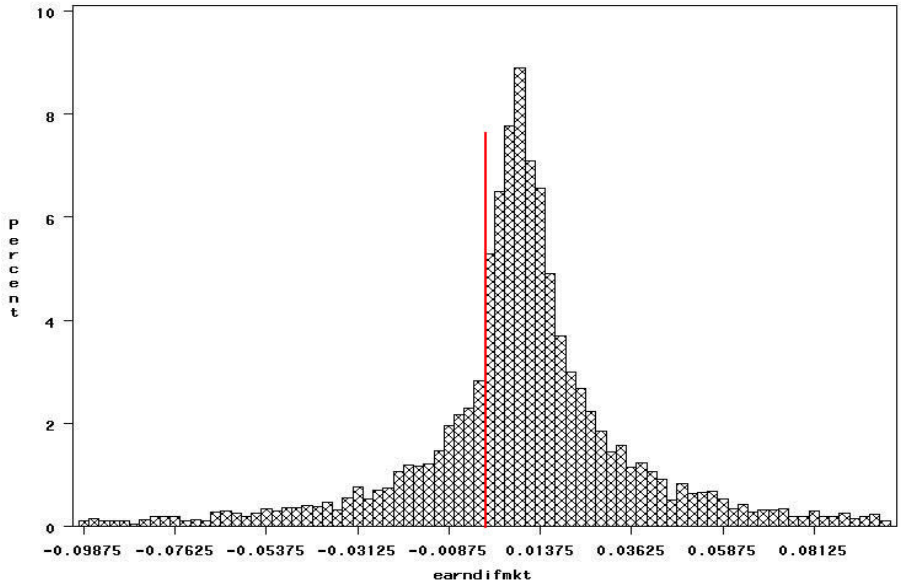


Table 1. Summary statistics of the key variables

This table presents the summary statistics of the key variables for the whole sample, firms with small profit/losses (earnings less than 1% of the market value of equity), and firms with small earnings increases/decreases (earnings changes less than 0.25% of the market value of equity). Because most of the variables are highly skewed in the sample and have extreme outliers, the mean and standard deviation reported here are winsorized mean/standard deviation at 1% at each tail.

EARNMKT: Earnings divided by the fiscal year beginning market value of equity.
EARNDIFMKT: Annual earnings changes divided by the fiscal year beginning market value of equity.
LNMKT: Logarithm of the market value of equity as of fiscal year beginning.
NUMEST: Maximum number of analyst following during the 12 month preceding the annual earning announcement
FE: Analyst forecast error. It is equal to the actual EPS minus consensus analyst forecast issued in the month immediately preceding the annual earnings announcement.
SFE: Absolute value of FE scaled by the absolute value of actual EPS.
MODJONES: Discretionary accruals estimated using the modified Jones model described in Dechow, Sloan and Sweeney (1995).
ROA: Return on assets. Net Income/Total Assets

Panel 1. Summary statistics for the whole sample and firms with small profit/losses

	Whole Sample			Firms with Small Profit			Firms with Small Losses		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
EARNMKT	(0.036)	0.053	0.419	0.005	0.005	0.003	(0.005)	(0.005)	0.003
EARNDIFMKT	0.0036	0.007	0.480	0.001	(0.002)	0.147	(0.016)	(0.002)	0.111
EARNINGS (In Millions)	40.02	2.10	158.73	3.94	0.35	20.64	(4.56)	(0.56)	16.46
MKT VALUE (In Millions)	818	64	2757	1026	63	3924	889	66	2884
LNMKT	4.21	4.19	2.34	4.54	4.23	2.24	4.81	4.51	2.24
NUMEST	7.06	4	7.61	6.73	4	7.31	7.37	5	7.54
FE	(0.126)	0	0.484	(0.126)	(0.020)	0.327	(0.103)	(0.016)	0.247
SFE	0.318	0.037	0.825	2.372	0.320	5.064	2.046	0.275	5.430
MODJONES	(0.015)	(0.011)	0.191	0.009	(0.002)	0.167	0.012	(0.005)	0.202
ROA	(0.075)	0.024	0.381	0.008	0.004	0.016	(0.011)	(0.005)	0.107

Panel 2. Summary statistics for the whole sample and firms with small earnings increases/decreases

	Whole Sample			Firms with Small Earnings Increases			Firms with Small Earnings Decreases		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
EARNMKT	(0.036)	0.053	0.419	0.056	0.060	0.064	0.048	0.053	0.072
EARNDIFMKT	0.0036	0.007	0.480	0.001	0.001	0.001	(0.001)	(0.001)	0.001
EARNINGS (In Millions)	40.02	2.10	158.73	94.87	9.96	263.59	101.50	7.48	326.60
MKT VALUE (In Millions)	818	64	2757	1942	183	6082	2206	163	7489
LNMKT	4.21	4.19	2.34	5.35	5.21	2.22	5.26	5.09	2.27
NUMEST	7.06	4	7.61	9.20	6	8.68	8.93	6	8.61
FE	(0.126)	0	0.484	(0.029)	0	0.149	(0.047)	0.000	0.224
SFE	0.318	0.037	0.825	0.125	0.016	0.384	0.126	0.022	0.364
MODJONES	(0.015)	(0.011)	0.191	0.006	0.003	0.131	0.007	(0.001)	0.143
ROA	(0.075)	0.024	0.381	0.026	0.045	0.151	(0.001)	0.039	0.203

Table 2. Correlation Matrix (Prob > |r| under H0: Rho=0)

This table reports the Pearson (left to the diagonal) and Spearman Correlation Coefficients of the whole sample. Because the sample shows skewed results for most of the variables, the nonparametric Spearman correlation coefficients are also included in addition to the standard Pearson correlation.

	Earnmkt	Earndifmkt	Earnings	MKT VALUE	LNMKT	NUMEST	FE	SFE	Modjones	Jones	ROA
Earnmkt	1	**0.4751 (0.00)**	**0.7138 (0.00)**	**0.2730 (0.00)**	**0.2731 (0.00)**	**0.0965 (0.00)**	**0.2751 (0.00)**	**-0.2678 (0.00)**	**0.1781 (0.00)**	**0.1505 (0.00)**	**0.7724 (0.00)**
Earndifmkt	**0.6874 (0.00)**	1	**0.3268 (0.00)**	**0.0481 (0.00)**	**0.0478 (0.00)**	**0.0137 (0.53)**	**0.2726 (0.00)**	**-0.1433 (0.00)**	**0.0855 (0.00)**	**0.0641 (0.00)**	**0.0392 (0.00)**
Earnings	0.0015 (0.56)	0.0008 (0.77)	1	**0.6433 (0.00)**	**0.6436 (0.00)**	**0.5551 (0.00)**	**0.2351 (0.00)**	**-0.4212 (0.00)**	**0.1643 (0.00)**	**0.1414 (0.00)**	**0.7151 (0.00)**
MKT VALUE	0.0007 (0.80)	0.0006 (0.81)	**0.5900 (0.00)**	1	**1.0000 (0.00)**	**0.7535 (0.00)**	**0.1949 (0.00)**	**-0.3986 (0.00)**	**0.0941 (0.00)**	**0.0717 (0.00)**	**0.3485 (0.00)**
LNMKT	-0.0004 (0.87)	-0.0011 (0.68)	**0.2707 (0.00)**	**0.3397 (0.00)**	1	**0.7536 (0.00)**	**0.1950 (0.00)**	**-0.3986 (0.00)**	**0.0940 (0.00)**	**0.0715 (0.00)**	**0.3485 (0.00)**
NUMEST	-0.0012 (0.77)	-0.0015 (0.70)	**0.2903 (0.00)**	**0.3461 (0.00)**	**0.7184 (0.00)**	1	**0.1488 (0.00)**	**-0.3872 (0.00)**	**0.0263 (0.00)**	**0.0211 (0.00)**	**0.2183 (0.00)**
FE	0.0044 (0.28)	0.0017 (0.68)	0.0013 (0.76)	0.0002 (0.96)	**0.0098 (0.02)**	0.0055 (0.18)	1	**-0.2656 (0.00)**	**0.0465 (0.00)**	**0.0265 (0.00)**	**0.0235 (0.00)**
SFE	**-0.0072 (0.08)**	-0.0014 (0.73)	**-0.0140 (0.00)**	**-0.01353 (0.00)**	**-0.0751 (0.00)**	**-0.0533 (0.00)**	-0.0041 (0.31)	1	**-0.0873 (0.00)**	**-0.0678 (0.00)**	**-0.0323 (0.00)**
Modjones	-0.0003 (0.92)	-0.0003 (0.92)	0.0020 (0.50)	0.0008 (0.80)	0.0023 (0.45)	-0.0051 (0.26)	0.0012 (0.79)	0.0002 (0.96)	1	**0.9282 (0.00)**	**0.1932 (0.00)**
Jones	-0.0003 (0.92)	-0.0003 (0.92)	0.0021 (0.50)	0.0006 (0.84)	0.0010 (0.73)	-0.0060 (0.18)	0.0007 (0.89)	0.0022 (0.63)	**0.9918 (0.00)**	1	**0.1600 (0.00)**
ROA	0.00002 (0.99)	0.00004 (0.98)	**0.0047 (0.08)**	0.0030 (0.26)	**0.0243 (0.00)**	**0.0209 (0.00)**	**0.0209 (0.00)**	**-0.0180 (0.00)**	0.0023 (0.43)	0.0029 (0.34)	1

Table 3. Cross-sectional variation of the earnings management activities around thresholds
This table presents the results from the regression analysis testing the relation between information asymmetry and the discontinuities around thresholds in earnings and earnings changes distributions.

Model: $Diff = \alpha + \beta_1 Info + \beta_2 Threshold + \beta_3 Info \bullet Threshold$

Panel 1. Earnings level distributions

Measure of information asymmetry		Intercept	Info	Threshold	Info • Threshold	Adjusted R^2
	Predicted Sign		?	+	+	
Firm size	Est. Coefficient (t statistics)	-0.037 (-0.63)	0.020 (0.25)	**1.882***** **(4.28)**	**3.886***** **(6.25)**	44.8%
Whether or not there is analyst coverage	Est. Coefficient (t statistics)	-0.018 (-0.44)	0.002 (0.04)	**3.318***** **(10.93)**	**2.011***** **(4.69)**	64.8%
Number of analyst following and analyst forecast errors	Est. Coefficient (t statistics)	-0.063 (-0.62)	0.042 (0.30)	**1.852**** **(2.42)**	**4.317***** **(3.98)**	23.7%

Panel 2. Earnings changes distributions

Measure of information asymmetry		Intercept	Info	Threshold	Info • Threshold	Adjusted R^2
	Predicted Sign		?	+	+	
Firm size	Est. Coefficient (t statistics)	-0.018 (-0.50)	0.012 (0.25)	**1.779***** **(4.16)**	0.493 (0.81)	24.1%
Whether or not there is analyst coverage	Est. Coefficient (t statistics)	-0.017 (-0.37)	0.004 (0.07)	**2.367***** **(6.87)**	-0.006 (-0.01)	27.8%
Number of analyst following and analyst forecast errors	Est. Coefficient (t statistics)	-0.041 (-0.62)	0.014 (0.39)	**3.798***** **(4.20)**	0.168 (0.83)	11.3%

The symbols *, **, and *** indicate statistical significance at 10%, 5% and 1% (two-tail) respectively.

Diff: The standardized difference between the expected number of observations and the actual number of observations for each bin in the two distributions. The expected number of observations is equal to the average number of observations in the two neighboring bins.

Threshold: An indicator variable that is one for the histogram bin just above zero, -1 for the histogram bin just below zero, and zero otherwise.

Info: An indicator variable that is one if the Diff value is drawn from the histogram of high information asymmetry firms, zero otherwise.

Table 4. Discretionary accruals of small profit/loss firms (TBEAT firms and TMISS firms in earnings histogram)

Panel 1. Small profit firm-years -- firm-years with profit less than 1% of the market value of equity

	mean	median	Std. Dev.	*Tests of whether mean/median discretionary accruals are zero*					
				t test	P value of t test	Sign test	P value of sign test	Signed rank test	P value of signed rank test
Market value < $100 million	0.011	0.001	0.280	**1.81**	**0.07**	7.5	0.80	12477	0.17
Market value > $1000 million	0.009	(0.007)	0.175	1.07	0.29	(14.5)	0.18	(2498)	0.33
Without analyst coverage	0.015	0.001	0.290	**2.28**	**0.02**	7	0.77	12122	0.63
With analyst coverage	0.009	(0.006)	0.206	1.63	0.11	**(41)**	**0.03**	(16130)	0.26
NUMEST in the lowest quartile and SFE in the highest quartile	0.003	0.002	0.250	0.21	0.84	3.5	0.73	830	0.61
NUMEST in the highest quartile and SFE in the lowest quartile	(0.007)	(0.030)	0.185	(0.29)	0.78	**(8.5)**	**0.04**	**(254)**	**0.08**

Panel 2. Small loss firm-years -- firm-years with loss less than 1% of the market value of equity

	mean	median	Std. Dev.	*Tests of whether mean/median discretionary accruals are zero*					
				t test	P value of t test	Sign test	P value of sign test	Signed rank test	P value of signed rank test
Market value < $100 million	0.029	0.0009	0.825	1.12	0.26	4.5	0.80	12477	0.17
Market value > $1000 million	(0.002)	(0.025)	0.313	(0.09)	0.92	**(33.5)**	**0.00**	**(4121)**	**0.00**
Without analyst coverage	0.032	0.0009	0.834	1.21	0.22	5	0.78	9352	0.31
With analysts coverage	0.005	(0.010)	0.164	0.81	0.43	**(43)**	**0.00**	(7982)	0.11
NUMEST in the lowest quartile and SFE in the highest quartile	0.005	(0.002)	0.146	0.39	0.70	(1.5)	0.86	179	0.68
NUMEST in the highest quartile and SFE in the lowest quartile	(0.009)	(0.049)	0.255	(0.21)	0.83	**(8.5)**	**0.01**	**(135)**	**0.06**

Table 5. Discretionary accruals of firms reporting small earnings increase/decrease (TBEAT firms and TMISS firms in earnings changes histogram)

Panel 1. Small earnings increase firm-years -- firm-years with earnings increases less than 0.25% of the market value of equity

	mean	**median**	**Std. Dev.**	***Tests of whether mean/median discretionary accruals are zero***					
				t test	P value of t test	Sign test	P value of sign test	Signed rank test	P value of signed rank test
Market value < $100 million	(0.014)	0.004	0.316	(0.79)	0.43	**30**	**0.06**	8270	0.34
Market value > $1 billion	0.001	0.002	0.122	**3.01**	**0.00**	15.5	0.24	**9139**	**0.06**
Without analyst coverage	(0.005)	0.004	0.298	(0.60)	0.54	**37**	**0.03**	**21073**	**0.05**
With analysts coverage	0.007	0.002	0.129	**2.00**	**0.05**	19.5	0.31	12820	0.41
NUMEST in the lowest quartile and SFE in the highest quartile	0.007	0.004	0.166	0.41	0.68	3	0.68	18	0.95
NUMEST in the highest quartile and SFE in the lowest quartile	0.002	0.003	0.112	**2.04**	**0.04**	4.5	0.60	1376	0.18

Panel 2. Small earnings decrease firm-years -- firm-years with earnings decreases less than 0.25% of the market value of equity

	mean	**median**	**Std. Dev.**	***Tests of whether mean/median discretionary accruals are zero***					
				t test	P value of t test	Sign test	P value of sign test	Signed rank test	P value of signed rank test
Market value < $100 million	0.016	(0.0003)	0.541	0.80	0.45	(3)	0.85	2679	0.65
Market value > $1 billion	0.012	(0.005)	0.172	1.53	0.13	(14.5)	0.19	**(5441)**	**0.05**
Without analyst coverage	0.017	0.003	0.497	1.00	0.32	11.5	0.46	5016	0.51
With analysts coverage	0.007	(0.004)	0.152	1.37	0.17	(21)	0.19	(11444)	0.20
NUMEST in the lowest quartile and SFE in the highest quartile	0.005	(0.004)	0.170	0.23	0.82	(1)	0.91	(115)	0.54
NUMEST in the highest quartile and SFE in the lowest quartile	(0.007)	(0.010)	0.097	(0.76)	0.45	**(15.5)**	**0.01**	**(838)**	**0.03**

Table 6. Future Accounting Performance

This table presents the subsequent three years' ROA and annual ROA growth for TBEAT firms versus TMISS firms around the two earnings thresholds. The annual ROA growth in year t is equal to ROA_t-ROA_{t-1}. Numbers in parenthesis are the P values from the one sided nonparametric median test testing the difference between the values in the two samples.

Panel 1. First Threshold – Zero Earnings.

This panel reports the future ROA and ROA growth of firms making small profit/losses (less than 1% of the market value of equity)

		ROA			Annual ROA growth		
	No. of Obs.	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**
t							
$0<EARNMKT_t<0.01$	3882		0.0044				
$-0.01<EARNMKT_t<0$	1923		-0.0050				
Difference			**0.0094** **(P<0.01)**				
t+1							
$0<EARNMKT_t<0.01$	3412	-0.0572	0.0052	0.0422	-0.0705	0.0002	0.0299
$-0.01<EARNMKT_t<0$	1633	-0.1048	-0.0100	0.0268	-0.0921	-0.0001	0.0393
Difference			**0.0152** **(P<0.001)**			**0.0003** **(P=0.09)**	
t+2							
$0<EARNMKT_t<0.01$	2973	-0.0724	0.0066	0.0464	-0.0666	0.0024	0.0367
$-0.01<EARNMKT_t<0$	1375	-0.1097	-0.0016	0.0412	-0.0846	0.0027	0.0445
Difference			**0.0082** **(P<0.001)**			-0.0003 (P=0.46)	
t+3							
$0<EARNMKT_t<0.01$	2603	-0.0687	0.0107	0.0507	-0.0591	0.0011	0.0391
$-0.01<EARNMKT_t<0$	1172	-0.1207	-0.0017	0.0430	-0.0704	-0.0006	0.0491
Difference			**0.0124** **(P<0.001)**			0.0017 (P=0.14)	

Panel 2. The Second Threshold – Last period's earnings

This panel reports the future ROA and ROA growth of firms making small earnings increases/decreases (less than 0.25% of the market value of equity)

		ROA			Annual ROA growth		
	No. of Obs.	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**
t							
$0<EARNDIFMKT_t<0.0025$	3414		0.0455				
$-0.0025<EARNDIFMKT_t<0$	2450		0.0390				
Difference			**0.0065 (P<0.01)**				
t+1							
$0<EARNDIFMKT_t<0.0025$	3024	0.0078	0.0394	0.0753	-0.0273	-0.0022	0.0077
$-0.0025<EARNDIFMKT_t<0$	2155	-0.0009	0.0324	0.0644	-0.0282	-0.0022	0.0088
Difference			**0.0070 (P<0.01)**			0.0000 (P=0.44)	
t+2							
$0<EARNDIFMKT_t<0.0025$	2690	0.0058	0.0370	0.0755	-0.0231	-0.0007	0.0110
$-0.0025<EARNDIFMKT_t<0$	1869	-0.0089	0.0316	0.0638	-0.0277	-0.0012	0.0120
Difference			**0.0054 (P<0.01)**			0.0005 (P=0.35)	
t+3							
$0<EARNDIFMKT_t<0.0025$	2368	0.0053	0.0381	0.0760	-0.0225	-0.0001	0.0140
$-0.0025<EARNDIFMKT_t<0$	1616	-0.0057	0.0335	0.0637	-0.0249	-0.0004	0.0149
Difference			**0.0046 (P<0.01)**			0.0003 (P=0.15)	

Table 7. Future accounting performance grouped by degree of information asymmetry

This table reports the subsequent three years' ROA and ROA growth for TBEAT firms versus TMISS firms facing various information environments. The numbers in parenthesis are the P value from the one-sided nonparametric median test testing the difference between the values in the two samples.

Panel 1. The first threshold – Zero earnings.

Median of the future ROA and ROA growth of firms making small profit/losses at time t (less than 1% of the market value of equity)

	Market Value < $100 Mil	Market Value >$1 Billion	Without Analyst Coverage	With Analyst Coverage	SFE in the highest quartile & NUMEST in the lowest quartile	SFE in the lowest quartile & NUMEST in the highest quartile
ROA						
t+1						
$0<EARNMKT_t<0.01$	0.0015	0.0178	0.0024	0.0091	0.0021	0.0334
$-0.01<EARNMKT_t<0$	-0.0171	0.0116	-0.0160	0.0042	-0.0085	0.0287
Difference	**0.0186**	0.0062	**0.0184**	**0.0049**	**0.0106**	0.0047
	(P<0.01)	(P=0.15)	**(P<0.01)**	**(P<0.01)**	**(P=0.08)**	(P=0.22)
t+2						
$0<EARNMKT_t<0.01$	0.0024	0.0257	0.0035	0.0144	0.0044	0.0377
$-0.01<EARNMKT_t<0$	-0.0081	0.0197	-0.0100	0.0153	0.0048	0.0200
Difference	**0.0105**	0.0060	**0.0135**	-0.0009	-0.0004	**0.0177**
	(P<0.01)	(P=0.28)	**(P<0.01)**	(P=0.43)	(P=0.46)	**(P=0.03)**
t+3						
$0<EARNMKT_t<0.01$	0.0077	0.0313	0.0070	0.0191	0.0104	0.0391
$-0.01<EARNMKT_t<0$	-0.0122	0.0293	-0.0115	0.0149	-0.0032	0.0328
Difference	**0.0199**	0.0020	**0.0185**	0.0042	0.0136	0.0063
	(P=0.01)	(P=0.35)	**(P<0.01)**	(P=0.25)	(P=0.18)	(P=0.17)
ROA growth						
t+1						
$0<EARNMKT_t<0.01$	-0.0053	0.0076	-0.0037	0.0033	-0.0037	0.0281
$-0.01<EARNMKT_t<0$	-0.0058	0.0185	-0.0048	0.0095	-0.0048	0.0365
Difference	0.0005	**-0.0109**	0.0011	**-0.0062**	0.0011	-0.0084
	(P=0.15)	**(P=0.03)**	(P=0.48)	**(P=0.05)**	(P=0.40)	(P=0.11)
t+2						
$0<EARNMKT_t<0.01$	0.0028	0.0026	0.0012	0.0003	0.0032	-0.0048
$-0.01<EARNMKT_t<0$	0.0023	0.0028	0.0014	0.0041	0.0068	0.0015
Difference	0.0005	-0.0002	-0.0002	-0.0038	-0.0036	-0.0063
	(P=0.13)	(P=0.19)	(P=0.49)	(P=0.30)	(P=0.20)	(P=0.28)
t+3						
$0<EARNMKT_t<0.01$	0.0011	0.0015	0.0021	0.0000	0.0033	0.0004
$-0.01<EARNMKT_t<0$	-0.0017	0.0024	-0.0010	-0.0002	-0.0018	0.0061
Difference	**0.0027**	-0.0009	**0.0031**	0.0002	0.0051	**-0.0065**
	(P=0.10)	(P=0.25)	**(P=0.09)**	(P=0.48)	(P=0.24)	**(P=0.05)**

Panel 2. The second threshold – Last period's earnings

Median of the future ROA and ROA growth of firms making small earnings increase/decrease at time t (less than 0.25% of the market value of equity)

	Market Value < $100 Mil	Market Value >$1 Billion	Without Analyst Coverage	With Analyst Coverage	SFE in the highest quartile & NUMEST in the lowest quartile	SFE in the lowest quartile & NUMEST in the highest quartile
ROA						
t+1						
$0<EARNDIFMKT_t<0.0025$	0.0189	0.0474	0.0291	0.0423	0.0123	0.0577
$-0.0025<EARNDIFMKT_t<0$	0.0157	0.0450	0.0241	0.0402	0.0156	0.0520
Difference	0.0032 (P=0.13)	0.0024 (P=0.24)	**0.0050 (P=0.06)**	0.0021 (P=0.21)	-0.0033 (P=0.42)	0.0057 (P=0.13)
t+2						
$0<EARNDIFMKT_t<0.0025$	0.0177	0.0456	0.0268	0.0445	0.0174	0.0565
$-0.0025<EARNDIFMKT_t<0$	0.0139	0.0408	0.0212	0.0390	0.0107	0.0489
Difference	**0.0038 (P=0.10)**	**0.0048 (P=0.04)**	**0.0056 (P=0.04)**	**0.0055 (P<0.01)**	0.0067 (P=0.16)	**0.0076 (P=0.02)**
t+3						
$0<EARNDIFMKT_t<0.0025$	0.0206	0.0442	0.0250	0.0425	0.0216	0.0595
$-0.0025<EARNDIFMKT_t<0$	0.0187	0.0437	0.0255	0.0386	0.0164	0.0531
Difference	0.0019 (P=0.30)	0.0005 (P=0.47)	-0.0005 (P=0.40)	**0.0039 (P=0.07)**	**0.0052 (P=0.10)**	**0.0064 (P=0.05)**
ROA growth						
t+1						
$0<EARNDIFMKT_t<0.0025$	-0.0019	-0.0028	-0.0014	-0.0025	-0.0021	-0.0038
$-0.0025<EARNDIFMKT_t<0$	-0.0050	-0.0019	-0.0024	-0.0017	-0.0028	-0.0025
Difference	**0.0031 (P=0.08)**	**-0.0009 (P=0.10)**	0.0010 (P=0.17)	**-0.0008 (P=0.06)**	0.0007 (P=0.42)	-0.0013 (P=0.21)
t+2						
$0<EARNDIFMKT_t<0.0025$	-0.0010	-0.0011	-0.0014	-0.0001	0.0013	0.0004
$-0.0025<EARNDIFMKT_t<0$	-0.0007	-0.0021	-0.0024	-0.0011	-0.0008	-0.0011
Difference	-0.0003 (P=0.19)	0.0010 (P=0.11)	0.0010 (P=0.39)	**0.0010 (P=0.04)**	0.0021 (P=0.24)	**0.0015 (P=0.09)**
t+3						
$0<EARNDIFMKT_t<0.0025$	-0.0008	-0.0005	-0.0007	-0.0001	0.0002	-0.0001
$-0.0025<EARNDIFMKT_t<0$	-0.0016	-0.0007	-0.0002	0.0001	-0.0039	-0.0020
Difference	0.0008 (P=0.29)	0.0002 (P=0.47)	-0.0005 (P=0.24)	-0.0002 (P=0.27)	0.0041 (P=0.25)	0.0019 (P=0.12)

Table 8. Abnormal stock returns around the annual earnings announcement date for TBEAT firms and TMISS firms facing various degree of information asymmetry

Model: $CAR = \alpha + \beta_1 Info + \beta_2 Pos + \beta_3 Info \bullet Pos + \beta_4 EARNMKT + \beta_5 FE + \beta_6 EARNDIFMKT + Ydummies + e$

Measure of Information asymmetry		Intercept	Pos	Info	Info • Pos	EARNMKT	FE	EARNDIFMKT	Adj. R^2	No. of Obs.
	Predicted Sign		+	-	+	+	+	+		
Panel 1. Firms with small profit/losses firms (earnings are less than 1% of the market value of equity)										
Analyst coverage	Est. Coefficient	-0.004	-0.003	**-0.007***	**0.010****	0.428	-	**0.033*****	0.62%	3722
	(t statistics)	(-0.13)	(-0.41)	**(-1.43)**	**(1.57)**	(0.80)		**(3.09)**		
NUMEST & SFE	Est. Coefficient	0.005	-0.005	**-0.022*****	**0.023*****	-0.119	**0.024*****	-	1.8%	1816
	(t statistics)	(0.59)	(-0.65)	**(-2.54)**	**(1.93)**	(-0.18)	**(3.26)**			
Panel 2. Firms with small earnings increases/decreases (earnings changes are less than 0.25% of the market value of equity)										
Analyst coverage	Est. Coefficient	0.002	-0.004	-0.004	**0.010****	**0.070*****	-	-0.849	0.24%	3987
	(t statistics)	(0.36)	(-0.73)	(-0.80)	**(1.60)**	**(3.98)**		(-0.53)		
NUMEST & SFE	Est. Coefficient	-0.002	-0.001	0.0010	0.002	**0.065*****	**0.029*****	-	0.62%	2502
	(t statistics)	(-0.28)	(-0.22)	(1.06)	(0.19)	**(2.72)**	**(4.06)**			

The symbols *, **, and *** indicate statistical significance at 10%, 5% and 1% (one-tail) respectively.

CAR: The abnormal returns are the three-day cumulative market-adjusted return from day -1 to day +1 around the annual earnings announcement date.

EARNMKT: Net income divided by market value of equity as of the fiscal year beginning

EARNDIFMKT: Change of net income divided by the market value of equity as of the fiscal year beginning.

FE: Earnings surprise. Equal to actual earnings minus the closest consensus earnings forecast

Info: Dummy variable for information asymmetry. If using analyst coverage as measure of information asymmetry, it is equal to 1 if a firm has analyst coverage and zero otherwise. Using NUMEST and SFE, it is equal to 1 if a firm's NUMEST is in the lowest quartile and SFE in the highest quartile, 0 otherwise.

NUMEST: Average number of analyst following during the 12 months immediately before the annual earnings announcement.

Pos: Dummy variable. It is equal to 1 if the firm has made a small profit or earnings increase, 0 if the firm has made a small loss or earnings decrease.

SFE: The absolute value of the difference between the closest consensus analyst earnings forecast and the actual earnings, scaled by the absolute value of the actual earnings.

Ydummies: Year dummies controlling for individual year effect.

Table 9. Testing results of the return reversal of small profit/loss firms

Model: $CAR_{t+1} = \alpha + \beta_1 \, Info_t + \beta_2 \, Pos_t + \beta_3 \, Info_t \bullet Pos_t + \beta_4 \, EARNMKT_{t+1} + Ydummies + e$

Panel 1. Short window – t+1 represents the first quarterly earnings announcement date following the original annual earnings announcement date.

Measure of Information asymmetry		Intercept	Pos_t	$Info_t$	$Info_t \bullet Pos_t$	$EARNMKT_{t+1}$	Adj. R^2	No. of Obs.
	Predicted Sign		+	?	Non-negative	+		
Analyst coverage	Est. Coefficient (t statistics)	**0.018***** **(3.40)**	0.002 (0.41)	-0.007 (-0.97)	0.007 (0.92)	**0.338***** **(6.76)**	1.4%	3598
NUMEST & SFE	Est. Coefficient (t statistics)	**0.025***** **(4.12)**	0.0001 (0.01)	-0.013 (-1.44)	0.011 (0.99)	**0.296***** **(4.59)**	1.0%	2544

Panle 2. Long window – t+1 represents the first annual earnings announcement date following the original annual earnings announcement date.

Measure of Information asymmetry		Intercept	Pos_t	$Info_t$	$Info_t \bullet Pos_t$	$EARNMKT_{t+1}$	Adj. R^2	No. of Obs.
	Predicted Sign		+	?	Non-negative	+		
Analyst coverage	Est. Coefficient (t statistics)	**0.022**** **(2.33)**	0.004 (0.79)	0.006 (0.85)	-0.001 (-0.06)	**0.162***** **(7.52)**	1.9%	3399
NUMEST & SFE	Est. Coefficient (t statistics)	-0.004 (-0.66)	0.003 (0.67)	-0.002 (-0.25)	0.004 (0.36)	**0.113***** **(4.70)**	0.9%	2429

The symbols *, **, and *** indicate statistical significance at 10%, 5% and 1% (two-tail) respectively.

Table 10. Testing results of the return reversal of small earnings increase/decrease firms

Model: $CAR_{t+1} = \alpha + \beta_1 Info_t + \beta_2 Pos_t + \beta_3 x\ Info_t \bullet Pos_t + \beta_4 EARNMKT_{t+1} + Ydummies + e$

Panel 1. Short window – t+1 represents the first quarterly earnings announcement date following the original annual earnings announcement date.

Measure of Information asymmetry		Intercept	Pos_t	$Info_t$	$Info_t \bullet Pos_t$	$EARNMKT_{t+1}$	Adj. R^2	No. of Obs.
	Predicted Sign		+	?	Non-negative	+		
Analyst coverage	Est. Coefficient (t statistics)	**0.007*** **(1.64)**	-0.001 (-0.30)	**-0.014***** **(-2.78)**	**0.012*** **(1.86)**	**0.217***** **(4.23)**	0.5%	3540
NUMEST & SFE	Est. Coefficient (t statistics)	**0.011***** **(2.53)**	-0.002 (-0.64)	-0.015 (-1.61)	0.019 (1.60)	**0.148***** **(2.59)**	0.05%	2851

Panle 2. Long window – t+1 represents the first annual earnings announcement date following the original annual earnings announcement date.

Measure of Information asymmetry		Intercept	Pos_t	$Info_t$	$Info_t \bullet Pos_t$	$EARNMKT_{t+1}$	Adj. R^2	No. of Obs.
	Predicted Sign		+	?	Non-negative	+		
Analyst coverage	Est. Coefficient (t statistics)	0.001 (0.15)	0.0001 (0.04)	-0.0008 (-0.16)	-0.0007 (-0.11)	**0.145***** **(6.81)**	1.1%	3516
NUMEST & SFE	Est. Coefficient (t statistics)	-0.001 (-0.29)	0.0002 (0.06)	-0.0007 (-0.07)	-0.0015 (-0.13)	**0.134***** **(5.48)**	1.1%	2821

The symbols *, **, and *** indicate statistical significance at 10%, 5% and 1% (two-tail) respectively.