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Management Earnings Forecasts, Earnings Management, and the Sarbanes–Oxley Act

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I. Introduction

In a concurrent working paper, Pincus et al. (2020) replicate Cohen et al. (2008) and make a few calls for future research on how the Sarbanes–Oxley Act of 2002 (SOX) affects earnings management.[1] In this study, we answer some of the calls by replicating prior literature's findings that firms switch from accrual-based earnings management (AEM) to real earnings management (REM) after the passage of SOX. Substitutions of AEM with REM and downward earnings forecast exist in both pre- and post-SOX periods. While prior literature has documented that both downward earnings forecast and REM can be used to substitute AEM, it is unclear how SOX affects such substitutions. In this article, we examine the impact of SOX on the substitutions between (1) AEM and REM, (2) AEM and downward forecast guidance. We also examine whether SOX increases or decreases the level of positive abnormal accruals. We further examine the relation between REM and downward forecast guidance which is ignored by prior literature.

Cohen et al. (2008) examine AEM and REM in the pre- and post-SOX periods. They find that firms switch from AEM to REM after the passage of the SOX Act of 2002. Also, Zang (2012) finds that such substitution exists pre-SOX. Combing the findings of Cohen et al. (2008) and Zang (2012), we expect that such substitution exists post-SOX. However, it is unclear how SOX affects such substitution. Different from Zang (2012) and Cohen et al. (2008), we focus on the moderating effect of SOX on such substitution. We expect that SOX increases the probability of such substitution because it is costly for managers to engage in accrual earnings management post-SOX. For instance, the increased scrutiny of public firms' accounting practices from both the auditors and the regulators after SOX constrains managers' opportunities to engage in AEM in the U.S. (Zang, 2012). Relative to AEM, REM and management earnings guidance are less costly because they are subject to less scrutiny. Therefore, we expect that the likelihood of substituting downward earnings guidance (and REM) for income-increasing AEM is higher in the post-SOX period than in the pre-SOX period.

Prior literature documents that managers manage earnings to beat three major benchmarks: avoiding reporting losses, avoiding earnings declines, and meeting or beating analyst forecasts (Graham et al., 2005). In recent years, meeting or beating analyst forecasts is the most important benchmark managers seek to achieve (Brown and Caylor, 2005). To meet or beat analyst forecasts, managers have incentives to walk down analysts' earnings expectations through downward earnings guidance. Further, evidence shows that managers increasingly focus on meeting or beating analyst forecasts recently (Dechow et al., 2003). We also are motivated by this increasing trend and its causes. We posit that SOX may contribute to this trend, which is discussed in the hypothesis development section.

We first examine how SOX affects income-increasing AEM. We then examine how SOX affects the likelihood of substituting downward earnings guidance for income-increasing AEM. Next, we examine how SOX affects the likelihood

[1] We list five calls from Pincus et al. (2020): 1. "Future research might examine in-depth small firms' AEM (accrual-based earnings management) and REM (real earnings management) practices." 2. "Future research might further investigate REM increases post-SOX (SOX refers to the Sarbanes–Oxley Act of 2002)." 3. "These results should caution researchers against automatically assuming AEM and REM substitution is the expected relation in general. Future research replicating or re-examining these findings would be useful." 4. "Future research also might consider other robustness checks. For example, Stubben's (2010) approach for estimating AEM based on abnormal revenues, or the making of REM and AEM decisions sequentially, as in Pincus and Rajgopal (2002) and Zang (2012)." 5. "Future research also might explore variables beyond AEM and REM and/or interactions with them, such as major restatements, GAAP-based lawsuits, fraud and enforcement cases, and recessionary cash crunches."

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of substituting REM for income-increasing AEM. Last, we explore the relation between downward forecast guidance and REM, which is ignored by prior literature.

Using annual data for the period of 1994–2018, we find evidence supporting the substitution of income-increasing AEM with downward forecast guidance and a positive moderating effect of SOX on such substitution. We also find evidence supporting the substitution of income-increasing AEM with income-increasing REM and a positive moderating effect of SOX on such substitution. We further find that downward forecast guidance complements income-increasing REM, after controlling for the effect of income-increasing AEM.

We contribute to the stream of earnings management literature and especially to the stream of literature studying the relation among AEM, earnings forecast, and REM. Our findings suggest that managers have a few menu choices to manage earnings and others' perceptions of their earnings. Prior literature finds that managers substitute downward earnings forecast and REM for AEM. We extend this stream of literature by: (1) replicating prior literature's findings of the trends of REM, AEM, and especially income-increasing AEM;[2] (2) examining how SOX affects such substitutions; and (3) revealing a new relation between REM and downward forecast guidance. We show that SOX increases the two substitutions. Our results suggest that managers engage in more REM and downward forecast guidance when AEM is constrained. Our findings are important because it shows some unintended consequences of SOX.

The remainder of the article is organized as follows: Section II discusses the related literature and develops our hypotheses; Section III discusses the research methodology; Section IV describes the sample selection and data; Section V presents results; and Section VI concludes the study.

II. Literature Review and Hypothesis Development

The literature about earnings management is extensive.[3] Earnings management is heavily studied since earnings play an important role in the financial market. Earnings are the key metrics that the capital market relies on to allocate resources (Chen and Yuan, 2004). Further, prior studies show that earnings are used in bank loan contracts, management compensation contracts, and stock valuations (Kothari, 2001). Therefore, managers have incentives to report higher earnings numbers. One way to report higher earnings is to manipulate accruals. Positive accruals increase earnings, while negative accruals decrease earnings. Managers can exercise discretions over the accrual accounting process. Therefore, prior literature uses abnormal discretionary accruals as a proxy of AEM (e.g., Dechow et al., 1995).

We replicate Cohen et al. (2008) and extend it by providing direct evidence of substitutions effects among the earnings surprise management mechanisms.[4] Cohen et al. (2008) examine the earnings management metrics for the pre- and post-SOX periods. The post-SOX period is 2002-2005, which includes only three years after SOX. They find that AEM (REM) increase (decrease) prior to the passage of SOX and decrease (increase) after the passage of SOX. Their findings suggest that firms switch from AEM to REM after the passage of SOX. Cohen et al. (2008) and Pincus et al. (2020) focus on the time trend of earnings management, but they do not test the substitution effect directly. Our study is different from Cohen et al. (2008) and Pincus et al. (2020) by examining the substitution effect between AEM and REM directly in an extended sample period. We limit our study sample to firm-years that use only one earnings management mechanism (not both). In addition, we incorporate a third earnings surprise management mechanism, forecast guidance. We study the substitution effect between AEM and forecast guidance by limiting the sample to firm-years that use either AEM or forecast guidance, but not both. We further test our results using suspect firms and find more pronounced evidence. Finally, we investigate whether REM and forecast guidance complement each other.

A series of accounting scandals in 2000 and 2001 eroded investors' trust in firms' financial reports. SOX was passed by Congress in 2002 in order to restore the public's confidence by curbing earnings management and accounting fraud. The increased scrutiny of public firms' accounting practices from both auditors and regulators after SOX constrains AEM in the U.S. (Zang, 2012). Besides, Cohen et al. (2008) show that the level of positive discretionary accruals begins to decline but the level of negative discretionary accruals begins to increase post-SOX. This result suggests that firms are less likely to engage in income-increasing earnings management post-SOX. Different from Cohen et al. (2008) that measure the aggregate

[2] In this study, we use "income-increasing AEM" and "AEM with positive abnormal accruals" interchangeably to refer to upward AEM.

[3] For brevity, we do not review the earnings management literature in this study. Graham et al. (2005) provides an comprehensive review of earnings management studies.

[4] We do not replicate Pincus et al. (2020) which is a working paper.

level of discretionary accruals, we study the likelihood of using positive discretionary accruals on the firm level. We expect our results will be consistent with the findings of Cohen et al. (2008).[5] Therefore, we hypothesize that:

H1: The likelihood of income increasing AEM is lower in the post-SOX period than in the pre-SOX period.

Dechow and Skinner (2000) suggest that meeting or beating earnings benchmarks is one of the causes for earnings management. Further, Brown and Pinello (2007) find that managers use downward earnings guidance as an alternative way to meet or beat earnings benchmarks when their ability to manage AEM is constrained. In a similar vein, Ho et al. (2012) find that managers substitute earnings guidance for AEM when AEM is constrained by a bloated balance sheet. We treat SOX as a constraining factor in our context. Thus, we expect that managers are more likely to substitute downward earnings guidance for AEM post-SOX. Therefore, we hypothesize that:

H2: The likelihood of substituting downward earnings guidance for income-increasing AEM is higher in the post-SOX period than in the pre-SOX period.

Relative to AEM, REM is subject to less auditor and regulatory scrutiny (Ho et al., 2014; Markmann and Ghani, 2019). However, REM is detrimental to firms' operations (Roychowdhury, 2006). Therefore, managers trade off the two earnings management methods based on their relative costs and adjust the level of discretionary accruals according to the level of real activities manipulation realized (Zang, 2012). In addition, Cohen et al. (2008) suggest that AEM decreases while REM increases for their post-SOX period (2002–2005). We extend the sample period to 2018 and retest whether managers engage in more REM post-SOX (2002–2018). In our context, we view SOX as a constraint on income-increasing AEM. Thus, on the firm level, we expect that firms are more like to substitute REM for AEM post-SOX.[6] Therefore, we hypothesize that:

H3: The likelihood of substituting REM for income-increasing AEM is higher in the post-SOX period than in the pre-SOX period.

Last, we examine the relationship between REM (standardized) and downward forecast guidance.[7] We hypothesize that there is a complementary effect between REM and downward forecast guidance. When AEM is not enough to meet/beat earnings targets, managers will engage in REM and downward forecast guidance. Downward forecast guidance as a means of voluntary disclosure complements REM to achieve earnings goals. Therefore, we hypothesize that:

H4: REM is positively related to downward forecast guidance, after controlling for AEM.

III. Research Method

Proxy for AEM

To test our first hypothesis, we use the propensity of discretionary accruals as the proxy for AEM. Following Kothari et al. (2005), we estimate the below accruals model which controls for performance. Specifically,

$$\frac{TA_{ijt}}{A_{ijt-1}} = \alpha_{jt}\left(\frac{1}{A_{ijt-1}}\right) + \beta_{1jt}\left(\frac{\Delta REV_{ijt}-\Delta REC_{ijt}}{A_{ijt-1}}\right) + \beta_{2it}\left(\frac{PPE_{ijt}}{A_{ijt-1}}\right) + \beta_{3jt}ROA_{ijt-1} + \epsilon_{ijt} \qquad (1)$$

Where

TA_{ijt} = the total accruals for firm i in the two-digit SIC code j in year t, defined as earnings before extraordinary items and discontinued operations less operating cash flows;

A_{ijt-1} = the total assets for firm i in the two-digit SIC code j in year t-1;

ΔREV_{ijt} = the change in revenues for firm i in the two-digit SIC code j in year t;

ΔREC_{ijt} = the change in accounts receivables for firm i in the two-digit SIC code j in year t;

PPE_{ijt} = the gross property, plant, and equipment for firm i in the two-digit SIC code j in year t;

ROA_{ijt-1}=the return on assets for firm i in the two-digit SIC code j in year t-1.

[5] This expectation is mainly to confirm the findings in prior literature and validate our measure of AEM.
[6] This expectation is mainly to confirm the findings in prior literature and validate our measure of REM.
[7] "Standardized" means the distribution of the variable has a mean of 0 and a standardized deviation of 1.

We estimate the model in equation (1) to obtain normal total accruals for each firm-year using all firm observations in that year from the same two-digit SIC code. To ensure sufficient data for parameter estimation, the sample includes only firm-years with at least ten observations in the same two-digit SIC code industry for a given year. The difference between actual total accruals and the estimated normal total accruals represents abnormal accruals, the proxy for discretionary accruals. The proxy for income-increasing AEM is the dichotomous variable POSITIVE, which is 1 for a firm-year with positive abnormal accruals, and 0 otherwise.

Proxy for Management Earnings Forecast Guidance

To test our second hypothesis, we follow the methodology in Matsumoto (2002) to develop a proxy for forecast guidance. First, the annual change in earnings is modeled as a function of the prior year's change in earnings and excess returns cumulated over the current year.

$$\frac{\Delta EPS_{ijt}}{P_{ijt-1}} = \alpha_{jt} + \beta_{1jt}\left(\frac{\Delta EPS_{ijt-1}}{P_{ijt-2}}\right) + \beta_2 CRET_{ijt} + \epsilon_{ijt} \qquad (2)$$

Where:

ΔEPS_{ijt} = earnings per share for firm i in two-digit SIC code j in year t, less earnings per share for the same firm one year prior (*i.e.*, year t-1), as reported in I/B/E/S;

P_{ijt} = price per share for firm i in two-digit SIC code j at the end of year t, as reported by annual COMPUSTAT (adjusted for splits);

$CRET_{ijt}$ = cumulative daily excess returns for firm i in two-digit SIC code j in year t obtained from the Center for Research in Security Prices (CRSP). Returns are cumulated from three days after the earnings announcement date in year t-1 to twenty days before the earnings announcement date in year t.

Similar to model (1), the sample includes only firm-years with at least ten observations in the same two-digit SIC code industry for a given year.

Following Matsumoto (2002), we use the parameter estimates from firm-years in year t-1 to determine the expected change in EPS($i.e., E[\Delta EPS_{ijt}]$) in yeat t. Then we add the expected change in EPS to EPS of the prior year (*i.e.*,EPS_{ijt-1}) to estimate the expected forecast of the current year's earnings per share($i.e., E[F_{ijt}]$).

$$E[\Delta EPS_{ijt}] = \left[\hat{\alpha}_{jt-1} + \hat{\beta}_{1jt-1}\left(\frac{\Delta EPS_{ijt-1}}{P_{ijt-2}}\right) + \hat{\beta}_{2jt-1} CRET_{ijt}\right] \times P_{ijt-1} \qquad (3)$$

$$E[F_{ijt}] = EPS_{ijt-1} + E[\Delta EPS_{ijt}] \qquad (4)$$

We compare the expected forecast of the current year's earnings per share with the last published median forecast before the earnings announcement date. If managers attempt to keep expectations low to avoid negative earnings surprises, then the last published median forecast will be less than the expected forecast, indicating downward forecast guidance. A dummy variable DOWN is used as the proxy for management earnings forecast guidance, which equals to 1 if the last published median forecast is less than the expected analysts' forecast, zero otherwise.

Proxy for REM

To test our third hypothesis, we estimate the normal levels of production costs and discretionary expenditures using the below two equations following Zang (2012).[8]

$$\frac{PROD_{ijt}}{A_{ijt-1}} = \alpha_{jt}\left(\frac{1}{A_{ijt-1}}\right) + \beta_{1jt}\left(\frac{SALES_{ijt}}{A_{ijt-1}}\right) + \beta_{2jt}\left(\frac{\Delta SALES_{ijt}}{A_{ijt-1}}\right) + \beta_{3jt}\left(\frac{\Delta SALES_{ijt-1}}{A_{ijt-1}}\right) + \epsilon_{ijt} \qquad (5)$$

[8] Following Zang (2012) and Pincus et al. (2020), we exclude cash flow from operation (CFO) when estimating REM because the directional effect of CFO can be ambiguous.

$$\frac{\text{DISEXP}_{ijt}}{A_{ijt-1}} = \alpha_{jt}\left(\frac{1}{A_{ijt-1}}\right) + \beta_{1jt}\left(\frac{\text{SALES}_{ijt-1}}{A_{ijt-1}}\right) + \epsilon_{ijt} \qquad (6)$$

Where:

PROD_{ijt} = production costs for firm i in the two-digit SIC code j in year t, defined as the sum of cost of goods sold and the change in inventories;

A_{ijt-1} = total assets for firm i in the two-digit SIC code j in year t-1;

SALES_{ijt}= sales revenues for firm i in the two-digit SIC code j in year t;

ΔSALES_{ijt}= change in sales revenue for firm i in the two-digit SIC code j in year t;

DISEXP_{ijt} = discretionary expenditures for firm i in the two-digit SIC code j in year t, defined as the sum of advertising, R&D, and SG&A expenses.

We estimate the models in equations (5) and (6) for each firm-year using all observations in that year from the same two-digit SIC code. Our sample includes only firm-years with at least ten observations in the same two-digit SIC code industry for a given year. The abnormal production costs and abnormal discretionary expenses are computed as the difference between the actual values and the normal levels predicted from equations (5) and (6). We aggregate the two individual REM variables to measure the level of REM. Specifically, REM is calculated by summing the value of abnormal production costs to the negative value of abnormal discretionary expenses (i.e., multiply -1).

Positive abnormal production costs indicate that firms manage earnings upward by overproduction, and negative abnormal discretionary expenses indicate that firms cut discretionary expenditures to manage earnings upward. The proxy for the propensity of REM is the dichotomous variable REAL which equals 1 if a firm-year has a positive REM, suggesting the firm has engaged in real activities manipulation by either reporting a lower cost of goods sold through increased production or reducing advertising, R&D, and SG&A expenses, and 0 otherwise.

Empirical Model Examining H1

To test our first hypothesis, we perform the below logit regression modeling the relationship between SOX and the probability that a firm engages in income-increasing AEM.

$$\begin{aligned}\text{Prob}(\text{POSITIVE} = 1) &= \text{F}(\beta_0 + \beta_1\text{SOX} + \beta_2\text{MTB} + \beta_3\text{LOSS} + \beta_4\text{EARNCRET} + \beta_5\text{ICLAIM} + \beta_6\text{FIRMSIZE} + \beta_7\text{LIT} \\ &\quad + \beta_8\text{FE} + \beta_9\text{INSOWN} + \beta_{10}\text{BIGAUDIT} + \text{Industry Fixed} + \epsilon_i) \qquad (7)\end{aligned}$$

Here SOX is an indicator assigned a value of 1 for firm-years after the passage of SOX (2002 and thereafter), and 0 otherwise. MTB is the market-to-book ratio. LOSS is a dummy variable for the value relevance of earnings, which equals 1 if firms report a loss before extraordinary items in the previous year, and 0 otherwise (Matsumoto, 2002). EARNCRET is a variable for the cumulated excess daily return from three days after earnings announcement date in previous year t-1 to three days after earnings announcement date in year t, which is regressed on the change in earnings per share from previous year t-1 to year t, scaled by price per share at the end of year t-1. ICLAIM is a measure of reliance on implicit claims based on a factor analysis of three variables: membership in a durable goods industry, R&D expense, and labor intensity (Bowen et al., 1995; Matsumoto, 2002). FIRMSIZE is the log of the market value of equity in year t. LIT is an industry dummy variable to identify firms in high-risk industries: SIC codes 2833–2836 (biotechnology), 3570–3577 and 7370–7374 (computers), 3600–3674 (electronics), and 5200–5961 (retailing). FE is the absolute value of the forecast error deflated by price at the end of the prior year t-1. INSOWN is a measure of institutional ownership in year t. BIGAUDIT is an indicator which equals to 1 if the auditor is one of the Big 4/5 auditors, and 0 otherwise. The definitions of control variables are listed in APPENDIX.

We control for industry effects based on the two-digit SIC code. We hypothesize that SOX has a negative effect on income-increasing AEM in H1, therefore we expect the coefficient β_1 in equation (7) to be negative.

Empirical Model Examining H2

In our second hypothesis, we examine the effect of SOX on the tradeoff between income-increasing AEM and downward forecast guidance. That is our second hypothesis relates to a substitution effect between income-increasing AEM and downward forecast guidance. Because SOX is expected to have a negative effect on income-increasing AEM, we expect that firms that do not engage in income-increasing AEM are more likely to have downward forecast guidance. Therefore,

we limit our sample to firms that use either income-increasing AEM or downward forecast guidance, but not both.[9] Following Ho et al. (2010), we create a dummy variable GUIDANCE as follows:

GUDIANCE=1: when firm-year exhibits only downward forecast guidance (DOWN=1), but not income-increasing AEM (POSITIVE=0);

GUIDANCE=0: when firm-year exhibits only income-increasing AEM (POSITIVE =1), but not downward forecast guidance (DOWN=0).

We test our second hypothesis using the following logit model:

$$\begin{aligned}\text{Prob}(\text{GUIDANCE} = 1) &= \text{F}(\beta_0 + \beta_1\text{SOX} + \beta_2\text{MTB} + \beta_3\text{LOSS} + \beta_4\text{EARNCRET} + \beta_5\text{ICLAIM} + \beta_6\text{FIRMSIZE} + \beta_7\text{LIT} \\ &\quad + \beta_8\text{FE} + \beta_9\text{INSOWN} + \beta_{10}\text{BIGAUDIT} + \text{Industry Fixed} + \epsilon_i) \qquad (8)\end{aligned}$$

We expect the coefficient β_1 in equation (8) to be positive to support H2.

Empirical Model Examining H3

Our third hypothesis tests the effect of SOX on the tradeoff between AEM and REM. We expect that firms are more likely to substitute REM for AEM after SOX. In our third hypothesis, we focus on the firm-years that use either income-increasing AEM or income-increasing REM, but not both. We create a dummy variable REALACT as follows:

REALACT=1: when a firm-year exhibits only income-increasing REM (REAL=1), but not income-increasing AEM (POSITIVE=0).

REALACT=0: when a firm-year exhibits only income-increasing AEM (POSITIVE=1), but not income-increasing REM (REAL=0).

We test our third hypothesis using the following logit model:

$$\begin{aligned}\text{Prob}(\text{REALACT} = 1) &= \text{F}(\beta_0 + \beta_1\text{SOX} + \beta_2\text{MTB} + \beta_3\text{LOSS} + \beta_4\text{EARNCRET} + \beta_5\text{ICLAIM} + \beta_6\text{FIRMSIZE} + \beta_7\text{LIT} \\ &\quad + \beta_8\text{FE} + \beta_9\text{INSOWN} + \beta_{10}\text{BIGAUDIT} + \text{Industry Fixed} + \epsilon_i) \qquad (9)\end{aligned}$$

We expect the coefficient β_1 in equation (9) to be positive to support H3.

Empirical Model Examining H4

In our fourth hypothesis, we expect REM is positively related to downward forecast guidance, after controlling for AEM. To test H4, we use the following logit model to regress the downward forecasts guidance (DOWN) on SOX, income-increasing REM (REAL), income-increasing AEM (POSITIVE), and other control variables

$$\begin{aligned}\text{Prob}(\text{DOWN} = 1) = \text{F}(&\beta_0 + \beta_1\text{SOX} + \beta_2\text{REAL} + \beta_3\text{POSITIVE} + \beta_4\text{MTB} + \beta_5\text{LOSS} + \beta_6\text{EARNCRET} + \\ &\beta_7\text{ICLAIM} + \beta_8\text{FIRMSIZE} + \beta_9\text{LIT} + \beta_{10}\text{FE} + \beta_{11}\text{INSOWN} + \beta_{12}\text{BIGAUDIT} + \text{Industry Fixed} + \epsilon_i) \qquad (10)\end{aligned}$$

We expect the coefficient β_2 in equation (10) to be positive to support H4.

Control Variables

We control for growth prospects (MTB), value-relevance of earnings (LOSS and EARNRET), reliance on implicit claims (ICLAIM), firm size (FIRMSIZE), litigation risk (LIT), uncertainty in the forecasting environment (FE), corporate governance (INSOWN and BIGAUDIT) and industry effect (Bowen et al., 1995; Matsumoto, 2002; Skinner and Sloan, 2002; He et al., 2009; Ho et al. 2014).

Growth prospects. Skinner and Sloan (2002) document that market reaction to earnings surprises is stronger for high-growth firms than for low-growth firms. Managers from high-growth firms may have stronger incentives to avoid negative earnings surprises. Matsumoto (2002) finds evidence that firms with relatively higher growth prospects are more likely to avoid negative earnings surprises. In this study, we use the market-to-book ratio (MTB) as a proxy for growth prospects.

[9] This limit leads to the smaller sample size for testing H2 than that for testing H1 in our study.

Value-relevance of earnings. Matsumoto (2002) finds that firms with low value-relevance earnings are less likely to take action to avoid negative earnings surprises. Therefore, we control for two measures of value-relevance of earnings. The first measure of value-relevance of earnings is a dummy variable LOSS, which equals to 1 if firms report a loss before extraordinary items in the previous year; 0 otherwise. The second measure of value-relevance of earnings is the industry-specific R-squared from a regression of annual returns on earnings. We regress cumulated excess daily return from three days after the previous year t-1 earnings announcement date to three days after the year t earnings announcement date on the change in earnings per share from year t-1 to year t, scaled by price per share at the end of year t-1. Then the annual decile rank of the two-digit SIC code industry's R-squared is used to measure the value-relevance of earnings (EARNRET). We expect a negative relation between LOSS and tendency to avoid negative earnings surprises and a positive relation between EARNRET and tendency to meet or beat analysts' expectations.

Reliance on implicit claims. Bowen et al. (1995) argue that firms that rely heavily on implicit claims with stakeholders have strong incentives to manage earnings upward to meet or beat analysts' forecasts. Matsumoto (2002) concludes that firms with greater reliance on implicit claims with stakeholders are more likely to take actions to avoid negative earnings surprises. Following Bowen et al. (1995) and Matsumoto (2002), we include three control variables as follows:

DUR: Membership in a durable goods industry. DUR=1 if the three-SIC code of a firm is among150-179,245,250-259,283,301, and 324-399, and 0 otherwise.

RD: Research and Development expenditures scaled by total assets.

LABOR: A measure of labor intensity, which equals one minus the ratio of gross property, plant, and equipment to total gross assets.

We also conduct a factor analysis to reduce the three variables to one single variable ICLAIM. Firms with higher values of ICLAIM have more reliance on implicit claims with their stakeholders.

Firm size. Matsumoto (2002) finds evidence that larger firms are more likely to engage in downward forecast guidance. Thus, we control for the firm size that is the log of the market value of equity (FIRMSIZE).

Litigation risk. Shareholder litigation likely results from a sudden drop in stock price. Thus, managers of firms with high litigation risks are more likely to have greater incentives to avoid negative earnings surprises. Consistent with this notion, Matsumoto (2002) finds evidence that firms with high litigation risks are more likely to take actions to avoid negative earnings surprises. Following Matsumoto (2002), we use an industry dummy variable (LIT) to identify firms in high-risk industries: SIC codes 2833–2836 (biotechnology), 3570–3577 and 7370–7374 (computers), 3600–3674 (electronics), and 5200–5961 (retailing).

Uncertainty in the forecasting environment. The uncertainty in the forecasting environment increases the level of difficulties for managers to provide forecasts. We control for the level of uncertainty using the absolute value of the forecast error deflated by price at the end of the prior year t-1(FE). The forecast error is the difference between the first published median forecast and actual earnings per share reported by I/B/E/S.

Corporate governance. Previous studies show that there are associations between corporate governance and earnings management (e.g., He et al. 2009). More specifically. Ho et al. (2014) find that good corporate governance (such as audit committees) curb downward earnings guidance. Therefore, we control for two corporate governance measures: institutional ownership (INSOWN) and auditor type (BIGAUDIT).[10]

IV. Sample Selection and Descriptive Statistics

Our sample contains firm-year observations from COMPUSTAT, CRSP, and I/B/E/S databases for the period of 1994–2018. Panel A of Table 1 presents the detailed sample selection steps. Following Matsumoto (2002) and Ho et al. (2010), we only include firm-years with a fiscal year-end day on December 31 to make sure that the return data used to calculate EARNRET are from the same period. The number of initial firm-year observations with December 31 fiscal year-end from COMPUSTAT, CRSP, and I/B/E/S databases is 114,743. The incentives of firms in regulated industries are different from those in nonregulated industries. Therefore, we exclude financial institutions (SIC codes 6000–6999), utilities

[10] Due to data limitation, we do not control for audit committee characteristics.

(SIC codes 4800–4999), and other regulated industries (SIC codes 4000–4499, and 8000 and higher). These specific industry exclusions reduce our sample to 74,683 firm-year observations. Finally, requiring complete data for our study, our final full sample contains 32,767 observations. We further form a restricted sample using firm-years that either meet or beat analysts' earnings forecast (suspect firms).[11] The restricted sample has 20,456 observations. We expect the effect of SOX is more pronounced for these suspect firms because they have stronger incentives to manage earnings and earnings surprises. The purposes of H2 and H3 are to examine the substitution effects between AEM and forecast guidance (REM). Our full sample for H2 (H3) is further reduced to 16,842 (14,462) by limiting to firm-year observations that use either income-increasing AEM or downward forecast guidance (income-increasing REM), but not both. Similarly, the restricted sample for H2 (H3) only includes firm-year observations either meet or beat analysts' earnings forecasts. The sample size used to test H4 is the same as the sample for H1.

Panel B of Table 1 shows the sample distribution by year. Our sample is evenly distributed from 1994 to 2018. Table 2 presents the descriptive statistics for both the full sample that consists of 32,767 firm-years and the restricted sample that consists of 20,456 firm-years. For the full sample, the average of POSITIVE is 0.432, indicating that income-increasing AEM occurs in 43.2% of the observations. The mean of DOWN indicates that 55.0% of all firm-year observations have downward forecast guidance and the mean of REAL suggests 55.3% of all firm-year observations use REM to increase earnings. 49.4 % of the observations are from durable goods industries and 39.2% are from the high litigation risk industries. 25.9% of the firms report a loss in the prior year. Consistent with Ho et al. (2010), the average of FIRMSIZE is 6.6. On average, the institutional ownership is 36.7% and 87.5% of the firms hire a Big 4/5 auditor during the sample period.

Panel A of Table 3 presents the t-test of means difference for all variables between the pre-SOX period and the post-SOX period. From the univariate results, we find that income-increasing AEM is significantly lower in the post-SOX period, while the likelihood of substituting downward forecast guidance and REM for AEM is significantly higher in the post-SOX period. Panel B of Table 3 shows similar results for the restricted sample.

V. Hypothesis Testing

Testing of H1

Table 4 reports the logit regression results from estimating equation (7) which is used to test H1. For both full and restricted samples, the coefficient of SOX is negative and significant, suggesting that SOX constrains income-increasing AEM. Consistent with Cohen et al. (2008), we find that firms are less likely to use income-increasing AEM in the post-SOX period. Consistent with our expectation, the negative effect of SOX on income-increasing AEM is more pronounced for the restricted sample. Therefore, our findings support H1.

The coefficient of LOSS is positive and significant for both samples, suggesting that firms reporting a loss in the prior year are more likely to engage in income-increasing AEM. The value relevance of earnings encourages AEM. The level of reliance on implicit claims with stakeholders is negatively associated with the tendency to report positive discretionary accruals. The coefficient of FIRMSIZE is negative and significant, which is consistent with previous findings (e.g., Brown and Pinello, 2007; Ho et al., 2010) that larger firms are less likely to report positive discretionary accruals. The negative and significant coefficient of LIT suggests that firms in high litigation risk industries are less likely to use positive discretionary accruals. This result is probably due to the high litigation concern related to AEM. As expected, both measures of corporate governance, INSOWN and BIGAUDIT, are significantly negative. This result suggests that strong corporate governance constraints income-increasing AEM.

Testing of H2

Our second hypothesis predicts that the likelihood of substituting downward guidance for income-increasing AEM is higher in the post-SOX period than in the pre-SOX period. In Table 5, the positive and significant coefficient on SOX suggests that firms are more likely to substitute downward guidance for income-increasing AEM in the post-SOX period than in the pre-SOX period. Further, we find that the effect of SOX is more pronounced for the restricted sample (suspect firms). This result suggests that, for suspect firms that meet or beat forecasts, they are more likely to substitute downward guidance for income-increasing AEM than other firms are. Therefore, our findings support H2.

[11] This process is consistent with Ho et al. (2010) which tests the tradeoff between two mechanisms by limiting the sample to observations with zero or small positive earnings surprises (i.e., firms that either meet or slightly beat analysts' earnings forecasts).

Our testing of the first hypothesis shows that in the post-SOX period, firms are less likely to engage in income-increasing AEM. Considering the testing for H1 and H2 together, we find evidence supporting a substitution effect between downward forecast guidance and income-increasing AEM and a positive moderating effect of SOX on such substitution.

Table 5 shows that LOSS is negatively related to the likelihood of substituting downward guidance for income-increasing AEM. The level of reliance on implicit claims with stakeholders is positively related to the documented substitution effect. Larger firms are more likely to substitute downward guidance for income-increasing AEM. Forecast uncertainties discourage the substitution between forecast guidance and income-increasing AEM. Our corporate governance measures, both INSOWN and BIGAUDIT, have positive effects on the likelihood of substituting downward guidance for income-increasing AEM.

Testing of H3

Our third hypothesis predicts that the likelihood of substituting income-increasing REM for income-increasing AEM is higher in the post-SOX period than in the pre-SOX period. In Table 6, the positive and significant coefficient on SOX suggests that firms in the post-SOX period are more likely to substitute income-increasing REM for income-increasing AEM. Further, we find that the effect of SOX is more pronounced for the restricted sample (suspect firms). Therefore, our findings support H3.

Our testing of the first hypothesis shows that in the post-SOX period, firms are less likely to use income-increasing AEM. Considering the testing of H1 and H3 together, we find evidence supporting a substitution effect between income-increasing REM and income-increasing AEM and a positive moderating effect of SOX on such substitution.

As for control variables, Table 6 shows that LOSS is negatively related to the likelihood of substituting income-increasing REM for income-increasing AEM. Growth firms, firms reporting a loss in the prior year, firms with high-value relevance of earnings, firms with a high level of reliance on implicit claims with stakeholders, large firms, and litigious firms are less likely to substitute income-increasing REM for income-increasing AEM. Our corporate governance measures, both INSOWN and BIGAUDIT, have positive effects on the likelihood of substituting income-increasing REM for income-increasing AEM.

Additional Analysis for H1, H2, and H3

We perform several additional analyses to robustly validate our results. First, we use abnormal accruals instead of the propensity of abnormal accruals when testing H1 and find similar results in Table 7. Second, we use standardized REM instead of the indicator variable REALACT when testing H2. Our results in Table 8 show that REM increases post-SOX.[12]

Testing of H4

The results for testing H4 are presented in Table 9. The coefficient of SOX is positive and significant, suggesting that the downward forecast guidance is used more in the post-SOX period than the pre-SOX period. Income-increasing AEM is negatively associated with downward forecast guidance while income-increasing REM is positively related to downward forecast guidance. This evidence reveals that REM and downward forecast guidance serve as complements, rather than a substitute for each other. This finding is new to the literature. To the best of our knowledge, no studies document such a relation between REM and downward forecast guidance.

In our main analysis, the variable of interest is SOX. We assume that the effect of SOX remains after 2002. However, this assumption may not hold because almost 20 years have passed since SOX was enacted. Ideally, we could create a dummy variable for each year and then group each year to a specific period based on the estimated coefficient, similar to Pincus et al. (2020). However, we do not have a theory to support such a grouping method. Therefore, following both Pincus et al. (2020) and Cohen et al. (2008), we plot our key variables for the period 1994–2018 and perform visual analysis.

Figure 1 shows the plot of POSITIVE, DOWN, and REAL by year. The visual analysis shows that the percentage of firms having positive abnormal accruals decreases (POSITIVE=1) is in a declining trend. However, the percentage of downward earnings guidance (DOWN=1) has spiked for the periods 2001–2005 and 2011–2012. The standardized REM

[12] Our additional analysis for H2 has the same sample size as H1 when we use standardized REM instead of the indicator variable REALACT.

does not have a clear trend from 1994 to 2007. However, we notice that the REM has an increasing trend from 2008 to 2018, supporting H1.

Figure 2 shows the plot of POSITIVE, GUIDANCE, and REALACT by year. The visual analysis shows that GUIDANCE has a similar trend as DOWN does. The variable REALACT measures the probability of substituting income-increasing REM for income-increasing AEM. Figure 2 suggests that the two substitutions have increased post-SOX, supporting H2 and H3. Further, REALACT and GUIDANCE seem to complement each other in that they move in the same direction during most of the years from 1994 to 2018, which further supports H4.

VI. Conclusions

Income-increasing AEM, income-increasing REM, and downward forecast guidance serve as three main choices for managers to manage earnings. While prior literature has documented that both downward earnings forecast and REM can be used to substitute for AEM, how SOX affects such substitutions are unknown. We examine the impact of SOX on the trade-offs between (1) income-increasing AEM and income-increasing REM (2) AEM and downward forecast guidance. To answer some of the calls in Pincus et al. (2020), we further examine whether SOX increases or decreases the levels of positive abnormal accruals. We also examine the relation between income-increasing REM and downward forecast guidance, which is ignored by prior literature.

Using annual data from the period 1994–2018, we find evidence that in the post-SOX period, firms are less likely to use income-increasing AEM, indicating SOX serves as a constraint that mitigates AEM. Overall, we find evidence supporting a substitution effect between downward forecast guidance and income-increasing AEM, and a positive moderating effect of SOX on such substitution. We also find evidence supporting a substitution effect between income-increasing REM and income-increasing AEM, and a positive moderating effect of SOX on such substitution. Our results indicate that although SOX curbs managers' income-increasing AEM, it increases managers' propensity to engage in income-increasing REM and downward forecast guidance.

Prior research by Cohen et al. (2008) examines the trade-offs between AEM and REM. They find that firms switched from AEM methods to REM after the passage of SOX in 2002. Zang (2012) find AEM declined after the passage of SOX, while REM increased steadily. Our study extends their research by examining the possibility of using downward forecast guidance as an alternative mechanism to meet or beat analysts' expectations and its substitutes with AEM.

There are some limitations to our study. First, we acknowledge that SOX may be dated at this point and its potential practical relevance may be limited. Second, our study may not infer the impact of future regulations. We encourage future research to answer the calls in Pincus et al. (2020).

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Table 1: Sample Selection and Distribution by Year
Panel A: Sample Selection Description

Sample Selection for H1	
Initial firm-year observations with December 31 fiscal year-end from the COMPUSTAT, I/B/E/S, and CRSP databases during 1994–2018	114,743
Excluding financial institutions (SIC codes 6000–6999), utilities (SIC codes 4800–4999), and other regulated industries (SIC codes 4000–4499, and 8000 and higher)	(40,060)
Requiring each observation has complete data to estimate discretionary accruals, forecast guidance, earnings surprises, and control variables	(41,916)
Full Sample of H1	**32,767**
Requiring each firm-year either meet or beat analysts' earnings forecasts	(12,311)
Restricted Sample of H1	**20,456**
Sample Selection for H2	
Initial firm-year observations included in the full sample of H1	32,767
Limiting to firm-year observations that use either income-increasing AEM or downward forecast guidance, but not both	(15,925)
Full Sample of H2	**16,842**
Requiring each firm-year either meet or beat analysts' earnings forecasts	(6,312)
Restricted Sample of H2	**10,530**
Sample Selection for H3	
Initial firm-year observations included in the full sample of H1	32,767
Limiting to firm-years observations that use either income-increasing AEM or income-increasing REM, but not both	(18,305)
Full Sample of H3	**14,462**
Requiring each firm-year either meet or beat analysts' earnings forecasts	(5,630)
Restricted Sample of H3	**8,832**
Sample Selection for H4	
Full Sample of H4 (same as the full sample of H1)	**32,767**
Restricted Sample of H4 (same as the restricted sample of H1)	**20,456**

Panel B: Sample Distribution by Year

	Full Sample n=32,767				Restricted Sample n=20,456			
YEAR	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1994	859	2.62	859	2.62	525	2.57	525	2.57
1995	946	2.89	1,805	5.51	534	2.61	1,059	5.18
1996	1,144	3.49	2,949	9.00	717	3.51	1,776	8.68
1997	1,218	3.72	4,167	12.72	733	3.58	2,509	12.27
1998	1,249	3.81	5,416	16.53	740	3.62	3,249	15.88
1999	1,354	4.13	6,770	20.66	867	4.24	4,116	20.12
2000	1,346	4.11	8,116	24.77	759	3.71	4,875	23.83
2001	1,269	3.87	9,385	28.64	795	3.89	5,670	27.72
2002	1,298	3.96	10,683	32.60	855	4.18	6,525	31.90
2003	1,411	4.31	12,094	36.91	958	4.68	7,483	36.58
2004	1,458	4.45	13,552	41.36	936	4.58	8,419	41.16
2005	1,442	4.40	14,994	45.76	916	4.48	9,335	45.63
2006	1,422	4.34	16,416	50.10	875	4.28	10,210	49.91
2007	1,455	4.44	17,871	54.54	863	4.22	11,073	54.13
2008	1,445	4.41	19,316	58.95	749	3.66	11,822	57.79
2009	1,414	4.32	20,730	63.26	953	4.66	12,775	62.45
2010	1,401	4.28	22,131	67.54	917	4.48	13,692	66.93
2011	1,314	4.01	23,445	71.55	818	4.00	14,510	70.93
2012	1,294	3.95	24,739	75.50	806	3.94	15,316	74.87
2013	1,303	3.98	26,042	79.48	786	3.84	16,102	78.72
2014	1,321	4.03	27,363	83.51	844	4.13	16,946	82.84
2015	1,298	3.96	28,661	87.47	844	4.13	17,790	86.97
2016	1,310	4.00	29,971	91.47	847	4.14	18,637	91.11
2017	1,405	4.29	31,376	95.75	942	4.61	19,579	95.71
2018	1,391	4.25	32,767	100.00	877	4.29	20,456	100.00

Table 2: Descriptive Statistics for All Variables

Variable	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
	Full sample n=32,767			Restricted sample n=20,456		
POSITIVE	0.432	0.000	0.495	0.430	0.000	0.495
DOWN	0.550	1.000	0.498	0.559	1.000	0.496
REAL	0.553	1.000	0.497	0.530	1.000	0.499
GUIDANCE	0.615	1.000	0.487	0.625	1.000	0.484
REALACT	0.634	1.000	0.482	0.613	1.000	0.487
MTB	3.233	2.265	5.171	3.443	2.444	5.089
LOSS	0.259	0.000	0.438	0.219	0.000	0.414
EARNRET	2.936	2.000	2.501	2.911	2.000	2.475
DUR	0.494	0.000	0.500	0.503	1.000	0.500
RD	0.081	0.016	0.214	0.079	0.019	0.198
LABOR	0.620	0.676	0.251	0.636	0.694	0.244
ICLAIM	0.007	0.024	0.945	0.044	0.063	0.918
FIRMSIZE	6.642	6.557	1.997	6.896	6.817	1.931
LIT	0.392	0.000	0.488	0.410	0.000	0.492
FE	0.283	0.003	1.868	0.175	0.002	1.479
INSOWN	36.72	27.93	37.21	39.97	36.56	37.85
BIGAUDIT	0.875	1.000	0.331	0.893	1.000	0.309

Table 3: Descriptive Statistics for the Pre- and Post-SOX Periods
Panel A: Full Sample

Variable	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	t-test of mean difference
	Full Sample n=32,767						
	Pre-Sox Period n=9,385			Post-Sox Period n=23,382			
POSITIVE	0.484	0.000	0.500	0.411	0.000	0.492	<.0001
DOWN	0.550	1.000	0.498	0.550	1.000	0.498	0.943
REAL	0.561	1.000	0.496	0.550	1.000	0.498	0.0671
GUIDANCE	0.566	1.000	0.496	0.634	1.000	0.482	<.0001
REALACT	0.447	0.000	0.497	0.495	0.000	0.500	<.0001
MTB	3.259	2.256	4.929	3.223	2.269	5.265	0.5542
LOSS	0.212	0.000	0.409	0.278	0.000	0.448	<.0001
EARNRET	2.907	2.000	2.462	2.947	2.000	2.516	0.1847
DUR	0.502	1.000	0.500	0.491	0.000	0.500	0.068
RD	0.069	0.013	0.153	0.085	0.017	0.234	<.0001
LABOR	0.584	0.619	0.238	0.634	0.700	0.254	<.0001
ICLAIM	-0.068	0.004	0.896	0.037	0.030	0.962	<.0001
FIRMSIZE	6.043	5.941	1.962	6.882	6.794	1.960	<.0001
LIT	0.342	0.000	0.475	0.412	0.000	0.492	<.0001
FE	0.313	0.002	2.002	0.271	0.003	1.812	0.084
INSOWN	19.49	0.000	27.59	43.63	44.64	38.32	<.0001
BIGAUDIT	0.944	1.000	0.230	0.847	1.000	0.360	<.0001

Panel B: Restricted Sample

Variable	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	t-test of mean difference
	Restricted Sample n=20,456						
	Pre-Sox Period n=5,670			Post-Sox Period n=14,786			
POSITIVE	0.491	0.000	0.500	0.407	0.000	0.491	<.0001
DOWN	0.560	1.000	0.496	0.559	1.000	0.497	0.8379
REAL	0.545	1.000	0.498	0.525	1.000	0.499	0.0106
GUIDANCE	0.570	1.000	0.495	0.645	1.000	0.478	<.0001
REALACT	0.423	0.000	0.494	0.481	0.000	0.500	<.0001
MTB	3.576	2.473	4.885	3.392	2.429	5.164	0.0175
LOSS	0.171	0.000	0.377	0.237	0.000	0.425	<.0001
EARNRET	2.921	2.000	2.461	2.907	2.000	2.481	0.7162
DUR	0.509	1.000	0.500	0.501	1.000	0.500	0.3203
RD	0.064	0.014	0.132	0.084	0.021	0.217	<.0001
LABOR	0.588	0.624	0.237	0.654	0.720	0.244	<.0001
ICLAIM	-0.066	0.016	0.886	0.085	0.080	0.926	<.0001
FIRMSIZE	6.372	6.270	1.891	7.096	7.009	1.908	<.0001
LIT	0.344	0.000	0.475	0.435	0.000	0.496	<.0001
FE	0.161	0.001	1.472	0.181	0.002	1.481	0.4016
INSOWN	21.57	0.000	28.68	47.02	52.90	38.56	<.0001
BIGAUDIT	0.955	1.000	0.206	0.870	1.000	0.337	<.0001

Table 4: Logit Analysis of the Probability of Income-increasing AEM (H1)

	Full Sample n=32,767			Restricted Sample n=20,456		
Variable	Estimate		P Value	Estimate		P Value
Intercept	0.197	***	<.0001	0.423	***	<.0001
SOX	-0.131	***	<.0001	-0.144	***	<.0001
MTB	0.000		0.974	0.002		0.416
LOSS	0.229	***	<.0001	0.340	***	<.0001
EARNRET	0.007	*	0.057	0.010	**	0.026
ICLAIM	-0.252	***	<.0001	-0.255	***	<.0001
FIRMSIZE	-0.038	***	<.0001	-0.050	***	<.0001
LIT	-0.147	***	<.0001	-0.155	***	<.0001
FE	-0.003		0.420	0.024	***	0.000
INSOWN	-0.001	***	<.0001	-0.001	***	0.000
BIGAUDIT	-0.075	***	0.001	-0.117	***	0.000
Industry Fixed Effects	Yes			Yes		
Pseudo R-Squared	5.48%			7.50%		

***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively. In this and all following regression analyses, we correct for standard errors by clustering on firm and fiscal year.

Table 5: Logit Analysis of the Probability of Substituting Downward Forecast Guidance for Income-increasing AEM (H2)

	Full Sample n=16,842			Restricted Sample n=10,530		
Variable	Estimate		P Value	Estimate		P Value
Intercept	-0.446	***	<.0001	-0.732	***	<.0001
SOX	0.103	***	<.0001	0.128	***	0.000
MTB	0.004	**	0.039	0.002		0.432
LOSS	-0.316	***	<.0001	-0.435	***	<.0001
EARNRET	-0.007		0.185	-0.015	**	0.023
ICLAIM	0.240	***	<.0001	0.245	***	<.0001
FIRMSIZE	0.051	***	<.0001	0.058	***	<.0001
LIT	0.140	***	0.001	0.175	***	0.001
FE	-0.014	**	0.014	-0.031	***	0.001
INSOWN	0.001	*	0.058	0.000		0.580
BIGAUDIT	0.149	***	<.0001	0.187	***	<.0001
Industry Fixed Effects	Yes			Yes		
Pseudo R-Squared	8.25%			10.66%		

Table 6: Logit Analysis of the Probability of Substituting Income-increasing REM for Income-increasing AEM (H3)

	Full Sample n=14,462			Restricted Sample n=8,832		
Variable	Estimate		P Value	Estimate		P Value
Intercept	0.885	***	<.0001	0.751	***	<.0001
SOX	0.211	***	<.0001	0.219	***	<.0001
MTB	-0.018	***	<.0001	-0.026	***	<.0001
LOSS	-0.239	***	<.0001	-0.345	***	<.0001
EARNRET	-0.012	**	0.021	-0.019	***	0.007
ICLAIM	-0.079	***	0.002	-0.079	**	0.018
FIRMSIZE	-0.027	***	0.000	-0.018	*	0.055
LIT	-0.652	***	<.0001	-0.787	***	<.0001
FE	0.012	**	0.030	-0.009		0.321
INSOWN	0.002	***	<.0001	0.003	***	<.0001
BIGAUDIT	0.121	***	0.001	0.210	***	<.0001
Industry Fixed Effects	Yes			Yes		
Pseudo R-Squared	10.79%			14.71%		

Table 7: Additional Analysis for H1 using the Magnitude of Discretionary Accruals

	Full Sample n=32,767			Restricted Sample n=20,456		
Variable	Estimate		P Value	Estimate		P Value
Intercept	-0.017	***	0.001	0.006		0.378
SOX	-0.005	***	0.003	-0.006	***	0.005
MTB	0.000		0.457	0.000		0.992
LOSS	0.016	***	<.0001	0.025	***	<.0001
EARNRET	0.001	***	0.000	0.002	***	<.0001
ICLAIM	-0.018	***	<.0001	-0.016	***	<.0001
FIRMSIZE	-0.001	***	0.002	-0.004	***	<.0001
LIT	-0.014	***	<.0001	-0.018	***	<.0001
FE	-0.001	*	0.087	0.003	***	0.001
INSOWN	0.000	***	0.002	0.000	***	0.004
BIGAUDIT	-0.008	***	0.002	-0.013	***	0.000
Industry Fixed Effects	Yes			Yes		
Adj. R-Squared	2.68%			4.53%		

Table 8: Additional Analysis for H2 using the Magnitude of Standardized REM

	Full Sample n=32,767			Restricted Sample n=20,456		
Variable	Estimate		P Value	Estimate		P Value
Intercept	0.097		0.138	0.176	*	0.071
SOX	0.144	***	<.0001	0.115	***	<.0001
MTB	-0.024	***	<.0001	-0.030	***	<.0001
LOSS	-0.083	***	0.000	-0.095	***	0.003
EARNRET	-0.004		0.287	-0.013	**	0.011
ICLAIM	-0.289	***	<.0001	-0.263	***	<.0001
FIRMSIZE	-0.060	***	<.0001	-0.050	***	<.0001
LIT	-0.928	***	<.0001	-1.041	***	<.0001
FE	0.027	***	<.0001	0.039	***	0.003
INSOWN	0.000		0.172	0.000		0.116
BIGAUDIT	0.037		0.337	0.049		0.421
Industry Fixed Effects	Yes			Yes		
Adj. R-Squared	9.58%			10.38%		

Table 9: Analysis of Relation among Downward Forecast Guidance, Income-increasing REM, and Income-increasing AEM (H4)

	Full Sample n=32,767			Restricted Sample n=20,456		
Variable	Estimate		P Value	Estimate		P Value
Intercept	-0.189	***	0.000	-0.204	***	0.001
SOX	0.079	***	<.0001	0.102	***	<.0001
REAL	0.040	***	0.008	0.040	**	0.039
POSITIVE	-0.048	***	0.001	-0.042	**	0.022
MTB	0.004	***	0.004	0.004	**	0.017
LOSS	-0.108	***	<.0001	-0.120	***	<.0001
EARNRET	-0.003		0.336	-0.009	**	0.041
ICLAIM	-0.005		0.765	0.000		0.998
FIRMSIZE	0.012	***	0.006	0.007		0.196
LIT	0.009		0.744	0.035		0.330
FE	-0.018	***	<.0001	-0.012	*	0.066
INSOWN	0.000		0.198	-0.001	**	0.012
BIGAUDIT	0.080	***	0.000	0.073	**	0.015
Industry Fixed Effects	Yes			Yes		
Pseudo R-Squared	4.03%			4.54%		

Figure 1: The Probability of Income-increasing AEM (POSITIVE), Income-increasing REM (REAL), and Downward Forecast Guidance (DOWN) by Year

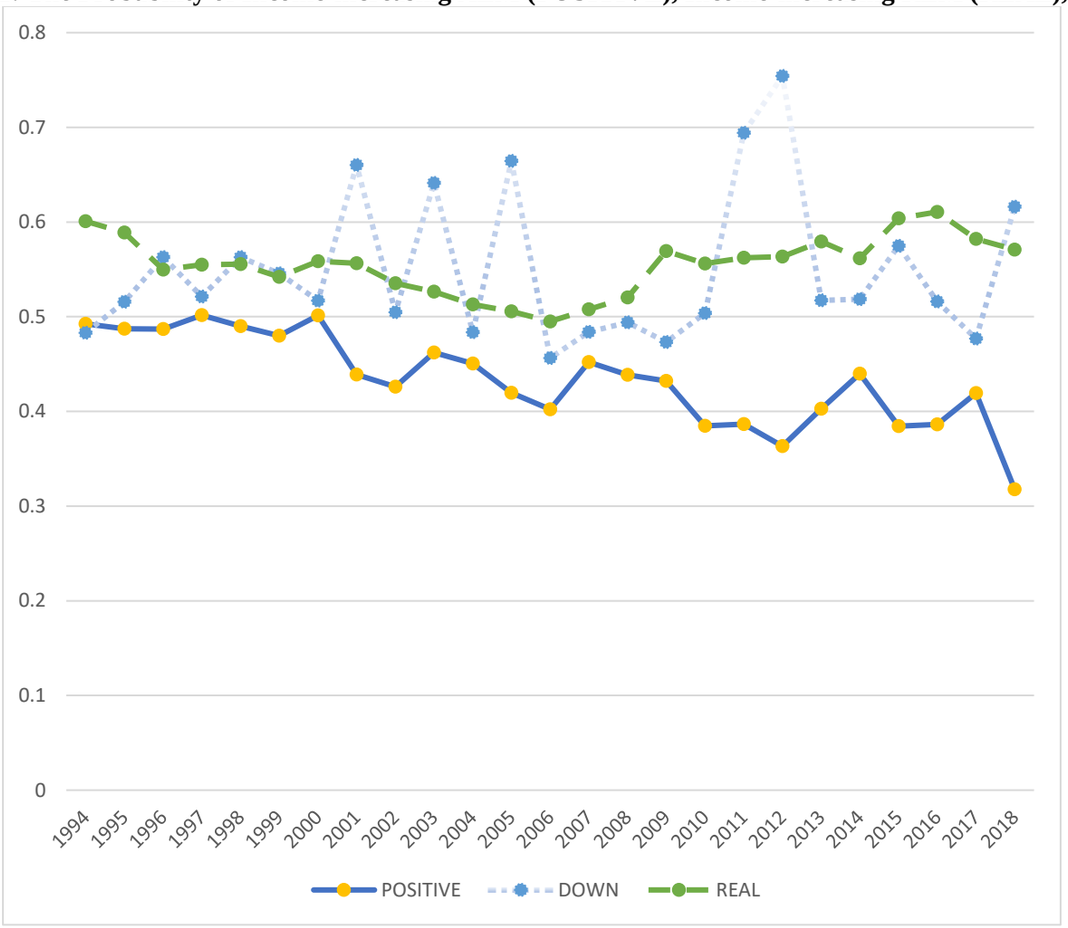
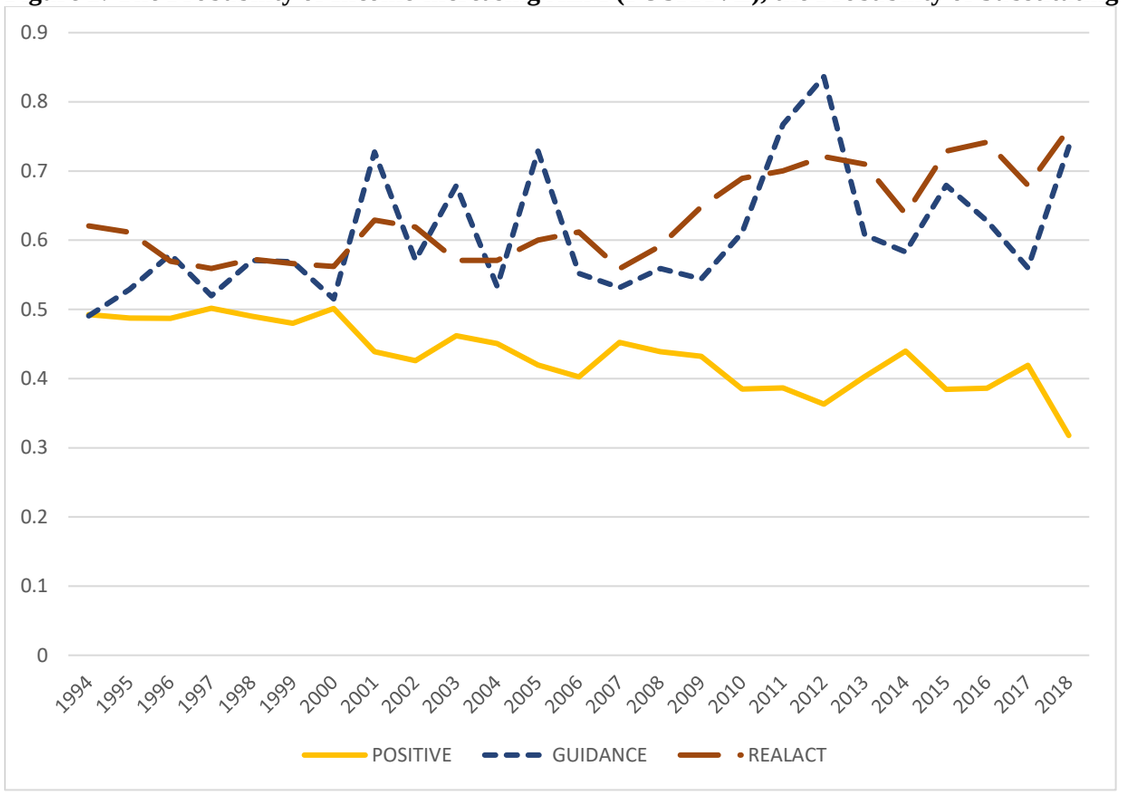


Figure 2: The Probability of Income-increasing AEM (POSITIVE), the Probability of Substituting Income-increasing REM (REALACT) for Income-increasing AEM (POSITIVE), and the Probability of



Substituting Downward Forecast Guidance Substitution for Income-increasing AEM (GUIDANCE) by Year

Appendix: Variable Definition

Main Variables	DOWN	An indicator variable equals to 1 if the last published median forecast is less than the expected analysts' forecast, and 0 otherwise.
	GUIDANCE	An indicator variable equals to 1 when a firm-year exhibits only downward forecast guidance (DOWN=1), but not income-increasing AEM (POSITIVE=0). It equals to 0 when a firm-year exhibits only income-increasing AEM (POSITIVE =1), but not downward forecast guidance (DOWN=0).
	POSITIVE	An indicator variable equals to 1 for firm-years with positive abnormal accruals and 0 otherwise.
	REAL	An indicator variable equals to 1 if a firm-year engages in real activities manipulation by either reporting a lower cost of goods sold through increased production or reducing advertising, R&D, and SG&A expenses, and 0 otherwise.
	REALACT	An indicator variable equals to 1 when a firm-year exhibits only income-increasing REM (REAL=1), but not income-increasing AEM (POSITIVE=0). It equals to 0 when a firm-year exhibits only income-increasing AEM (POSITIVE=1), but not income-increasing REM (REAL=0).
	SOX	An indicator variable equals to 1 for firm-years after the passage of SOX (2002 and thereafter), and 0 otherwise.
Control Variables and other variables	BIGAUDIT	An indicator variable equals to 1 if the auditor is one of the Big 4/5 auditors, and 0 otherwise.
	DUR	An indicator variable for membership in a durable goods industry, which equals to 1 if the three-SIC code of a firm is among150–179, 245, 250–259, 283, 301, and 324–399), and 0 otherwise.
	EARNCRET	The cumulated excess daily return from three days after the previous year t-1 earnings announcement date to three days after this year t earnings announcement date is regressed on the change in earnings per share from previous year t-1 to year t, scaled by price per share at the end of year t-1. Then the annual decile rank of the two-digit SIC code industry's R-square is used to measure EARNCRET.
	FE	The absolute value of the forecast error deflated by price at the end of prior year t-1.
	FIRMSIZE	The log of the market value of equity in year t.
	ICLAIM	A measure of reliance on implicit claims based on a factor analysis of three variables: membership in a durable goods industry, R&D expense, and labor intensity (Bowen et al., 1995; Matsumoto, 2002).
	INSOWN	Institutional ownership in year t.
	LABOR	A measure of labor intensity, which equals one minus the ratio of gross property, plant, and equipment to total gross assets.
	LIT	An industry dummy variable to identify firms in high-risk industries: SIC codes 2833–

		2836 (biotechnology), 3570–3577 and 7370–7374 (computers), 3600–3674 (electronics), and 5200–5961 (retailing).
	LOSS	An indicator variable equals 1 if a firm reports a loss before extraordinary items in the previous year, and 0 otherwise.
	MTB	Market-to-book ratio in year t.
	RD	Research and Development expenditures scaled by total assets.