

Bias in Quarterly Estimates of Annual Effective Tax Rates and Earnings Management

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Abstract

We investigate whether quarterly annual effective tax rate (ETR) estimates are systematically biased in comparison to year-end actual ETRs. We find that estimated annual ETRs in the first, second, and third quarters are systematically higher than year-end ETRs. We then investigate whether firms' overstatement of quarterly ETRs creates slack that is used for earnings management. We find that quarterly ETR increases are more likely to be reversed when firms would have missed their analysts' earnings forecast absent the reversal. Finally, we show that in the years subsequent to the passage of the Sarbanes-Oxley Act (SOX) the changes in the ETR are more highly associated with earnings management. These results documenting patterns of annual ETR estimates and revisions contribute to research about how earnings management is accomplished.

JEL classification: H25; M41

Keywords: Earnings Management; Effective Tax Rates; Quarterly Earnings

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Abstract

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1.0. Introduction

We investigate whether quarterly (quarters one to three) estimates of annual effective tax rates (ETRs) are biased upwards. Upwardly biased ETR estimates create hidden reserves (i.e., slack) for managers to use in later periods for earnings management, whether that was management's original intention or not. If quarterly ETR estimates are biased upwards, then positive quarterly ETR changes should be more highly associated with subsequent ETR reversals than are negative quarterly ETR changes. Consequently, we provide evidence of both bias and an asymmetric association between quarterly ETR estimates and subsequent reversals. We then investigate whether reversals of positive quarterly annual ETR estimates are larger when firms would otherwise fail to meet analyst earnings forecasts, consistent with earnings management. Our paper provides evidence on the use of ETR estimates as a source of the financial flexibility needed to manage earnings, consistent with Healy and Whalen (1999) and Schipper's (1989) call for additional research concerning how earnings are managed.

Quarterly ETR reporting provides a powerful context to study the effect of management estimates on earnings management because Accounting Principles Board Opinion No. 28 (APB 28) requires firms to use estimates of the annual ETR in their quarterly earnings computations.¹ Further, interim financial reporting may provide an opportunity for intra-period earnings management because auditors do not audit interim financial reports.² Although both contracting

¹ Changes in interim filing requirements by the SEC highlight the importance of interim financial statements as a source of capital market information. For example, large filers must accelerate their SEC filings. For filings made on or after December 15, 2005, annual reports are due within 60 days of the fiscal year-end and quarterly reports are due within 35 days of quarter-end for large filers (over \$75 million of market capitalization) (<http://www.sec.gov/rules/final/33-8128.htm>). Other changes include a requirement that interim disclosures be included in 10-Ks (only large companies formerly had to provide these disclosures) and that for quarters ending on or after March 15, 2000, interim financials must be reviewed by auditors for compliance with GAAP (Regulation S-X, Article 0-01(d)).

² The auditors merely perform a review of the financial information in interim financial reports (and not an audit) and thus auditors do not have a basis for expressing an opinion on interim reports (Statement of Auditing Standards (SAS) 100, *Interim Financial Information*).

and benchmark studies of earnings management investigate cross-sectional evidence of upward and downward earnings management, there has been no research on how annual ETRs (or other costs subject to interim estimates) are allocated over the four quarters of the year and how this relates to earnings management.

Our paper contributes to the earnings management literature by testing whether 1) quarterly ETR estimates are biased upwards (it is extremely rare for an ETR revision to cause a firm to miss its quarterly analyst earnings forecast), creating slack that can be used to manage earnings in subsequent quarters and 2) this slack is used to increase income in quarters when firms would have otherwise missed their analyst forecasts. Our paper also contributes to the quarterly earnings management literature by examining how a specific accrual contributes to quarterly earnings management.³ Finally, we contribute to the literature on the effect of the integral method on interim financial reporting by examining whether a specific estimate made by managers under the integral method shows evidence of intra-year earnings management.⁴

We also extend prior research on the specific use of ETRs for earnings management by considering a longer sample period and other interim quarters. Dhaliwal, Gleason, and Mills (2004) find that fourth quarter ETRs are lowered to help firms beat analysts' forecasts. Cook, Huston, and Omer (2008) corroborate this finding and extend it to investigate the role of tax planning in ETR choices. We provide evidence that these fourth quarter revisions are associated with prior quarter overstatements of expected annual ETRs. We also show that prior quarter overstatements of ETRs are associated with larger ETR revisions in later quarters when firms

³ In contrast, studies like Brown and Piniello (2007) and Das, Shroff, and Zhang (2007) investigate summary measures like discretionary accruals and earnings reversals.

⁴ Prior research (Rangan and Sloan 1998), focused on the effect of the integral method on the persistence of quarterly earnings. We consider that the judgment involved in constructing integral method estimates also permits opportunism.

face earnings management incentives. Our research complements recent research on the capital market effects of ETR changes (Schmidt 2006, Gleason and Mills 2008).

Finally, our paper contributes to research on the Sarbanes-Oxley Act (SOX), which was enacted by Congress in July of 2002. SOX was the legislative response to the numerous accounting scandals of the early 2000s, and its purpose was to increase investor confidence in the quality of financial statements following scandals such as Enron and WorldCom. Cohen, Dey and Lys (2008) find that earnings management using accruals was significantly lower after the passage of SOX while real earnings management was higher. We extend this research by investigating whether the use of the quarterly ETR is a substitute for accrual-based pre-tax earnings management subsequent to SOX. Cook et al. (2008) find little change in fourth quarter earnings management using the ETR subsequent to SOX. In contrast to Cook et al. (2008), we investigate quarterly earnings management using the ETR across quarters two through four and using a broader sample with more quarters of data. Like Cook et al. (2008), we find no difference in fourth quarter earnings management when firms do not create ETR slack in the third quarter.

We find that observed quarterly patterns of estimated annual ETRs are consistently biased upwards and that the resulting slack is associated with earnings management in later quarters.⁵ Specifically, we find that annual ETR estimates for quarters one to three are higher on average than the actual annual ETRs at either the prior or the current year-end. In addition, we find that ETR reversals tend to occur when firms would miss their quarterly analysts' forecasts without a decrease in tax expense. Unlike Cook et al. (2008), we find earnings management through the ETR is more highly associated with slack subsequent to SOX in quarters two, three

⁵ Quarterly ETR estimates are significantly different from the both the fourth quarter actual ETR of the current year and the prior year fourth quarter actual ETR, consistent with managers building slack into their estimates. If these differences are due to random error, we would be unlikely to find significant results in the statistical tests that we employ later in the paper.

and four as well. Overall, our findings complement research efforts to understand the limits of multi-year earnings management to show how flexible accounts like the provision for income taxes permit firms to manage earnings within a year.

The remainder of the study proceeds as follows: Section 2 provides background information on how the integral method applies to the provision for income taxes and reviews the research in tax-related earnings management. We summarize our discussion with specific hypotheses. Section 3 presents the research design and describes the sample. Section 4 presents results and interprets the evidence, and Section 5 concludes.

2.0. Overview, Literature Review, and Hypotheses

2.1. Background on the Use of ETRs for Interim Reporting

Interim reporting refers to financial reporting for periods shorter than one year. Since 1970, the SEC has required firms subject to its periodic reporting requirements to file quarterly condensed financial information on either Form 10Q or Form 10QSB. In 1973, the FASB issued APB Opinion No. 28 (APB 28): *Interim Financial Reporting*, which established GAAP for firms issuing interim financial statements. An issue that arises with interim reporting is how to determine expenses (such as income tax expense) in the first three quarters when the true amount will not be known until the end of the year. In general, APB 28 requires firms to use the integral approach to determine these amounts. Under the integral approach, firms should estimate the annual expense and apply the expense to each quarter on a pro-rata basis.

Using the integral method, firms compute the quarterly provision for income taxes by estimating the ETR that managers expect to be applicable for the full fiscal year. The estimated annual ETR should reflect anticipated tax credits, foreign tax rates, percentage depletion, capital gains rates, and other available tax planning alternatives (FASB Interpretation No. 18, 1977 ¶18).

Firms then apply the estimated annual ETR to ordinary income to determine the year-to-date tax expense.⁶ Managers record the difference between the year-to-date provision for the current quarter and the year-to-date provision for the prior quarter as the current quarter provision for income taxes.

Thus, the current period provision for income taxes reflects both expected tax expense and expected earnings. In addition, changes in expected taxes and earnings relative to prior interim periods affect the current period provision. Management discretion over quarterly tax expense comes primarily via estimates of expected annual ETRs that are used to determine the ETR applied in a given quarter.

2.2. *Earnings Management and ETRs*

In their commentary on earnings management, Dechow and Skinner (2000) conclude that “managers have strong incentives to ‘beat benchmarks,’ implying that firms just beating benchmarks are potentially more likely to be engaging in earnings management.” Investors typically use three thresholds to benchmark firms’ quarterly earnings – meeting or beating analyst forecasts, avoiding losses, and avoiding earnings decreases. Early benchmark research identified and explored the avoidance of either losses or earnings decreases.⁷ However, beginning in the mid-1990s, managers’ focus shifted to meeting or beating analysts’ expectations.⁸

⁶ The FASB does not use ordinary income in the income tax context of ordinary income and capital gains. Instead, the FASB defines ordinary income as pretax income before significant unusual or infrequent items, extraordinary items, discontinued operations, and cumulative effects of changes in accounting principles (FASB Interpretation No. 18, 1977, ¶9).

⁷ Hayn (1995) and Burgstahler and Dichev (1997) document discontinuities around zero earnings and zero earnings changes. Barth, Elliott, and Finn (1999) find that firms are rewarded for a consistent string of earnings increases. We do not examine these two benchmarks, which other earnings management research investigates (Myers, Myers and Skinner 2007) or critiques (Beaver, McNichols, and Nelson 2007).

⁸ Burgstahler and Eames (2006) find evidence that firms are more likely to meet or just beat analysts’ forecasted earnings than they are to just miss analysts forecasted earnings. Consistent with analysts’ forecasts assuming more

Brown and Caylor (2003) show that meeting or beating analyst forecasts is associated with higher returns than is avoiding losses or earnings decreases. Similarly, other research documents market rewards for firms that beat forecasts, including abnormal returns at the earnings announcement date (Bartov, Givoly, and Hayn 2002; Lopez and Rees 2002), premiums to the firm's share price (Kasznik and McNichols 2002; Dopuch, Seethamraju, and Xu 2008), and reductions in the firm's cost of debt (Jiang 2008).⁹ In addition, managers have been found to have personal incentives to meet or beat forecasts. For example, McVay, Nagar, and Tang (2006) document that managing earnings to beat thresholds enables managers to sell their stock at a higher price. Overall, managers of firms with earnings near analysts' expectations likely have incentives to manage earnings to beat the benchmark.¹⁰ However, sophisticated investors temper these incentives to some degree. Bartov et al. (2002) show that the announcement period abnormal returns of firms that beat the forecast through earnings or expectations management are lower than those of firms that do not engage in such behavior. Gleason and Mills (2008) show this discount is substantial for beating the forecast through fourth quarter ETR decreases. We examine whether firms decrease their quarterly income tax expenses estimated using the integral method when they would miss the analyst forecast absent such a decrease.¹¹

importance, the frequency of firms just beating the forecast has increased in the 1990s (Brown 2001, Matsumoto 2002).

⁹ Bartov et al. (2002) investigate whether there is a premium to meeting or beating analysts' forecasts of earnings (after controlling for the forecast error) and whether that premium (if any) is impacted by any earnings or expectations management. Bartov et al. (2002) find that firms that beat analysts' forecasts earn abnormal returns at the earnings announcement and that these abnormal returns do not reverse subsequently. In addition, they find that firms that beat analysts' forecasts through earnings or expectations management also earn abnormal returns at the earnings announcement, although the abnormal returns are lower than those of firms that do not engage in such behavior. Firms that beat forecasts also have higher earnings response coefficients (Lopez and Rees 2002). Kasznik and McNichols (2002) find firms that meet or beat analysts' expectations for at least two years are rewarded with higher share prices. In addition, Kasznik and McNichols (2002) find firms that meet or beat expectations over three years have a higher premium than firms that only do so only twice.

¹⁰ See also Abarbanell and Lehavy (2002), who report that firms receiving buy recommendations from analysts are more likely to engage in earnings management to meet or just beat analysts' forecasts.

¹¹ Managers are motivated to meet or beat analyst earnings expectations primarily because of capital market incentives, but other reputational effects with stakeholders, contracting, and career concerns also provide incentives

There is a body of research that examines how specific accruals contribute to earnings management; however, these studies often focus on accounts that are unique to particular industries.¹² Like Dhaliwal et al. (2004) and Cook et al. (2008), we consider total tax expense because this account is material for a broad set of firms and because it contains the necessary discretion to generate information asymmetry between managers and market participants. The tax accounts provide information about earnings in two distinct ways. First, total tax expense directly affects net income. This effect is the primary focus of our paper. Second, the computation of deferred tax expense, which is a component of total tax expense, provides information about accruals in pretax earnings.¹³ This second stream of research, while receiving relatively recent attention in the earnings quality literature, is generally unrelated to our research setting.

The interim reporting requirements for ETR estimation in quarterly earnings reporting provide a unique research setting. First, under APB Opinion No. 28 (APB 1973), a firm must "make its best estimate of the ETR expected to be applicable for the full fiscal year. The rate so determined should be used in providing for income taxes on income for the quarter." Thus, the year-to-date ETR in quarters one through three is a management projection of the year-end ETR. Second, changes in the ETR have a significant impact on reported earnings (Bauman and Shaw 2005). Finally, because estimating tax expense is complex (Plumlee 2003) and involves

(Graham, Harvey, and Rajgopal 2006). These incentives to meet or beat analyst earnings forecasts have intensified recently as analysts have taken a more prominent role in the functioning of capital markets. Brown and Caylor (2005) document a significant recent increase in the number of analysts, the number of firms followed by analysts, the amount of media attention paid to analyst forecasts, and the accuracy and precision of analyst forecasts.

¹² Specific accruals examined for earnings management include bad-debt expense (Teoh, Wong, and Rao 1998), and industry-specific accruals such as loan-loss provisions (Beaver, Eger, Ryan, and Wolfson 1989, Wahlen 1994) and claim loss reserves (Petroni 1992; Beaver and McNichols 1998; Nelson 2000; Beatty, Ke, and Petroni 2002).

¹³ Phillips, Pincus, and Rego (2003), Joos, Pratt, and Young (2003), and Phillips, Pincus, Rego, and Wan (2004) position the deferred tax expense as providing an alternative measure of pre-tax discretionary accruals. Hanlon (2005) uses deferred tax expense to impute temporary book-tax differences to determine whether firms with large differences have lower earnings persistence, and hence reflect on earnings quality. Ayers, Jiang and LaPlante (2009) find that implied taxable income is more informative for future earnings when current earnings are low quality.

judgment (Gleason and Mills 2002), the income tax expense estimate creates information asymmetry between financial statement users and managers. Previous research provides evidence that even sophisticated users of financial statements have difficulty interpreting the effects of ETR changes. For example, Plumlee (2003) finds that analysts do not make sophisticated predictions concerning the effects of tax law changes suggesting that investors may have difficulty determining whether ETR changes reflect earnings management. Further, Bauman and Shaw (2005) provide evidence that analysts fail to incorporate the effects of large ETR decreases into their forecasts. Finally, tax accounts are ripe for small manipulations -- existing research describes the technical aspects of the tax account (valuation allowances, deferred taxes on foreign income, and tax cushion) that make it so.¹⁴ Thus, managers can use changes in tax expense or, equivalently, in the ETR (tax expense divided by pretax income), to opportunistically affect net income.

Dhaliwal et al. (2004) and Cook et al. (2008) demonstrate that fourth quarter ETR changes are associated with achieving analysts' earnings targets when earnings absent tax rate changes would miss the target. Schmidt (2006) refines and extends Lipe (1986), Lev and Thiagarajan (1993), and Abarbanell and Bushee (1997) to determine if ETR-related earnings changes are persistent.¹⁵ Schmidt (2006) finds that initial tax changes (Q1) are more permanent (less transitory) than revised tax changes (Q2 – Q4). The more transitory nature of ETR-related earnings changes late in the year is consistent with Dhaliwal et al.'s (2004) assertion that fourth quarter ETR changes can represent earnings management.

¹⁴ Other literature examines specific tax contexts that apply only to subsets of the population, including valuation allowances (Miller and Skinner 1998, Visvanathan 1998, Schrand and Wong 2003, Burgstahler, Elliot, and Hanlon 2002, Frank and Rego 2006) and permanently reinvested foreign earnings (Collins, Hand, and Shackelford 2000, Krull 2004).

¹⁵ Additionally, Bryant-Kutcher, Guenther, and Jones (2010) show that the persistence of ETR-related earnings is increasing in both the persistence of the firm's ETR and the firm's pre-tax earnings.

However, Dhaliwal et al. (2004) do not answer the question of how companies establish the financial flexibility for year-end earnings management. Findings in Schmidt (2006) indicate that initial tax changes contain transitory elements, which suggests that management could set the estimated annual ETR in the first quarter opportunistically.¹⁶ Consequently, we investigate whether bias in the estimated annual ETR is related to earnings management.

2.3. Hypotheses

To summarize the above discussion, our research question is whether managers systematically overstate quarterly ETRs, creating slack that can be used to meet targets. We formalize this broad question with specific hypotheses. First, we explore managers' incentives to overstate the quarterly ETR. Beginning with the first quarter earnings release, managers record interim tax expense based on their best estimate of the annual ETR during every quarter. The choice of when and how much to revise ETRs for interim reporting is largely under management's discretion. Managers frequently revise these interim estimates of the annual ETR in subsequent quarters, which affects net income for that quarter. Interim estimates of the annual ETR that are too high will likely lead to subsequent revisions that increase earnings. In contrast, ETR estimates that are too low would likely lead to subsequent revisions that decrease earnings. Accordingly, we expect managers who care about meeting future earnings expectations will be pessimistic when making their interim ETR estimates so that any revisions will make it easier to meet earnings expectations later in the year.

¹⁶ Schmidt (2006) hypothesizes that initial tax changes (*INTCC*) will be more persistent and have greater forecasting ability than revised tax changes (*REVTCC*) primarily because *INTCC* is more likely to incorporate anticipated tax planning activities (which are likely to be more permanent) relative to *REVTCC*, which is more likely to reflect responses to earnings management incentives (which are likely to be more transitory). However, neither component is expected to be perfectly persistent or perfectly transitory. Schmidt's (2006) finding of a coefficient on *INTCC* less than one in the forecasting model indicates that *INTCC* contains some transitory effects.

An alternative incentive is that managers prefer to make conservative (income-decreasing) estimates in quarters one to three so that they will not be forced to take an unexpected hit to earnings in the fourth quarter. In any case, whether managers systematically overstate the quarterly ETR to purposefully create slack or slack is merely a by-product of conservative estimates, slack facilitates earnings management using the ETR. Therefore, we investigate whether interim ETR estimates are greater than the ETRs realized at the fiscal year-end. We will conclude that bias exists if quarterly ETR estimates consistently exceed ETRs realized at year-end.¹⁷ Our first hypothesis is stated as follows:

H₁: Managers bias their quarterly ETR estimates upwards.

We contend that the discretion inherent in the application of the integral method of quarterly reporting coupled with capital market incentives to meet or beat earnings targets make quarterly tax expense a likely vehicle for earnings management. We specifically investigate whether income-increasing changes in ETRs occur when firms would otherwise miss their quarterly analyst earnings forecasts by calculating an “as-if” analyst forecast (calculated by backing out the effect of the change in the ETR from analyst forecast errors). Absent earnings management incentives, one would not expect an association between the “as-if” forecast errors and changes in the ETR. Our tests extend the finding in Dhaliwal et al. (2004) to the second and third quarters. Our second hypothesis states that:

¹⁷ Although we use the year-end ETR as our primary test of bias, for purposes of considering whether slack is reversed, we use the prior year actual ETR to avoid inducing a reversal. We note that ETR changes could occur simply due to changes in pretax earnings, if permanent differences and tax credits do not change. For example, if permanent differences reduce taxable income, then a decrease in pretax earnings will mechanically decrease the ETR. Dhaliwal et al. (2004) and Gleason and Mills (2008) introduced a control for this induced change with no effect and learned that the mechanical portion was immaterial to ETR changes.

H₂: Quarterly changes in ETRs will be more negative when “as-if” analyst forecast errors (computed using the prior quarter effective tax rate) are negative.

If bias in quarterly ETRs builds in slack for earnings management, then reversals should come out of that slack (i.e., utilizing the cookie jar). Accordingly, we investigate whether ETR revisions are associated with both prior increases in the quarterly ETR and incentives to raise earnings to meet targets. Our third hypothesis states that:

H₃: Quarterly changes in ETRs associated with negative “as-if” forecast errors will be more negative when there is slack in the prior quarter ETR change`.

Finally, we consider whether ETR reversals are more or less associated with earnings management subsequent to SOX. A primary purpose of SOX was to reduce earnings management. However, Cohen et al. (2008) document that accrual-based earnings management declined subsequent to SOX while real earnings management activities increased. Accordingly, we investigate whether ETR revisions are differently associated with both the level of the quarterly ETR and incentives to raise earnings to meet targets both before and after SOX. We state our fourth hypothesis in the null form due to the mixed prior evidence:

H₄: Quarterly changes in ETRs associated with negative “as-if” forecast errors will be no different before and after SOX.

3.0. Research Design

3.1. *Measuring Effective Tax Rates*

Our research design depends on how the ETR affects earnings. Thus, we precede our discussion of the models by defining tax-related variables. We measure a firm’s ETR as:

$$ETR_t = \frac{IncomeTaxExpense_t}{PTE_t} \quad (1)$$

where *IncomeTaxExpense* is total tax expense and *PTE* is pretax earnings. Following Schmidt (2006), we use the interim reporting requirements prescribed by APB Opinion No. 28 and FASB Interpretation No. 18 to decompose the annual ETR change ($ETR_t - ETR_{t-1}$) into an initial ($I\Delta ETR_t = ETRQ1_t - ETR_{t-1}$) and a revised portion ($R\Delta ETR_t = ETR_t - ETRQ1_t$), as well as separate quarterly changes ($Q12\Delta ETR_t$, $Q23\Delta ETR_t$, and $Q34\Delta ETR_t$). In accordance with APB Opinion No. 28, $ETRQ1_t$ represents management's first quarter estimate of the ETR that is expected to be applicable for the full fiscal year.

3.2. Model Development

3.2.1. Tests of whether managers build earnings management slack into quarterly ETRs

We start by examining the univariate patterns of levels and changes in ETRs for the full sample. If managers upwardly bias their ETR estimates, then quarterly estimates will exceed the year-end realizations (H_1). To test H_1 , we compare quarterly ETR estimates to the year-end realizations. Any systematic difference between ETR estimates in the interim quarters and the actual ETR at the end of the current year we attribute to bias. An alternative test substitutes the ETR from the previous year instead of the current year. This comparison assumes that the prior year's actual ETR is the best estimate for the current year's ETR. Our results are similar using either the current or the prior year actual ETR. If managers are providing biased estimates, quarterly ETRs will exceed year-end ETRs (e.g., $ETRQ1_t > ETR_t$) on average. A further implication would be that quarterly ETR increases reverse more than quarterly ETR decreases.

3.2.2. Tests of whether ETR revisions are associated with earnings management.

To test the significance of the association between ETRs and earnings management incentives, we examine whether changes in ETRs in Q2, Q3, or Q4 are associated with incentives to meet or beat analyst forecasts. In addition, we examine whether firms are more likely to reverse ETRs in Q2, Q3, or Q4 for earnings management when they build slack into their quarterly estimates. We estimate the following regression:

$$\begin{aligned} \Delta ETR_{itq} = & \delta_0 + \delta_1 ETR_{itq-1} + \delta_2 EM_{itq} + \delta_3 EM_{itq} * SOX_{itq} + \delta_4 SLACK_{itq-1} + \delta_5 SLACK_{itq-1} * SOX_{itq} \\ & + \delta_6 SLACK_{itq-1} * EM_{itq} + \delta_7 SLACK_{itq-1} * EM_{itq} * SOX_{itq} + \varepsilon_{itq} \end{aligned} \quad (2)$$

where:

- ΔETR_{itq} = the change in the quarterly estimate of the annual ETR [$ETR_{itq} - ETR_{itq-1}$].
- ETR_{itq-1} = the estimated annual ETR from the previous quarter.
- EM_{itq} = a dummy variable that takes the value of one if a firm would have missed the consensus quarterly analysts' forecast (constructed using the *I/B/E/S Detail File*) using the ETR from the same quarter of the previous year, zero otherwise.
- $SLACK_{itq-1}$ = a dummy variable that takes the value of one if the prior quarterly ETR change was > 0 , zero otherwise.
- SOX_{itq} = a dummy variable with a value of one subsequent to SOX, zero otherwise.

We measure our dependent variable as the change in the ETR.¹⁸ We include lagged ETRs as a control to capture any effects that the magnitude of the previous quarter ETR has on our results. We expect, consistent with earnings management, that reductions in the level of the ETR will be more likely when a firm would have missed its quarterly earnings forecast without a decrease in tax expense. Therefore, we include EM to capture the incentive to meet or beat analyst forecasts using the last *I/B/E/S* quarterly forecast issued before the quarterly earnings report date as our measure of the earnings threshold.¹⁹ EM is a dummy variable that is equal to

¹⁸ This change includes both discretionary (unexpected) and nondiscretionary (expected) changes in the effective tax rate. We would prefer our dependent variable to measure only unexpected changes in the effective tax rate, but we cannot directly observe the unexpected component of this change.

¹⁹ The inferences from our tests are unchanged if we substitute the mean analyst forecast for the last analyst forecast as our measure of the earnings threshold.

one when the analyst forecast error is negative absent a change from the ETR of the same quarter of the previous year.²⁰ Based on our earnings management hypothesis (H₂), we predict that firms with quarterly earnings that otherwise would be below the consensus analyst forecast (i.e., $EM = 1$) will make income-increasing ETR changes ($\delta_2 < 0$).

We include a dummy variable for firms with slack (*SLACK*) in their quarterly ETR changes, which we interact with *EM*. We define slack as a dummy variable with a value of 1 if a firm had a positive ETR change in the prior quarter. Our third hypothesis (H₃) is that the coefficient on the interaction between the earnings management variable and firms with slack in their ETR estimates (δ_6) should be negative and significant. This test directly ties quarterly estimates of ETRs to earnings management through the use of slack.²¹

Finally, we include a dummy variable that equals one for quarters subsequent to SOX, which we interact with *EM* and *SLACK*. Our final hypothesis (H₄) is posed in the null form. We predict that the sum of the coefficients on post-SOX earnings management (δ_3) and the coefficient of the interaction between post-SOX earnings management and post-SOX slack in ETR estimates (δ_7) will not be significantly different from zero. Testing whether $(\delta_3 + \delta_7)$ differs from zero provides evidence concerning post-SOX earnings management.

²⁰ Our results are robust to using the change from the previous quarterly ETR to determine *EM*. However, we report the results using the change from the prior year ETR for the same quarter since we already have the level of the prior quarter ETR as a control variable in our model. Either measure, however, prevents an induced relationship because we use a pre-existing benchmark.

²¹ In untabulated results, we include the change in pre-tax earnings in our model. The change in pre-tax earnings controls for incentives to change the quarterly tax provision to smooth earnings to achieve increasing earnings, which Myers, Myers, and Skinner (2007) document. Unexpected changes in pretax earnings will cause an induced change in the ETR because the change in income alters the proportion of permanent differences in pretax book income, in addition to the tax effect of income relative to tax credits (Dhaliwal et al. 2004). Our results are insensitive to the addition of this control to our model.

3.3. *Sample Selection Procedures and Sample Profile*

We conduct our tests using a sample of U.S. firms between 1987 and 2008 with available annual and quarterly data on *Compustat* and *I/B/E/S* (1987 was the earliest date the *Compustat Unrestated Quarterly* data was available).²² Table 1 summarizes the sample selection process. First, we begin with all U.S. *Compustat* firm-quarters with data available from the *Compustat Unrestated Quarterly Database* and we combine them into annual observations (217,147 observations) while preserving the details of the quarterly results. We drop 56,250 observations that lack quarterly ETR data. Next, we drop 103,995 observations when a firm has negative pretax income, negative ETRs or ETRs above one.²³ We then delete 316 observations in SICs 6726, 6792, 6795, 6798, 6799, consistent with Hanlon (2005). Our final sample screen is to drop 30,168 observations lacking quarterly *I/B/E/S* data. Our final sample is 26,418 observations.

4.0. Results

4.1. *Bias*

Table 2 presents descriptive statistics and tests of bias in ETRs. The descriptive statistics for the levels variables are in Panel A. For the entire sample, the mean ETR is the highest in the first quarter at 35.40% then monotonically decreases through the second (35.29%) and third (35.15%) quarters ($ETRQ2_t$ and $ETRQ3_t$, respectively) to the year-end rate of 34.89% ($ETRQ4_t$).²⁴ In addition, the first quarter ETR is higher than the prior year ETR of 34.87%. This pattern is consistent with quarterly ETR estimates being set too high (as hypothesized in H_1) and income-increasing revisions occurring in subsequent quarters. The formal statistical tests (both

²² We also considered starting our sample after 1993, since the implementation of SFAS 109 in 1993 significantly changed the accounting for income taxes, in order to provide consistent accounting over the sample period. In addition, the highest statutory corporate tax rate increased to 35% from 34% for tax years after 1993. Our results are the same whether our sample is from 1987-2008 or 1994-2008, so we chose to report over the longer period.

²³ Alternatively, Gupta and Newberry (1997) set the ETR to 1 when the ETR is greater than 100% and to 0 when the ETR is negative. Our results are qualitatively similar using either method.

²⁴ Note that $ETRQ1_t$ - $ETRQ4_t$ are cumulative effective tax rates and that $ETRQ4_t$ is the same as ETR_t .

the t -test and the Wilcoxon signed-rank test) of H_1 ($ETRQ1_t > ETR_t$), ($ETRQ2_t > ETR_t$), and ($ETRQ3_t > ETR_t$) are strongly significant, consistent with quarterly ETRs being systematically overstated.

We next investigate the changes in quarterly ETRs. Increases in the ETR lead to decreases in net income. Panel B of Table 2 details the quarterly changes in ETRs. For the full sample, the average initial ETR change ($I\Delta ETR_t$) is significant and positive. Revised ETR changes ($R\Delta ETR_t$) are significant and negative, indicating that most ETR changes after the first quarter are negative. Additionally, the mean changes in individual quarters two, three, and four, represented by $Q12\Delta ETR_t$, $Q23\Delta ETR_t$, and $Q34\Delta ETR_t$, respectively, are each negative and significant. Therefore, the ETR estimate at the beginning of each individual quarter is too high and is subsequently revised downward, consistent with each of the quarterly ETR estimates being biased upwards.

Table 3 provides further evidence that quarterly estimates are reversed in subsequent quarters. Specifically, the reported correlation between ETR levels and subsequent ETR revisions is significantly negative in all cases. Specifically, $ETRQ1_t$ is negatively correlated with $Q12\Delta ETR_t$, $Q23\Delta ETR_t$, and $Q34\Delta ETR_t$, $ETRQ2_t$ is negatively correlated with $Q23\Delta ETR_t$ and $Q34\Delta ETR_t$, and $ETRQ3_t$ is negatively correlated with $Q34\Delta ETR_t$. Taken in conjunction with the result from Panel A of Table 2 that quarterly ETR estimates are set too high and from Panel B of Table 2 that the quarterly overstatements tend to reverse, the results in Table 3 provide further evidence that quarterly ETRs are set too high and are subsequently revised downward.

Table 4 displays the ETR variables by industry and partitions the data by whether firms create slack in their ETRs. On average, quarterly ETR changes are negative in total and across industries (there are a few exceptions for certain quarters in some industries). As one would

expect, this pattern seems to be driven by the firms with slack in their ETRs. Accordingly, the results in Table 4 demonstrate that the patterns observed in Panels A and B of Table 2 are largely consistent across industries and quarters.

Consistent with Table 4, Figure 1 presents evidence concerning the proportion of the absolute value of the quarterly change in the ETR by quarter and industry. We have three quarters of changes for 16 industries in the table (48 industry-quarters). For 41 of these 48 industry-quarters we observe a greater proportion of ETR changes in the quarters that firms have slack in the prior quarter, which is consistent with H_1 . Such a pattern is also consistent with ETR increases being associated with subsequent income-increasing revisions (H_2).

Overall, the patterns observed in Table 4 and in Figure 1 are not consistent with mere error in the estimation of quarterly ETRs. Instead, the observed patterns are consistent with managers consistently setting quarterly ETRs too high. In summary, the descriptive statistics indicate that, consistent with H_1 , managers bias their quarterly ETRs. If quarterly ETRs are biased, managers can lower the estimate later if necessary to increase net income.

4.2. Earnings Management and Slack in the Quarterly ETR

Table 5 presents the results of tests designed to capture the relationship between ETR revisions and building slack for earnings management.²⁵ The results of tests of H_2 provide evidence that effective tax rates are managed in quarters two, three, and four in order for firms to meet or beat analyst forecasts. Specifically, we find that ($\delta_2^{Q2} = -0.0121, t = -11.81$; $\delta_2^{Q3} = -0.0153, t = -14.84$; $\delta_2^{Q4} = -0.0269, t = -18.75$). This result not only confirms that fourth quarter earnings management (Dhaliwal et al. 2004) holds during our longer time period, but we find

²⁵ We present the results of a pooled regression with two-way clustered robust standard errors as suggested by Gow, Ormazabal, and Taylor (2010). Our results are qualitatively similar without the adjustment. Our results are also robust to using year-fixed effects and to dropping the control for the level of the prior quarter ETR.

firms using tax expense to achieve forecasts in the second and third quarter as well. These results are consistent with H₂.

In addition, we test whether earnings management to meet or beat analyst forecasts is incrementally associated with changes in the effective tax rate when there is slack in the quarterly ETR (H₃). To test this, we use the interaction term between *SLACK* and *EM* (*SLACK*EM*). Recall slack is exogenous because it is measured at the prior quarter. The interaction term is significant and negative in all quarters ($\delta_6^{Q2} = -0.0291, t = -5.50$; $\delta_6^{Q3} = -0.0179, t = -4.65$; $\delta_6^{Q4} = -0.0212, t = -6.30$). This negative association means that managers tend to reverse slack in their ETR estimates when they would otherwise fail to meet analysts' forecasts, consistent with H₃.

We find that slack tends to reverse even when it is not necessary for earnings management ($\delta_4^{Q2} = -0.0099, t = -9.27$; $\delta_4^{Q3} = -0.0125, t = -10.84$; $\delta_4^{Q4} = -0.0202, t = -10.69$). This result is consistent with reducing slack as better information about the year-end ETR becomes available and complements our finding that slack tends to be reduced more when analyst forecasts would be missed. Overall, our findings are consistent with managers overstating their ETR estimates to build slack and revising them downward due to either settling-up for the year-end or to meet analyst earnings estimates.

Finally, we find that earnings management through the ETR in quarters two, three, and four increases subsequent to SOX. Even for firms without prior quarter slack, firms significantly decrease ETRs to meet forecasts in quarters two and three. The presence of slack is significantly associated with post-SOX incremental decreases in ETRs to meet forecasts. The combined effect for firms with slack shows a significant increase in the use of ETR to manage earnings following the passage of SOX. Specifically, we find that $(\delta_3 + \delta_7)$ is significantly less than zero for each of

the three quarters ($\delta_3^{Q2} + \delta_7^{Q2} = -0.0390$, $F = -13.52$; $\delta_3^{Q3} + \delta_7^{Q3} = -0.0293$, $F = -5.60$; $\delta_3^{Q4} + \delta_7^{Q4} = -0.0276$, $F = 14.76$). Thus, following the passage of SOX, we find a significant increase in the use of the ETR to manage earnings. Although this result is surprising considering the Congressional intent for SOX to decrease earnings management, our result is consistent with managers shifting their earnings management away from pre-tax accruals post-SOX.

5.0. Conclusions

Much accounting research investigates earnings management to achieve earnings targets such as analysts' forecasts. Recent research on how earnings are managed provides evidence that the tax expense either reveals or directly exhibits earnings management. However, this paper is the first to investigate whether discretion in the application of the integral method to interim reporting for income tax expense contributes to intra-period earnings management. The integral method introduces discretion into the calculation of interim expenses since managers allocate tax expense to a given quarter based on their estimate of the effective tax rate at year-end.

Although recent research designs focus on settings where the earnings management is easy to observe (i.e., near targets), such settings do not provide powerful settings to observe the building of slack, or cookie jars. We use quarterly ETRs to provide a powerful setting to observe whether managers build slack and manage earnings. Specifically, we investigate whether managers overestimate quarterly ETRs in interim reports and whether such overestimates tend to be reversed when firms would miss their quarterly earnings targets without decreases in their tax expense.

We find that quarterly ETRs are systematically higher than prior or current year-end ETRs. Prior research has shown that changes in the fourth quarter provision for income taxes are

associated with meeting or beating analyst forecasts. Confirming and extending this research using a longer time period, we also find that firms report income-increasing changes in ETRs when the firm would otherwise miss its analyst earnings forecasts in quarters two and three. Further, we find that firms with slack in quarterly ETRs make even larger decreases in quarterly ETRs when they would otherwise miss their forecasts. This latter result is evidence that overestimates of the quarterly ETR build slack that can be used for earnings management in later quarters. Finally, consistent with managers shifting to other forms of earnings management after the passage of SOX, we find greater use of the ETR to manage quarterly earnings in the post-SOX time period.

Our findings should not be interpreted as suggesting that tax expense is the only or most important context for earnings management. Nevertheless, the combination of accounting standards that require quarterly ETRs to be calculated using annual estimates and the visibility of the tax expense in quarterly earnings statements makes this a powerful research setting. In addition, our evidence suggests that the discretion granted to managers by the integral method allows them the opportunity to influence the timing and the amount of income tax expenses reported in financial statements and thereby creates an opportunity for intra-period earnings management. This evidence should contribute to the debate on how to improve interim reporting.

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Figure 1

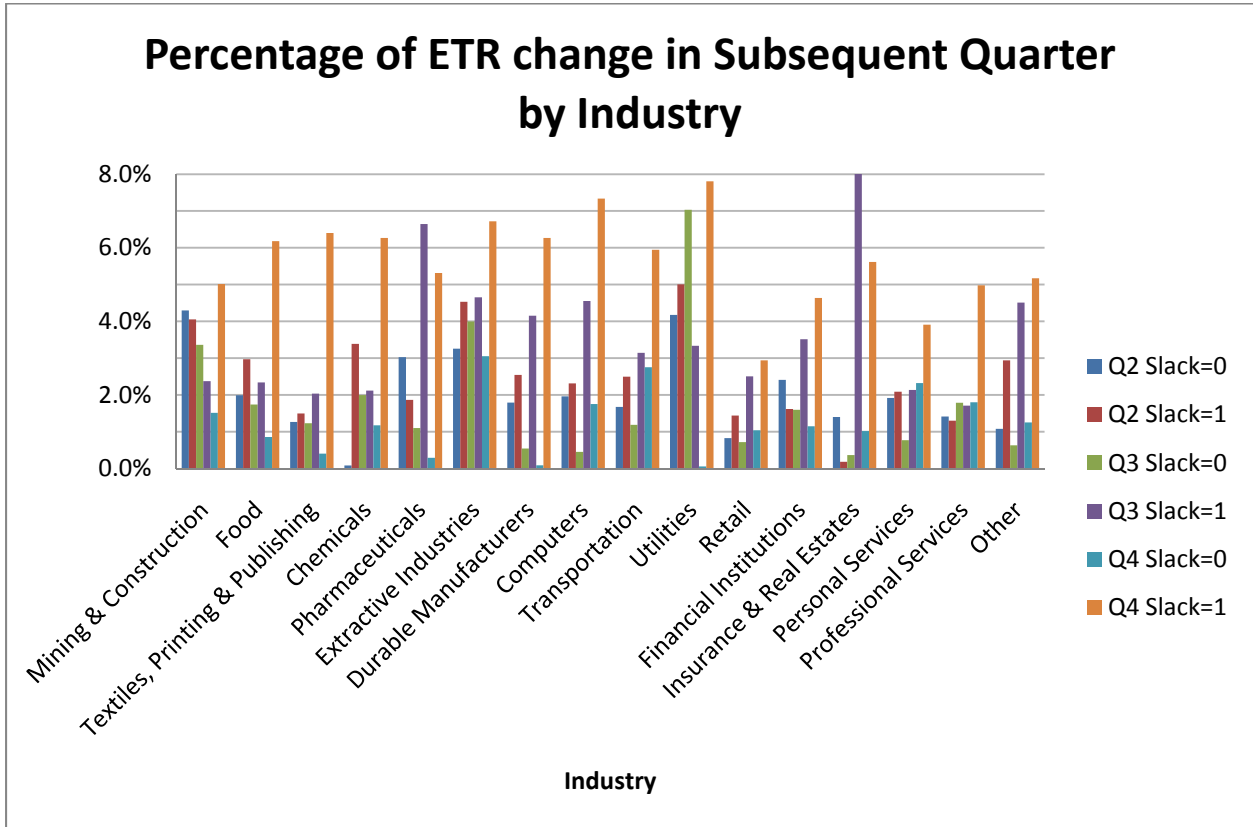


Fig. 1. This figure documents the pattern by industry of ETR changes for firms with slack in their prior quarter ETRs between 1987 and 2008. Slack is defined as equal to one when the firm raises its ETR in the prior quarter and as zero otherwise. The general pattern of ETR revisions exhibit greater revisions for the firms we classify as having slack in their ETR in subsequent quarters in nearly all quarters for nearly all industries. See table 4 for descriptive statistics regarding the breakdown of ETR changes and subsequent revisions by industry.

Table 1
Sample Selection and Composition: 1987-2008¹

Panel A: Sample Selection for Tests of Hypothesis 1

Description	N
Annual U.S. firm observations constructed using <i>Compustat Unrestated Quarterly Data</i> (1987-2008)	217,147
Less:	
Observations missing ETR data in any quarter	56,250
Observations with negative pre-tax earnings, negative ETRs, or ETRs above one in any quarter	103,995
Delete observations in SICs 6726, 6792, 6795, 6798, 6799	316
Missing analyst forecast data from <i>I/B/E/S</i>	<u>30,168</u>
Final Sample:	<u><u>26,418</u></u>

¹ This table presents the sample selection criteria. We use the sample period of 1987-2008. We also considered starting our sample after 1993, since the implementation of SFAS 109 in 1993 significantly changed the accounting for income taxes, in order to provide consistent accounting over the sample period. In addition, the highest statutory corporate tax rate increased to 35% from 34% for tax years after 1993. Our results are the same whether our sample is from 1987-2008 or 1994-2008, so we chose to report over the longer period.

Table 2
Descriptive Statistics

Panel A: Financial Variables¹

(n=26,418)	Mean	SD	25 th Percentile	Median	75 th Percentile
$Assets_t$	7771.4700	48576.2900	228.6670	806.2478	2971.6600
TAX_t	141.1491	675.9767	6.7280	20.7875	72.8000
PTE_t	412.6647	1790.71	19.6370	60.0985	213.3620
ETR_t	0.3489	0.0697	0.3206	0.3620	0.3897
ETR_{t-1}	0.3487	0.0904	0.3173	0.3625	0.3921
$ETRQ1_t$	0.3540†	0.0770	0.3285	0.3684	0.3929
$ETRQ2_t$	0.3529†	0.0714	0.3268	0.3669	0.3920
$ETRQ3_t$	0.3515†	0.0699	0.3250	0.3650	0.3906
$ETRQ4_t$	0.3489	0.0697	0.3206	0.3620	0.3897

Panel B: ETR Changes²

(n=26,418)	Mean	SD	25 th Percentile	Median	75 th Percentile
$I\Delta ETR_t$	0.0053*	0.0718	-0.0088	0.0003	0.0163
$R\Delta ETR_t$	-0.0122*	0.0847	-0.0317	-0.0038	0.0068
$Q12\Delta ETR_t$	-0.0017*	0.0540	-0.0066	-0.0000	0.0043
$Q23\Delta ETR_t$	-0.0031*	0.0633	-0.0107	-0.0000	0.0058
$Q34\Delta ETR_t$	-0.0075*	0.0844	-0.0251	-0.0007	0.0090

¹ Panel A reports descriptive statistics for the levels of selected financial variables. Variables are defined as follows: $Assets$ = Average total assets; TAX = Annual taxes; PTE = Pretax income; ETR = Effective tax rate ($TAX \div PTE$); $ETRQ1$ = Q1 Effective tax rate ($Q1TAX/Q1PTE$); $ETRQ2$ = Q2 YTD Effective tax rate [$(Q1TAX + Q2TAX)/(Q1PTE + Q2PTE)$]; $ETRQ3$ = Q3 YTD Effective tax rate [$(Q1TAX + Q2TAX + Q3TAX)/(Q1PTE + Q2PTE + Q3PTE)$]; $ETRQ4$ = Q4 YTD Effective tax rate [$(Q1TAX + Q2TAX + Q3TAX + Q4TAX)/(Q1PTE + Q2PTE + Q3PTE + Q4PTE)$].

† Indicates significant difference from ETR_t and ETR_{t-1}

² Panel B reports descriptive statistics for ETR changes and tests whether managers build slack into their quarterly ETR estimates. Variables are defined as follows: $I\Delta ETR$ = Initial ETR change (Computed as $ETRQ1_t - ETR_{t-1}$); $R\Delta ETR$ = Revised ETR change (Computed as: $ETR_t - ETRQ1_t$); $Q12\Delta ETR$ = ETR Revision between Q1 and Q2; $Q23\Delta ETR$ = ETR Revision between Q2 and Q3; $Q34\Delta ETR$ = ETR Revision between Q3 and Q4.

* Indicates that the mean is significantly different from zero at $p < 0.05$

Table 3
Sample Correlations¹

(n=26,418)

	$ETRQ1_t$	$ETRQ2_t$	$ETRQ3_t$	$ETRQ4_t$	$R\Delta ETR_t$	$I\Delta ETR_t$	$Q12\Delta ETR_t$	$Q23\Delta ETR_t$	$Q34\Delta ETR_t$
$ETRQ1_t$		0.9487 (0.0000)	0.9195 (0.0000)	0.8818 (0.0000)	-0.1338 (0.0000)	0.1157 (0.0000)	-0.1746 (0.0000)	-0.0141 (0.0222)	-0.0247 (0.0000)
$ETRQ2_t$	0.9227 (0.0000)		0.9629 (0.0000)	0.9196 (0.0000)	-0.0665 (0.0000)	0.0643 (0.0000)	0.0237 (0.0001)	-0.1023 (0.0000)	-0.0229 (0.0002)
$ETRQ3_t$	0.8905 (0.0000)	0.9633 (0.0000)		0.9546 (0.0000)	-0.0151 (0.0145)	0.0422 (0.0145)	0.0302 (0.0000)	0.0559 (0.0000)	-0.0978 (0.0000)
$ETRQ4_t$	0.8557 (0.0000)	0.9257 (0.0000)	0.9651 (0.0000)		0.1716 (0.0000)	0.0172 (0.0000)	0.0324 (0.0000)	0.0684 (0.0000)	0.0869 (0.0000)
$R\Delta ETR_t$	-0.2690 (0.0000)	-0.1467 (0.0000)	-0.0811 (0.0000)	0.1269 (0.0000)		-0.1767 (0.0000)	0.3016 (0.0000)	0.1487 (0.0000)	0.6474 (0.0000)
$I\Delta ETR_t$	0.2639 (0.0000)	0.1398 (0.0000)	0.1046 (0.0000)	0.0773 (0.0000)	-0.2272 (0.0000)		-0.1992 (0.0000)	-0.0088 (0.1538)	-0.0422 (0.0000)
$Q12\Delta ETR_t$	-0.3277 (0.0000)	0.0301 (0.0000)	0.0235 (0.0001)	0.0211 (0.0006)	0.3160 (0.0000)	-0.3063 (0.0000)		-0.2724 (0.0000)	0.0081 (0.1858)
$Q23\Delta ETR_t$	-0.0266 (0.0000)	-0.1694 (0.0000)	0.0472 (0.0000)	0.0598 (0.0000)	0.1035 (0.0000)	-0.0017 (0.7883)	-0.4356 (0.0000)		-0.2574 (0.0000)
$Q34\Delta ETR_t$	-0.0402 (0.0000)	-0.0394 (0.0000)	-0.1320 (0.0000)	0.0689 (0.0000)	0.7238 (0.0000)	-0.0307 (0.0000)	0.0037 (0.5495)	-0.3676 (0.0000)	

¹This Table reports Pearson (below the diagonal) and Spearman rank-order (above the diagonal) correlations for the full sample. The correlation coefficient, followed by a two-sided *p*-value, is reported in each cell.

Table 4
Industry Analysis & Tests of ETR Changes¹

	<i>ETRQ1_t</i>	<i>Q12ΔETR_t</i>	<i>ETRQ2_t</i>	<i>Q23ΔETR_t</i>	<i>ETRQ3_t</i>	<i>Q34ΔETR_t</i>
All Industries (n=26,418)						
All Firms	0.3540	-0.0017	0.3529	-0.0031	0.3515	-0.0075
Slack=1	0.3623	-0.0083	0.3534	-0.0120	0.3530	-0.0202
Slack=0	0.3437	0.0066	0.3523	0.0050	0.3501	0.0037
Mining & Construction (n=519)						
All Firms	0.3649	-0.0015	0.3624	0.0024	0.3624	-0.0058
Slack=1	0.3823	-0.0155	0.3620	-0.0086	0.3688	-0.0185
Slack=0	0.3446	0.0148	0.3628	0.0122	0.3568	0.0054
Food (n=719)						
All Firms	0.3657	-0.0022	0.3646	-0.0005	0.3638	-0.0084
Slack=1	0.3802	-0.0113	0.3677	-0.0086	0.3658	-0.0226
Slack=0	0.3511	0.0070	0.3621	0.0063	0.3621	0.0031
Textiles, Printing, and Publishing (n=1,625)						
All Firms	0.3761	-0.0009	0.3755	-0.0010	0.3748	-0.0106
Slack=1	0.3806	-0.0057	0.3780	-0.0077	0.3781	-0.0242
Slack=0	0.3709	0.0047	0.3733	0.0046	0.3719	0.0015
Chemicals (n=709)						
All Firms	0.3574	-0.0064	0.3541	0.0008	0.3533	-0.0124
Slack=1	0.3601	-0.0122	0.3588	-0.0076	0.3478	-0.0218
Slack=0	0.3543	0.0003	0.3506	0.0070	0.3581	-0.0042
Pharmaceuticals (n=588)						
All Firms	0.3102	0.0011	0.3106	-0.0073	0.3079	-0.0064
Slack=1	0.3218	-0.0060	0.3130	-0.0208	0.3087	-0.0164
Slack=0	0.2974	0.0090	0.3086	0.0034	0.3073	0.0009
Extractive Industries (n=950)						
All Firms	0.3708	-0.0050	0.3674	-0.0014	0.3664	-0.0063
Slack=1	0.3816	-0.0173	0.3697	-0.0172	0.3692	-0.0248
Slack=0	0.3563	0.0116	0.3651	0.0146	0.3637	0.0111

Table 4 Continued

	<i>ETRO1_t</i>	<i>Q12ΔETR_t</i>	<i>ETRO2_t</i>	<i>Q23ΔETR_t</i>	<i>ETRO3_t</i>	<i>Q34ΔETR_t</i>
Durable Manufacturers (n=4,577)						
All Firms	0.3537	-0.0025	0.3521	-0.0056	0.3497	-0.0097
Slack=1	0.3614	-0.0092	0.3539	-0.0147	0.3526	-0.0221
Slack=0	0.3458	0.0062	0.3507	0.0019	0.3473	0.0003
Computers (n=2,497)						
All Firms	0.3345	-0.0015	0.3324	-0.0062	0.3297	-0.0080
Slack=1	0.3456	-0.0080	0.3337	-0.0152	0.3285	-0.0241
Slack=0	0.3210	0.0063	0.3313	0.0015	0.3307	0.0058
Transportation (n=1,267)						
All Firms	0.3730	-0.0023	0.3714	-0.0032	0.3696	-0.0056
Slack=1	0.3803	-0.0095	0.3720	-0.0117	0.3767	-0.0224
Slack=0	0.3644	0.0061	0.3709	0.0044	0.3630	0.0100
Utilities (n=995)						
All Firms	0.3548	-0.0061	0.3538	0.0080	0.3557	-0.0140
Slack=1	0.3716	-0.0186	0.3568	-0.0119	0.3536	-0.0276
Slack=0	0.3283	0.0137	0.3512	0.0247	0.3580	-0.0002
Retail (n=2,942)						
All Firms	0.3787	-0.0016	0.3775	-0.0029	0.3762	-0.0030
Slack=1	0.3821	-0.0055	0.3792	-0.0095	0.3777	-0.0111
Slack=0	0.3747	0.0031	0.3762	0.0027	0.3749	0.0039
Financial Institutions (n=6,014)						
All Firms	0.3310	0.0003	0.3313	-0.0035	0.3305	-0.0053
Slack=1	0.3403	-0.0055	0.3302	-0.0116	0.3300	-0.0153
Slack=0	0.3193	0.0077	0.3324	0.0053	0.3309	0.0038
Insurance and Real Estate (n=126)						
All Firms	0.3764	0.0017	0.3770	-0.0135	0.3720	-0.0111
Slack=1	0.3797	-0.0007	0.3714	-0.0303	0.3704	-0.0208
Slack=0	0.3718	0.0052	0.3819	0.0014	0.3731	-0.0038

Table 4 Continued

	<i>ETRQ1_t</i>	<i>Q12ΔETR_t</i>	<i>ETRQ2_t</i>	<i>Q23ΔETR_t</i>	<i>ETRQ3_t</i>	<i>Q34ΔETR_t</i>
Personal Services (n=1,139)						
All Firms	0.3797	-0.0013	0.3779	-0.0025	0.3765	-0.0021
Slack=1	0.3877	-0.0081	0.3797	-0.0081	0.3787	-0.0148
Slack=0	0.3699	0.0071	0.3762	0.0029	0.3747	0.0087
Professional Services (n=924)						
All Firms	0.3871	-0.0002	0.3864	0.0004	0.3862	-0.0057
Slack=1	0.3916	-0.0051	0.3866	-0.0066	0.3895	-0.0194
Slack=0	0.3820	0.0054	0.3861	0.0069	0.3832	0.0069
Other (n=827)						
All Firms	0.3368	-0.0041	0.3345	-0.0056	0.3357	-0.0059
Slack=1	0.3467	-0.0102	0.3370	-0.0152	0.3480	-0.0180
Slack=0	0.3244	0.0035	0.3325	0.0021	0.3277	0.0041

¹ This table reports the mean quarterly ETR and quarterly revisions in the ETR by industry for all firms (row 1 of each industry group), for firms that potentially have slack in their ETR estimates (row 2 of each industry group), and for firms without potential slack in their ETR estimates (row 3 of each industry group). Potential slack is defined as firms having an increase in their prior quarter ETR. The industry breakdown is adapted from Barth, Beaver, Hand, and Landsman (1999); Rajgopal, Shevlin, and Venkatachalam (2003); and Schmidt (2006). Industries are defined according to the following four-digit SIC Codes (in parentheses): Mining and Construction (1000-1999, excluding 1300-1399); Food (2000-2111); Textiles, Printing, and Publishing (2200-2796); Chemicals (2800-2824, 2840-2899); Pharmaceuticals (2830-2836); Extractive Industries (1300-1399, 2900-2999); Durable Manufacturers (3000-3999, excluding 3570-3579 and 3670-3679); Computers (3570-3579, 3670-3679, and 7370-7379); Transportation (4000-4899); Utilities (4900-4999); Retail (5000-5999); Financial Institutions (6000-6411); Insurance and Real Estate (6500-6999); Personal Services (7000-7999, excluding 7370-7379); Professional Services (8011-8999).

Variables are defined as follows: *ETRQ1* = Q1 Effective tax rate ; *ETRQ2* = Q2 Effective tax rate ; *ETRQ3* = Q3 Effective tax rate ; *ETRQ4* = Q4 Effective tax rate ; *Q12ΔETR* = ETR Revision between Q1 and Q2 ; *Q23ΔETR* = ETR Revision between Q2 and Q3 ; *Q34ΔETR* = ETR Revision between Q3 and Q4 ; *SLACK* = a dummy variable that takes the value of one for firms having an increase in their prior quarter ETR, and zero otherwise.

Table 5*Regression Results of ETR Revisions on Earnings Management and Slack Pre/Post SOX¹*

$$\Delta ETR_{itq} = \delta_0 + \delta_1 ETR_{itq-1} + \delta_2 EM_{itq} + \delta_3 EM_{itq} * SOX_{itq} + \delta_4 SLACK_{itq-1} + \delta_5 SLACK_{itq-1} * SOX_{itq} + \delta_6 SLACK_{itq-1} * EM_{itq} + \delta_7 SLACK_{itq-1} * EM_{itq} * SOX_{itq} + \varepsilon_{itq} \quad (2)$$

(n=26,418)

	2 nd Quarter	3 rd Quarter	4 th Quarter
δ_0	0.0872 19.76*	0.0659 10.55*	0.0711 12.89*
δ_1	-0.2162 -18.17*	-0.1522 -9.01*	-0.1565 -11.23*
δ_2	-0.0121 -11.81*	-0.0153 -14.84*	-0.0269 -18.75*
δ_3	-0.0057 -3.06*	-0.0063 -2.53*	-0.0029 -1.21
δ_4	-0.0099 -9.27*	-0.0125 -10.84*	-0.0202 -10.69*
δ_5	-0.0015 -1.56	-0.0092 -5.35*	-0.0036 -1.68††
δ_6	-0.0291 -5.50*	-0.0179 -4.65*	-0.0212 -6.30*
δ_7	-0.0333 -2.93*	-0.0230 -2.02†	-0.0247 -3.42*
\bar{R}^2	0.1520	0.0832	0.0770

¹ This table presents the results of quarterly (excluding Q1) pooled OLS regressions of ETR revisions on prior quarter effective tax rates, an earnings management dummy variable, a dummy variable for slack in the quarterly ETR, a dummy variable for the post-Sarbanes Oxley (SOX) period, the interaction between the earnings management dummy variable and the slack dummy variable, and the interaction between the earnings management dummy variable, the slack dummy variable, and the SOX dummy variable. OLS is used rather than a fixed or random effects model, because results from Breusch-Pagan (1980) LM tests indicate that OLS is the appropriate estimation method. We use two-way cluster-robust standard errors as suggest by Gow, Ormazabal, and Taylor (2010). ΔETR_{itq} = the change in the year-to-date effective tax rate from quarter q to quarter $q - 1$ during time t . ETR_{itq-1} = the year-to-date ETR from the previous quarter. EM_{itq} = a dummy variable that takes the value of one if a firm would have missed the forecast if there was no ETR change in the current quarter from the same quarter one year before, zero otherwise. $SLACK_{itq-1}$ = a dummy variable that takes the value of one for firms having an increase in their prior quarter ETR, and zero otherwise. SOX_{itq} = a dummy variable that takes the value of one after the passage of SOX, zero otherwise.

The symbols *, †, and ‡ denote significance at the 0.01, 0.05, and 0.10 (one-tail) levels, respectively.