Valuation of tax expense

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October, 2010

Discussions with Dave Guenther and Doug Shackelford spurred work on this paper. We thank Michelle Hanlon, Cathy Schrand, Terry Shevlin, and participants at the University of Kentucky, Yale summer conference, and AAA annual meetings (2010) for comments and suggestions and the Yale School of Management for financial support.

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Abstract

Both intuition and empirical evidence suggest that higher revenues increase value whereas higher expenses, including higher tax expense, decrease value. Some prior research, however, suggests that higher tax expense may be good news, despite the resulting reduction in after-tax earnings. We conduct a comprehensive investigation and find that surprises in both the current and deferred components of tax expense are in general strongly *positively* related to contemporaneous returns and future earnings, even more so than surprises in pre-tax income. These unexpected positive relations appear to be due to regression misspecification and "measurement error" in earnings surprise, which allow tax expense to reflect information that is correlated with underlying profitability. The positive relation declines and even becomes negative when empirical choices made (e.g. dropping firms reporting losses) increase the information content of earnings. Inferences based on valuation of tax expense and its components should therefore be made with caution.

Valuation of tax expense

1. Introduction

We re-examine the value implications of tax expense, an important focus of the emerging literature on accounting for income taxes (Graham et al., 2010). Intuition and prior evidence (e.g., Lipe, 1986) suggest that unexpected changes in revenues are positively related to value changes whereas unexpected changes in expenses, including tax expense, are negatively related to value changes.[1] There are some prior results, however, that are consistent with the opposite view (e.g., Ohlson and Penman, 1992): tax expense surprises might be good news, holding constant surprises in revenues and other expenses. We investigate which conclusion is more representative and explore why both sets of results have been observed.

The intuition for why higher tax expense is bad news is straightforward and the evidence appears unequivocal. Consider two firms that report identical pre-tax incomes each year over their lives, but different tax expense. The firm reporting lower tax expense must be associated with higher after-tax earnings and therefore higher stock returns. Regressions of stock returns on surprises in tax expense and pre-tax income indicate negative coefficients on tax expense (e.g., Guenther and Jones, 2006). Similarly, an unexpected increase in effective tax rates—the ratio of tax expense to pre-tax income—is also viewed as bad news (e.g., Schmidt, 2006).

The opposite view that higher tax expense is good news is not prevalent, possibly because it is unintuitive and evidence consistent with it is limited, often indirect, and not emphasized. Ohlson and Penman (1992) finds a positive coefficient on tax expense in regressions of stock returns on levels of revenues and various expenses, but the unexpected sign is not discussed. More recently, studies investigating the incremental value relevance of taxable

[1] Some expenses, such as those related to Research & Development and certain write-offs, have been shown to be positively related to stock returns. Those positive relations do not appear in the broader expense categories considered here.

income, beyond that of pre-tax book income, document a significant positive coefficient on unexpected taxable income (e.g., Hanlon et al, 2005).[2] Since tax expense is not taxable income, that result was not extended to imply that higher tax expense is good news. However, since taxable income in these studies is derived from the current portion of tax expense, this finding suggests that tax expense includes a component—which is an alternative measure of profit based on tax rules—that is positively related to returns and contains value-relevant information beyond GAAP profits.

Our three main findings, described next, are generally consistent with this opposite view: unlike other expenses, an unexpected increase in tax expense is indeed good news. First, for our more comprehensive samples, cross-sectional regressions of stock returns on changes in pre-tax income and tax expense result in a positive coefficient on tax expense changes. Replacing pre-tax income with revenues and expense components confirms that inference: we find a positive coefficient on changes in revenue, negative coefficients on all other expense changes, but a positive coefficient on changes in tax expense. These results continue to hold if changes in revenue and expense components are replaced by levels of those variables.

Second, the t-statistics on tax expense changes are considerably larger than those on changes in pre-tax income. Even though pre-tax income is designed to be a primary measure of profit, tax expense is empirically a stronger proxy for underlying profitability. To understand the nature of this unique information contained in tax expense, we regress changes in next year's profits (both before and after taxes) on changes in this year's tax expense and profits. The

[2] A similar result is reported in Lev and Thiagarajan (1993) which finds that changes in effective tax rates, based not on tax expense but on the current portion of federal tax, are positively associated with stock returns. Rather than view taxes paid as being related to taxable income, which is a direct measure of profitability, the authors characterize a reduction in effective tax rates as a negative signal because reported earnings are of lower persistence and lower quality.

coefficient on changes in tax expense is significant and positive, suggesting that tax expense is incrementally positively related to future profits.

Third, splitting tax expense into its current and deferred portions, to determine each portion's separate contribution to the value-relevant information in tax expense changes, suggests that changes in both components of tax expense are positively and significantly related to returns, though the current portion has a considerably larger effect. Whereas the coefficient on taxable income surprises in prior research is less significant than that on book income surprises, we find for our sample that the coefficient on surprises in the current portion of tax expense, which proxies for taxable income, is more significant than that on surprises in pre-tax income.

While our empirical results suggest strongly that higher tax expense is good news, the fact that it also implies that *lower* after-tax income is good news (since pre-tax income surprise is held constant) is puzzling. GAAP earnings are after all designed to reflect value and a long stream of empirical research suggests that this objective has been successfully achieved. Our investigation suggests that the puzzling finding is due to the misspecifications in our return regressions and the considerable error with which pre-tax income surprise measures unexpected changes in core profitability.[3] Recall that we consider regressions that a) exclude other potentially relevant variables that provide context when interpreting pre-tax income, and b) assume across-firm homogeneity in the valuation impact of different regressors. Sensitivity analyses suggest that our results are less likely to be observed for "clean" subsamples that are constructed to increase the explanatory power of pre-tax income and its components. For example, dropping firm-years with negative values of pre-tax income in either the current or

[3] The unreasonably low estimated coefficients on pre-tax income surprise (well below 1) is another indication that the information content of this variable is suppressed.

prior year (which requires dropping about 35 percent of our sample) results in a negative (but insignificant) coefficient on tax expense changes.[4]

In effect, tax expense emerges as a superior measure of underlying profitability when misspecification and measurement error distort the information content of pre-tax income. As mentioned above, the current component of tax expense reflects the computation of profit from an alternative system, one based on tax rules. Even though tax rules focus on objectives other than reflecting value, the higher value relevance of taxable income over GAAP pre-tax income could be due in part because taxable income is a) associated with fewer opportunities for manipulation and b) computed in a more consistent manner across firms and over time.

The positive relation between value and the deferred portion of tax expense is likely to be less direct. Prior research has often viewed the various accruals that make up the deferred portion—such as changes in the valuation allowance—as being of lower quality, in the sense that they have lower persistence than other earnings components. That interpretation, however, implies a *negative* coefficient on surprises in the deferred portion of tax expense, albeit one that is smaller than coefficients on other earnings components. Observing a positive coefficient suggests that increases in the deferred portion are not only viewed as being of lower persistence, they signal that the associated pre-tax income is itself of low quality. For example, firms with underlying bad (good) news might seek to enhance (suppress) both pre-tax and after-tax income and a symptom of that intent is the choice of certain estimates that result in lower (higher) deferred tax expense.

Our results suggest two takeaways for future research. First, researchers investigating how tax items are priced in capital markets should be aware that the methodologies and samples

[4] These measurement errors and misspecifications have a larger impact over relatively short windows, such as the annual periods considered in this paper. As the window is expanded to include more years, the coefficient on tax expense surprise eventually turns negative (e.g., Ohlson and Penman, 1992).

that are commonly used will generate positive not negative valuation coefficients on tax expense surprise, and those coefficients are in general considerably larger than valuation coefficients on pre-tax or after-tax earnings surprises. This insight explains why, for example, Thomas and Zhang (2010) finds that this quarter's tax expense surprise predicts next quarter's tax expense surprise which in turn is associated with next quarter's returns, even after controlling for earnings surprise for both this quarter and the *next*.

Second, since the coefficients on tax expense and its current and deferred components are sensitive to the samples and regression specifications used, researchers should be cautious about making inferences based on observed results. At a simple level, returns are explained mainly by contemporaneous revisions in expectations of *future* earnings and discount rates (e.g., Liu and Thomas, 2000), and coefficients from regressions of returns on current surprises in pre-tax income and different tax variables are biased by correlation between included and omitted variables. Since estimated coefficients are affected mainly by such biases and thus do not reflect intrinsic properties of the included variables, only limited inferences are appropriate.

The rest of this paper is organized as follows. Section 2 provides a review of related prior literature, Section 3 describes our sample and variables, and Section 4 provides our primary results. Section 5 investigates why higher tax expense implies good news, Section 6 discusses some robustness tests, and Section 7 concludes.

2. Prior research

Capital markets research in accounting examines the relation between stock returns and after-tax earnings based on the premise that stock price reflects after-tax earnings accruing to shareholders (see Kothari, 2001, for a review). If so, lower after-tax earnings caused by higher tax expense—assuming pre-tax income is held constant—should be associated with lower stock

returns. When decomposing after-tax earnings into revenue and expenses, analogous reasoning suggests that unexpected revenue is good news to shareholders whereas unexpected expenses, including unexpected tax expense, are bad news. Results of prior studies support this intuition. For example, Lipe (1986) estimates firm-by-firm time-series regressions of annual returns on unexpected revenue and expense items and finds a positive coefficient on revenue surprises and negative coefficients on all expense surprises, including tax expense surprise.

While valuation research studying the value relevance of tax items typically investigates tax expense surprise, tax research tends to deflate tax expense by pre-tax income and investigates surprises in effective tax rates.[5] Stock returns are related to changes in effective tax rates, and *decreases* in effective tax rates, which translate roughly into tax expenses decreases when pre-tax income is held constant, are predicted to be good news. Schmidt (2006) articulates a rationale for this prediction: a declining effective tax rate reflects unexpected tax savings from a firm's strategic tax-planning and tax-optimization activities, which include tax shelters and the utilization of tax rate differentials across countries and states.[6]

Although most research on the valuation of tax items uses stock returns as the dependent variable, some studies regress market value of equity on variables derived from the balance sheet, such as deferred tax assets and tax liabilities. For example, the valuation regression in Ayers (1998) is based on market value of equity as the dependent variable and the explanatory variables include deferred tax assets, deferred tax liabilities, and the valuation allowance. The general finding from these studies is that stock price is positively related to deferred tax assets

[5] This emphasis on effective tax rates appears to reflect tax practice. Firms manage effective tax rates and even evaluate internal tax groups as "profit" centers based on managers' ability to lower effective tax rates (e.g., Robinson et al., 2010). Using effective tax rates reduces sample size substantially, since many firm-years are deleted if observed effective tax rates in the current or prior year are outside reasonable bounds.

[6] Schmidt (2006) also discusses reasons why changes in effective tax rates might be more or less persistent than other earnings components. Bryant-Kutcher et al. (2010) study the combined effect of the persistence of both pre-tax income and changes in effective tax rates.

and negatively related to deferred tax liabilities (Amir et al. 1997; Ayers 1998; Dhaliwal et al. 2000). Since revenues (expenses) are generally associated with increases (decreases) in assets and decreases (increases) in liabilities, these results are consistent with changes in market values of equity, or stock returns, being positively related to revenue surprises and negatively related to expense surprises.

Another regression specification issue that varies across valuation research is the use of levels of revenues and expenses, rather than changes in those variables, to proxy for revenue and expense surprises, respectively (e.g., Ohlson and Penman, 1992). Differences between the two specifications can be linked intuitively to differences in the underlying expectation model: changes represent surprises if expectations of earnings (or revenues and expenses) equal lagged values, whereas levels represent surprises if expectations are a function of lagged prices.[7]

While prior research has generally shown that tax expense surprises and changes in effective tax rates are negatively related to contemporaneous stock returns, there is at least one earlier instance where a positive relation has been documented. Ohlson and Penman (1992) finds a positive coefficient on tax expense levels when annual returns are regressed on annual levels of revenue and different expenses. While a similar positive coefficient is observed on tax expense when the windows are widened to two and five years' of returns and earnings components, the coefficient switches to a negative value when regressions are based on 10-year windows. The authors do not comment on the unexpected positive coefficient on tax expense over narrower windows, possibly because the paper's primary focus is to show that while coefficients vary

[7] Consider the case where unexpected price ($P_t - E[P_t]$) is proportional to unexpected earnings ($X_t - E[X_t]$). Since expected price equals lagged price times the expected rate of return (r), unexpected price = $P_t - r*P_{t-1}$, ignoring dividends. And if expected earnings equals lagged price times a constant (k), then unexpected earnings = $X_t - k*P_{t-1}$. Dividing both sides by lagged price leads to a regression model where stock returns are explained by the level of earnings, scaled by lagged price. If, however, expected earnings equal lagged earnings, unexpected earnings = $X_t - X_{t-1}$, and stock returns should be regressed on earnings differences, scaled by lagged price.

across different earnings components for narrower windows, coefficient magnitudes should converge for wider windows, and coefficient signs should be positive (negative) for revenues (expenses).

Lev and Thiagarajan (1993) documents a positive relation between changes in effective tax rates and current returns.[8] That observed relation is explained as being due to the general sentiment which implies that "an unusual decrease in the effective tax rate is generally considered a negative signal about earnings persistence." In essence, even though a lower effective tax rate translates into higher after-tax income, the quality of that reported income declines so much that the net effect is a negative stock market reaction.

The effective tax rate in that study is based only on the *current* portion of the *federal* tax expense, and excludes both the deferred portion as well as foreign and state taxes that are commonly included when computing effective tax rates. Since the current portion is linked to federal taxes paid that year, which is linked to federal taxable income reported that year, the effective tax rate could be reflecting profits based on the tax system. That is, the negative signal implied by a lower effective tax rate may be reflecting a decline in taxable income, rather than a decline in the persistence of book income.[9]

That inference is supported by recent research (e.g., Hanlon et al., 2005, Chen et al., 2007, and Ayers et al., 2009) that investigates book-tax differences and whether taxable income is incrementally value-relevant beyond GAAP income. Regressions of returns on changes in pre-tax income and estimates of taxable income indicate a significant positive coefficient on taxable income changes. While the magnitude and significance of that positive coefficient is smaller than

[8] The relation is negative, but not significant, when the regression is estimated on a smaller sample with non-missing values for all earnings quality signals (see Table 2 in Lev and Thiagarajan, 1993).

[9] Sensitivity analyses in Guenther and Jones (2006), based on alternative definitions of the effective tax rate, suggest that the unexpected positive coefficient observed in Lev and Thiagarajan (1993) result may be contingent on the particular tax rate measure used.

that for the coefficient on pre-tax income changes, taxable income appears to be an alternative measure of profit that is incrementally informative about underlying profitability. Ayers et al. (2009) shows that the incremental informativeness of taxable income is higher when taxable income is high quality (indicated by firms that engage in less tax planning) and book income is low quality (indicated by firms that engage in greater management of book accruals)., Raedy et al. (2010) investigate the relation between returns and different components of book-tax differences.

To review, while there is considerable logical and empirical support for the view that tax expense increases are bad news, there is also some support for the opposite view because tax expense might proxy for a firm's underlying profitability. Specifically, there are two contexts in which a higher tax expense could be viewed as good news. First, whereas firms might manage tax expense to achieve a variety of objectives, such as smoothing after-tax earnings or hitting earning targets (e.g. Dhaliwal et al., 2004 and Frank and Rego, 2006), reported earnings for firms engaged in more management of tax expense might be viewed as being of "low quality".[10] Specifically, even though a higher tax expense results in lower after-tax earnings, it is rewarded with higher returns because the high quality of those earnings more than compensates for the lower magnitudes. Second, tax expense reflects profits measured by tax rules. Even though those rules are not designed to measure value, but to achieve governmental goals, tax return variables hold the potential to provide independent value-relevant information.[11]

[10] Management of tax expense is assumed to occur via the deferred component. For example, Schrand and Wong (2003) provide evidence of how well-capitalized banks created valuation allowances and reduced deferred tax assets when adopting SFAS 109, to build reserves that could be used to boost book income in future periods. Hanlon (2005) focuses on deferred tax timing differences and shows that firms with the most extreme book-tax differences have less persistent book earnings and the accrual portion of earnings is also less persistent.

[11] As mentioned earlier, the tax system may, for example, be less susceptible to managerial manipulation and may offer fewer choices, relative to GAAP, which may in turn result in a more homogeneous relation between tax variables and value.

In the empirical analysis that follows, we first establish that changes in tax expense are a strong signal of underlying profitability, incremental to the information contained in pre-tax and after-tax earnings. We then investigate different potential reasons why that result is observed. Finally, we seek to understand better why our results suggest that tax expense increases are good news whereas the results of prior research suggest the opposite conclusion. Some of the differences in results are likely due to differences in regression specifications. Some others could be due to sample differences. While we do not expect to resolve every difference, we seek to provide some general and robust results regarding how regression specifications and sample selection affect analyses of the valuation impact of tax expense surprises.

3. Sample data and descriptive statistics

We obtain data for our primary sample from two sources: a) Compustat files for earnings, tax, and other financial variables, and b) CRSP monthly return files for stock return data. Our sample contains 162,705 firm-years between 1978 and 2007 (inclusive).

Our main dependent variable is the return over a 12-month holding period (RET_t), beginning from the end of the third month of the current fiscal year (year t) to the end of the third month of the next year. The three-month offset between fiscal years and return holding periods is designed to allow time for public disclosure of the financial variables we use.

Our main explanatory variable is tax expense surprise, and is measured as tax expense per share in year t minus tax expense per share in year t-1. We assume that all income statement variables are described by a random walk process, which allows us to use the first difference to proxy for the unexpected portion of that variable. We also consider an alternative specification where the level of income statement variables proxies for the surprise in those variables.

Since variables are measured at a per share level, we adjust for stock splits and stock dividends to maintain consistency when computing year-to-year changes. We scale variables by lagged price to improve across-share comparisons, and we measure lagged price at the end of the third month of the current fiscal year to maintain consistency with our return measure. Each year, all variables (except returns) are Winsorized at 1% and 99% of their cross-sectional distributions. Details of all variables are provided in the Appendix.

Table 1 provides descriptive statistics for the variables we use. When investigating the relation between unexpected tax expense and returns, we control for contemporaneous changes in pre-tax profits (ΔIBT_t) or changes in after-tax profits (ΔE_t). At times we consider the separate effects of the income statement variables that determine pre-tax profits by replacing changes in pre-tax income with changes in Sales ($\Delta SALE_t$), Cost of Goods Sold ($\Delta COGS_t$), Selling, General, and Administrative expenses (ΔSGA_t), Depreciation (ΔDEP_t), Interest expense (ΔINT_t), and all other expenses, net of other income ($\Delta OTHERS_t$).

To control for the expected portion of observed returns we include three variables that explain cross-sectional variation in returns: a) the market value of equity at the end of the prior fiscal year (MV_{t-1}), b) the book-to-market ratio at the end of the prior fiscal year (BM_{t-1}), and c) observed returns over a prior 12-month period (RET_{t-1}), computed from the end of the second month of the prior fiscal year to the end of the second month of the current fiscal year. We insert a one-month gap between RET_{t-1} and RET_t to mitigate the potential for negative correlation between adjacent-period returns (see, for example, Jegadeesh and Titman, 1995).

Panel A of Table 1 provides statistics describing the pooled distribution of each of the variables. Despite Winsorizing all regressors at 1 and 99 percent of the cross-sectional distributions, the minimum and maximum values for some variables remain quite extreme. To

mitigate the possibility that our regression results are skewed by outlier values, we confirm that our results are not affected substantively when our main analyses are repeated based on a) regressors that have been Winsorized at the 2 and 98 percentiles as well as at the 5 and 95 percentiles and b) decile ranks of the regressors.[12]

Panel B of Table 1 provides Pearson and Spearman correlations between pairs of some of the key variables. Most correlations are significant at the 1 percent level. As expected, returns are positively related to changes in profits (both pre-tax and after-tax). Returns are also positively related to changes in tax expense. Since tax expense could be proxying for pre-tax profits, this positive correlation should not be interpreted as suggesting that increases in tax expense signal incremental good news, beyond that provided by changes in pre-tax profit. Finally, the relations between returns and the three variables we use as controls for expected returns are generally but not entirely consistent with prior research. Specifically, we find a positive Spearman correlation for lagged market capitalization and a negative Pearson correlation for lagged returns, which is the opposite of the negative relation with size and the positive relation with lagged returns (price momentum) documented in the literature.

4. Main results

Table 2 contains the mean coefficients from estimating 30 annual regressions of returns on profit measures, both with and without controls for expected returns and changes in tax expense. Column 1 refers to the simple regression of returns on changes in after-tax income, as described by equation (1) below. The slope coefficient on ΔE_t is 0.269, which is substantially

[12] The coefficients on changes in pre-tax income and tax expense for our main results reported in column 4 of Table 2 for the case of Winsorization at 1 and 99 percent increase when we Winsorize at 2 and 98 percent, and then increase further when we Winsorize at 5 and 95 percent. Regressions based on decile ranks result in very significant t-statistics that are higher (lower) than those reported in column 4 of Table 2 for changes in pre-tax income (tax expense). Results for each decile of tax expense change are reported in Table 3.

lower than the "earnings response coefficients" observed in prior research. We explore later possible reasons for this difference.

$$RET_t = \alpha_0 + \alpha_1 \Delta E_t + \omega_t \qquad (1)$$

Including the three control variables that explain returns increases the slope coefficient on ΔE_t slightly to 0.280, and also increases the adjusted R^2 from 2.2 percent to 5.0 percent (see results reported in column 2). Consistent with prior research, the coefficients on MV_{t-1}, BM_{t-1}, and RET_{t-1} are negative, positive, and positive, respectively, though only the coefficient on the second control variable is statistically significant.

The third and fourth columns in Table 2 repeat the analyses in the first two columns but replace changes in net income in equation (1) with changes in pre-tax income and changes in tax expense, as described by equation (2) below.

$$RET_t = \beta_0 + \beta_1 \Delta IBT_t + \beta_2 \Delta TAX_t + \varepsilon_t \qquad (2)$$

Since after-tax income equals pre-tax income minus tax expense, a naïve mechanical prediction would be that β_1 and β_2 should be positive and negative, respectively. And to the extent that pre-tax income and tax expense have similar persistence, the prediction would be that β_1 and β_2 should be of similar magnitude and also similar to α_1 from equation (1).

The results in columns 3 and 4 of Table 2 offer two surprising findings. First, even though tax expense is deducted when computing net income, its coefficient (β_2) is significantly positive. That is, if two firms report the same change in pre-tax income, the firm reporting a larger tax expense change is perceived to have reported better news, even though it reports a lower change in after-tax income.

Second, not only is the coefficient on tax expense changes positive, both the coefficient and the associated t-statistic are many times larger than the corresponding amounts for pre-tax

income changes (β_1). The higher coefficient magnitudes on tax expense surprise are consistent with two non-mutually exclusive conditions: a) tax expense proxies for underlying profitability with less measurement error than pre-tax income, and b) the coefficient on tax expense should be grossed up for tax rates to the extent that tax expense is capturing an alternative measure of pre-tax profit. Since we are uncertain about the specific way in which tax expense proxies for underlying profitability, the larger coefficient magnitudes are not easy to interpret. However, the considerably higher t-statistics associated with tax expense surprise suggest that changes in underlying profitability are more closely related to tax expense changes than changes in pre-tax income.

Since tax expense is determined partly by prevailing statutory tax rates, there is a potential concern that our overall results based on 30 annual regressions might be affected by years associated with changes in statutory tax rates. To investigate that possibility, we repeated the analyses in Table 2 after deleting four of the 30 years in our sample during which tax rates changed: 1982, 1987, 1988, and 1993. The results remain relatively unchanged for the reduced 26-year subsample.

To investigate the effect of potential non-linearity in the relation between tax expense surprise and stock returns, we report the time-series mean of annual returns earned by ten portfolios sorted on *residual* changes in tax expense, obtained by controlling for the level of changes in pre-tax income. To compute residual tax expense surprise, we regress tax expense changes on changes in pre-tax income each year (see equation (3) below). The residuals from these regressions (η_t) are used to sort firms into deciles each year, and mean returns are computed for those deciles.

$$\Delta TAX_t = \delta_0 + \delta_1 \Delta IBT_t + \eta_t \qquad (3)$$

Table 3 contains the time-series mean of the average returns earned each year by the residual tax expense surprise deciles, as well as the time-series means of the corresponding annual averages for tax expense changes and pre-tax income changes. D1 refers to the decile with the most negative residual tax expense surprise and D10 refers to the decile with the most positive residual tax expense surprise. The returns reported in the first column indicate that mean contemporaneous returns increase almost monotonically from 8.02 percent for D1 to 39.71 percent for D10. To the extent that residual tax expense surprise captures the incremental effect of tax expense surprise after controlling for surprises in pre-tax income, these results suggest that the conclusions from Table 2 are robust and reflect a systematic relation.

The second column in Table 3 shows that portfolios sorted on residual tax expense surprise exhibit a monotonic positive relation with tax expense changes. This positive relation is expected since tax expense change is positively but not perfectly correlated with pre-tax income change; i.e., the residual tax expense change remaining after removing the portion that is related to pre-tax income change should still exhibit a positive relation with tax expense change.

The third column in Table 3 shows a U-shaped relation between residual tax expense surprise and changes in pre-tax income. Despite the general positive correlation between tax expense and pre-tax income, D1 is associated with large *positive* changes in pre-tax income (8.3 percent, which is second only to that for D10), even though it is the portfolio with the most negative tax expense changes. The low returns earned by D1 emphasize the important incremental effect of tax expense changes, since the positive value of pre-tax income changes would suggest high returns. The absence of a linear relation in the third column suggests that the process of computing residual tax expense changes represents a successful effort to remove the

portion of the relation between tax expense changes and returns that is due to the positive relation between tax expense surprise and pre-tax income.

We investigate next whether the positive relation between returns and tax expense surprise documented so far is altered when we substitute pre-tax income in equation (2) with the underlying revenues and expense components of pre-tax income. One reason to do so is that the coefficient on pre-tax income effectively masks variation in the valuation coefficients on the underlying items. As a result, the coefficient on tax expense in equation (2) could be altered when the different components underlying pre-tax income are allowed their own separate coefficients. To make that substitution, we use the income statement line items considered in Lipe (1986). Specifically, pre-tax income can be restated as Sales ($SALES_t$) less the sum of Cost of Goods Sold ($COGS_t$), Selling, General and Administrative Expenses (SGA_t), Depreciation (DEP_t), Interest (INT_t), and Other expenses, net of Other income ($OTHERS_t$). The expanded version of equation (2) can be stated as follows.

$$RET_t = \gamma_0 + \gamma_1 \Delta SALE_t + \gamma_2 \Delta COGS_t + \gamma_3 \Delta SGA_t + \gamma_4 \Delta DEP_t + \gamma_5 \Delta INT_t + \gamma_6 \Delta OTHERS_t + \gamma_7 \Delta TAX_t + e_t \quad (4)$$

Mean values of the estimated coefficients from annual regressions based on equation (4) are reported in Table 4. In column 1 we exclude the three control variables that explain variation in returns whereas column 2 includes those three variables. The results suggest the following conclusions. First, whereas we observe positive coefficients on sales changes and negative coefficients on changes in different expense items in both specifications, tax expense is the only expense for which the mean coefficient is positive. Second, allowing for revenue and component expenses to have their own separate valuation coefficients raises, rather than lowers, the coefficients and t-statistics on tax expense changes, relative to the values reported in columns 3 and 4 of Table 2. Third, the magnitudes of the coefficient and t-statistics on tax expense changes,

which are substantially larger than those on pre-tax income changes in Table 2, continue to be substantially larger than those on revenue changes as well as those on changes in any other expense item.

5. Why does higher tax expense imply good news?

To understand why tax expense increases imply good news, despite controls for changes in pre-tax income, we regress next year's earnings changes on this year's earnings changes and tax expense changes. If the coefficient on tax expense changes continues to remain positive, a higher tax expense today is good news because it implies higher future profits. The results reported in Table 5 confirm that prediction. Panel A provides the results for the case where earnings changes are based on pre-tax earnings and Panel B provides corresponding results for after-tax earnings. In both Panels, the coefficient on tax expense changes is positive and significant. We note that significance is greater for the case of after-tax earnings in Panel B; a tax expense increase is more likely to be associated with an increase in future after-tax income, relative to future pre-tax income, possibly because future tax expense will be lower.[13]

Our next analysis relates to the separate valuation impact of the two components of tax expense: current and deferred portions. Columns 1 and 2 in Table 6 describe the impact of replacing changes in tax expense (ΔTAX_t) in Columns 3 and 4 in Table 2 with changes in the current ($\Delta CTAX_t$) and deferred ($\Delta DTAX_t$) portions of tax expense. The results in Table 6 suggest that a dollar of changes in the current portion of tax expense has a considerably larger valuation impact than a dollar of changes in the deferred portion. The substantially higher t-statistics on $\Delta CTAX_t$ imply that the positive relation between tax expense changes and returns we document in Table 2 is driven primarily by the current portion. Comparing changes in the two components

[13] The negative coefficient observed on current earnings changes in both Panels reflects the mean reversion that exists for changes in annual earnings.

of tax expense with changes in pre-tax income indicates that while the magnitudes of coefficients and associated t-statics for the deferred portion are slightly below those for pre-tax income, those on the current portion are considerably higher.[14] Finally, observing similar coefficients in columns 1 and 2 of Table 6 confirm that our findings are not sensitive to the inclusion of controls for expected returns.

We consider next potential reasons why changes in the current and deferred portions of tax expense are positively related to value changes. Finding a large positive coefficient on changes in the current portion of tax expense suggests that pre-tax profit calculated using tax rules provides incremental information about long-term profitability, beyond that provided by pre-tax profit calculated using GAAP rules. The current portion of tax expense reflects taxes due on taxable income, the measure of pre-tax profit computed on tax returns. On the surface this conclusion seems odd, given that accounting rules focus on value creation whereas tax rules are also influenced by other considerations, such as fairness, ability to pay, and legislative efforts to use tax rules to alter taxpayers' incentives.

Recent evidence, however, has supported the view that profits calculated using tax rules represent an alternative measure of profits that provides value-relevant information not contained in accounting profits (e.g., Lev and Nissim, 2004, and Weber, 2009). Profit calculations under tax rules leave less room for estimates and judgment, relative to accounting profits. While managers can potentially use increased flexibility to improve the value relevance of accounting

[14] We find that separating the current and deferred portions of tax expense into their federal, foreign, and state and local subcomponents results in large positive and significant coefficients on all three subcomponents for both the current and deferred portions. The coefficients and t-statistics for the three subcomponents of deferred tax remain smaller than those for the corresponding subcomponents of current tax, but the differences are smaller than that reported for the overall deferred and current portions in Table 6 (which is based on a larger sample).

profits, it is possible that this increased flexibility results in greater measurement error and heterogeneity which dilutes the value relevance of accounting profits.[15]

Observing a positive coefficient on changes in the deferred portion of tax expense suggests that increases in the deferred portion of tax expense signal good news, holding constant changes in both pre-tax accounting income and the current portion of tax expense. Evidence documented in the prior literature suggests that firms use the deferred portion of tax expense to manipulate reported after-tax income and investors recognize those manipulations.[16] That is, firms experiencing unusually low pre-tax accounting profits are likely to understate the deferred portion of their tax expense to report a higher after-tax income than they would have otherwise. Our evidence suggests that deferred tax expense is a more fundamental signal of underlying profitability. Not only does a lower deferred tax expense suggest an overstated after-tax income, it also suggests an overstated pre-tax income. As a result, a decrease (increase) in the deferred portion of tax expense is rationally interpreted by the stock market as a negative (positive) signal, even when changes in pre-tax income and the current portion are held constant.

It is important to note that inferences regarding incremental information content are conditional on the validity of assumptions built into the valuation regressions. For example, the coefficients could be biased if the variables we use measure the underlying concepts with error. As described later, it is possible that surprises in pre-tax income are measured with more error than surprises in tax expense. Similarly, the regression specification assumes a linear relation between returns and surprises in pre-tax income and tax expense, with that linear relation being

[15] To be sure, there is also room for tax profits to be calculated differently for different firms; specifically, there is evidence of differential tax aggressiveness across firms (Graham and Tucker 2006; Desai and Dharmapala 2009). To the extent that tax aggressiveness does not vary much over time, however, annual *changes* in the current portion of tax expense are unlikely to be affected by this source of cross-sectional heterogeneity.

[16] For example, Schrand and Wong (2003) provide evidence of how well-capitalized banks create valuation allowances and reduced deferred tax assets when adopting SFAS 109, to build reserves that could be used to boost book income in future periods. Also, the evidence in Dhaliwal et al. (2004) suggests that firms increase earnings by decreasing tax expense, possibly via the accruals in deferred taxes.

homogeneous across firms in the same cross-section. To the extent that the relation between value and accounting profits is more nuanced than the simple structure implied by valuation regressions, the value relevance of accounting profits is suppressed. And to the extent that the relation between value and tax expense is more homogeneous and consistent with the simple structure implied by valuation regressions, tax expense changes are more likely to exhibit incremental information content as proxies for underlying profitability.

6. Robustness tests

Our results so far indicate that regressions of firm returns on changes in annual tax expense result in significant positive coefficients, in the presence of controls for changes in pre-tax income and its components. These regressions are estimated in cross-section each year across a large sample of all firms with available data during the period between 1978 and 2007, and the regressors are scaled by lagged price per share. We consider below whether our results are sensitive to those specifications in an effort to relate our results to those reported in prior research.

6.1 Time-series regressions

Lipe (1986) is an early study that considers the relation between returns and unexpected revenues and expenses by estimating time-series firm-by-firm regressions for a sample of 81 firms. The results in that study confirm the common intuition that unexpected revenue increases are good news and unexpected increases in all expenses, including tax expense, are bad news. While there are a number of differences between that study and our analyses that could be responsible for the opposite results relating to tax expense, we consider here the impact of estimating time-series versus cross-sectional regressions by collecting a subsample of 367 firms with non-missing data for the variables in equation (4) over the 30-year period between 1978 and

2007. To control for time-series variation in expected returns and to improve comparability with Lipe (1986), we include the market return earned over each annual period as an additional regressor.

Panel A of Table 7 provides the results of estimating firm-by-firm time-series regressions (left half) as well as annual cross-sectional regressions (right half) based on equation (4). The t-statistics in Table 7 are equal to $\sqrt{n} * \frac{mean}{stdev}$, where *n*, *mean*, and *stdev* are the number, mean, and standard deviation of the distribution of coefficients in each setting. Comparing the results in the left half of Panel A with those in the right half suggests that the inferences are generally the same: revenue changes have significant positive coefficients and all other expense changes have significant negative coefficients in both halves. There is a difference, however, for tax expense changes: it is associated with a significant negative coefficient for the time-series regressions but a positive (albeit insignificant) coefficient for the cross-sectional regressions.

While these Panel A results suggest that inferences are affected by the choice of time-series versus cross-sectional regressions, the results reported in Panel B reveal that the time-series evidence is not robust. We consider the impact on our time-series regressions of two transformations of the earnings surprise components: a) we use decile rankings, based on each firm's distributions (see left half of Panel B), and b) we Winsorize the lowest and highest value to the corresponding adjacent values, based on each firm's distributions for the different variables (see right half of Panel B). We find that the negative coefficient observed on tax expense surprise in the left half of Panel A switches to a positive coefficient in both cases considered in Panel B. It appears that a few influential observations in the firm-by-firm distributions are responsible for the negative coefficients on tax expense changes reported in the

left half of Panel A. Dampening the influence of those observations causes the time-series results to conform to the cross-sectional results reported earlier for our overall sample.

We repeated the analysis of next year's profit changes (both pre and after-tax profits) considered in Table 5 using time-series and cross-sectional regressions on our 367-firm subsample with non-missing data for all 30 years. Consistent with the results reported in Panel B of Table 7, we find that the coefficient on tax changes (results available upon request) is positive for both time-series and cross-sectional regressions, for both pre and after-tax profits. Overall, we conclude that for our sample period and methodology both time-series and cross-sectional analyses suggest that tax expense increases are good news for stock returns.[17]

6.2 Levels regressions versus changes regressions

In contrast with the general findings of prior research, results consistent with tax expense increases being viewed as good news by the stock market have been reported in Ohlson and Penman (1992). The regression specification in that paper resembles equation (4), except *changes* in earnings components are replaced by *levels* of those components. As described in Ohlson and Penman (1992) the levels specification is appropriate under certain assumptions. We investigate whether using the levels specification for our sample alters the results reported so far, which are based on the changes specification.

The results in Table 8 confirm that the coefficient on tax expense remains positive and significant when we switch to the levels specification. Columns 1 and 2 contain the results of estimating the annual cross-sectional levels regressions based on equations (2) and (4),

[17] We do not suggest that the results in Lipe (1986) are due to outliers or that similar transformations of the income statement variables would reverse the coefficient on tax expense surprises. As described later, our results appear to be affected substantially by the presence of loss firm-years, which were relatively infrequent during the sample period considered in Lipe (1986).

respectively. In both cases, we include the three controls for expected returns. The coefficient on TAX_t is positive and significant in both columns.[18]

As described in Ohlson and Penman (1992), reporting results that are aggregated over many years, rather than for annual windows, causes the sign of the coefficient on tax expense to switch from positive to negative. In that paper, the switch occurs between five-year windows and ten-year windows. We recognize that the coefficient on tax expense must eventually turn negative as the window widens sufficiently. Wider windows that span more years reduce the biases discussed in Section that are due to measurement errors, misspecification, and cross-sectional heterogeneity.

6.3 Other robustness analyses

Table 9, Panel A, contains the results of sensitivity analyses designed to determine whether our results are affected by our choice of lagged price as the deflator for surprises in pre-tax income and tax expense. We consider lagged total assets per share ($TAPS_{t-1}$) instead of lagged price. Comparing columns 1 and 2 of Panel A with columns 3 and 4 of Table 2, we find that the main results remain unchanged: tax expense changes are associated with positive coefficients, and those coefficients are larger than the positive coefficients on changes in pre-tax income.

Panel B of Table 9 provides the results of estimating equation (2) separately for sample partitions based on firm size. Each year, firms are sorted into three equal size categories—small, medium, and large—based on market capitalization at the end of the prior fiscal year, and cross-sectional regressions are estimated within each size category. The mean coefficients reported in Panel B suggest that the value impact per dollar of tax expense change (coefficient on ΔTAX) is

[18] We also combine both the levels of and changes in tax expense and pre-tax income and find that the coefficients are always substantially higher for tax expense, relative to pre-tax income, though the t-statistics on tax expense surprise are higher only for levels, not for changes.

highest for medium firms and smallest for large firms, whereas the value impact per dollar of pre-tax income change (coefficient on ΔIBT) increases with firm size.[19]

Prior research (e.g., Lev and Thiagarajan, 1992, Bryant-Kutcher et al, 2010, and Schmidt, 2006) has considered the valuation effect of earnings changes by separating that change into the portion that is due to changes in the effective tax rate (ratio of tax expense to pre-tax income) and the portion that is due to changes in the level of pre-tax income. To allow for meaningful interpretation of the estimated effects of those two portions, researchers have required that a) pre-tax income be positive in both the current and prior year, and b) effective tax rates ($ETR_t=TAX_t/IBT_t$) lie between 0 and 100 percent in both the current and prior year. Given the prevalence in recent years of losses and cases where TAX_t and IBT_t have opposite signs, imposing those restrictions reduces substantially the sample sizes available.

To determine the impact of these two conditions, we investigate different partitions of our sample based on values of pre-tax income, effective tax rates, and tax expense. The first partition is based on both conditions: Subsample A contains firm-years with positive IBT_t and IBT_{t-1} and both ETR_t and ETR_{t-1} lie between 0 and 1, whereas Non-subsample A contains all other firm-years. We then partition our sample based solely on the positive pre-tax condition: Subsample B contains firm-years with positive IBT_t and IBT_{t-1}, whereas Non-subsample B contains all other firm-years. Finally, we partition our sample based on whether or not tax expense is positive in both the current and prior years: Subsample C contains firm-years with positive TAX_t and TAX_{t-1}, whereas Non-subsample C contains all other firm-years

[19] To investigate cross-sectional variation in coefficient estimates from regressions based on equation (2), we partitioned the sample into quintiles based on a) share price, b) book-to-market ratio, and c) sales growth. While the coefficient magnitudes and t-statistics on tax expense surprise are not always larger than those on pre-tax income surprise, those coefficients are always positive and significantly different from zero.

Panel C of Table 9 provides the results for the three sets of partitions. We find that the coefficient on tax expense changes is insignificant in both subsamples A and B, whereas the coefficient on changes in pre-tax income is large and significant in both subsamples. In contrast non-subsamples A and B are both associated with large and significant positive coefficients on tax expense changes but much weaker coefficients for changes in pre-tax income. It appears as if the presence of losses and effective tax rates that are below 0 percent and above 100 percent reduces the explanatory power of pre-tax income changes. In effect, pre-tax income changes measure changes in underlying profitability with considerable error in non-subsamples A and B. In such cases, the relation between tax expense changes and current and future profitability adds considerable incremental value relevance.

Subsample C is selected to minimize potential measurement error for tax expense changes by requiring that tax expense be positive in both the current and prior years. As expected, that subsample is associated with the largest, most significant coefficient on tax expense changes reflecting the substantial incremental value relevance of tax expense changes when tax expense measures underlying profitability with the least error.

The analyses in Panel C of Table 9 illustrate the importance of measurement error in value relevance regressions. Subsamples associated with less (more) measurement error for pre-tax income generate the strongest (weakest) coefficients for changes in pre-tax income but the weakest (strongest) coefficients on tax expense changes. While it is reasonable in many contexts to delete firms where pre-tax income is likely to have been measured with more error, we see no *a priori* reason to do so in our study. Moreover, these firms represent a substantial fraction of firms—Non-subsamples A and B represent about 45 and 35 percent of our overall sample,

respectively—and that fraction has been increasing over time.[20] In sum, while our results suggest that a significant, positive relation between returns and tax expense changes is not observed for subsamples where the positive relation between returns and pre-tax income changes is strongest, analyses that focus on larger, more representative samples will be characterized by tax expense representing an important, incremental proxy of current and future profitability, indicated by a significant, positive relation between returns and tax expense changes.

We conducted other sensitivity analyses to determine if the strong positive relation between tax expense changes and returns is robust. For example, we deleted firms in the financial services and utility industries and added other regressors to equation (2) such as changes in tax loss carryforwards. In every case (results not tabulated here), we find that the coefficient on tax expense surprise is positive and very significant.

7. Conclusion

We document a surprising result regarding the valuation of tax expense: holding constant year-to-year changes in pre-tax earnings, a higher year-to-year change in tax expense and therefore a bigger reduction in after-tax earnings is associated with higher stock returns. The same positive relation with stock returns is observed for both the current and deferred components of tax expense surprise. This result is even more puzzling because the relation observed for changes in all other expense items is exactly the opposite: a higher change in all other expenses, while holding constant the level of change in revenues, is associated with lower returns.

We believe this result is caused by misspecification in the common valuation regression used and error in the extent to which pre-tax income surprises measure underlying changes in

[20] Dhaliwal et al. (2010) focus on firms reporting losses, and investigate how information in taxable income, net operating losses, and the valuation allowance can be used to estimate the persistence of losses.

core profitability, since the positive relation between returns and changes in tax expense declines substantially for "clean" subsamples, where pre-tax income is measured with less error. Overall, however, the observed positive relation with stock returns is strong, even stronger than that observed for surprises in pre-tax income, and survives a variety of robustness tests. Apparently, tax expense is generally a reliable, alternative measure of current and future profitability.

There appear to be two ingredients which are necessary for our surprising result. First, tax expense is different from other expenses in the sense that it is derived directly from contemporaneous pre-tax profit. Whereas increases in other expenses cause a decline in profits if the matched increase in revenues is insufficient to cover the higher expense, tax expense reflects profits because it is derived endogenously after pre-tax profit is computed. Second, tax expense provides a signal of underlying profitability in current and future periods that is not already provided by changes in revenues and other expenses.

We believe that features of the two components of tax expense are consistent with the requirements for our surprising result. The current portion of tax expense is derived from taxable income, which can be viewed as an alternative calculation of profit based on tax rules that is potentially more homogeneous and less amenable to managerial manipulation than accounting profits. Similarly, managerial efforts to manage the deferred portion of tax expense might result in reported tax expense numbers that are positively related to both the quality of reported pre-tax income and the level of underlying pre-tax profitability.

Appendix: Variable definitions

(Annual COMPUSTAT data items are provided in parentheses under Description)

Variables	Description
RET_t	The 12-month buy-and-hold stock returns starting from the end of the 3rd month of year *t* to the end of the 3rd month of year *t+1*.
ΔE_t	Changes in earnings per share (IB/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of the current fiscal year.
ΔTAX_t	Changes in tax expense per share (TXT/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
ΔIBT_t	changes in income before tax per share from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*. Calculated as $\Delta E_t + \Delta TAX_t$
$\Delta SALE_t$	Changes in sales per share (SALE/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
$\Delta COGS_t$	Changes in cost of goods sold per share (COGS/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
ΔSGA_t	Changes in selling, general, and administrative expense per share (XSGA/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
ΔDEP_t	Changes in depreciation expense per share (DP/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
ΔINT_t	Changes in interest expense per share (XINT/(CSHO*AJEX)) from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*.
$\Delta OTHER_t$	Changes in other expense per share from year t-1 to year t scaled by stock price at the end of the 3rd month of year *t*. Calculated as $\Delta SALE_t - \Delta COGS_t - \Delta SGA_t - \Delta DEP_t - \Delta INT_t - \Delta TAX_t - \Delta E_t$
$\Delta CTAX_t$	Changes in current tax expense per share from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*, where current tax expense per share is TXC/(CSHO*AJEX) if TXC is non-missing and (TXT-TXDI)/(CSHO*AJEX) otherwise.
$\Delta DTAX_t$	Changes in deferred tax expense per share from year *t-1* to year *t* scaled by stock price at the end of the 3rd month of year *t*. Calculated as $\Delta TAX_t - \Delta CTAX_t$
MV_{t-1}	The market value of equity (CSHO*PRCC_F) at end of year *t-1*.
BM_{t-1}	The book-to-market ratio (CEQ/(CSHO*PRCC_F)) at end of year *t-1*.
RET_{t-1}	Prior year's 12-month stock returns with a one-month lag relative to RET_t (from the end of the 2nd month of year *t-1* to the end of the 2nd month of year *t*).

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Table 1

Descriptive statistics

Panel A: Univariate statistics

Variable	N	Mean	Stdev	Min	Q1	Median	Q3	Max
RET_t	162705	0.170	0.856	-0.999	-0.231	0.055	0.371	58.680
ΔE_t	162705	0.027	0.838	-14.305	-0.028	0.007	0.037	16.024
ΔIBT_t	162705	0.036	0.913	-10.719	-0.038	0.010	0.053	18.717
ΔTAX_t	162705	0.004	0.092	-0.841	-0.007	0.000	0.013	0.999
$\Delta CTAX_t$	162705	0.003	0.055	-0.407	-0.003	0.000	0.008	0.742
$\Delta DTAX_t$	162705	0.002	0.075	-1.282	-0.006	0.000	0.007	1.405
$\Delta SALE_t$	162438	-0.032	2.369	-63.955	-0.039	0.048	0.204	24.839
$\Delta COGS_t$	162435	-0.028	2.006	-60.047	-0.028	0.027	0.140	27.312
ΔSGA_t	131955	-0.021	0.609	-14.997	-0.008	0.013	0.049	4.528
ΔDEP_t	154511	-0.002	0.128	-2.822	-0.002	0.002	0.009	1.498
ΔINT_t	140421	-0.006	0.202	-5.511	-0.004	0.000	0.007	1.654
$\Delta OTHERS_t$	111539	0.004	0.405	-4.498	-0.013	0.000	0.013	6.718
MV_{t-1}	159140	1350.6	5584.0	0.5	23.5	100.1	515.0	88166.3
BM_{t-1}	159085	0.724	0.650	-1.595	0.314	0.574	0.949	6.663
RET_{t-1}	160852	0.195	1.346	-0.995	-0.196	0.069	0.368	408.26

Panel B: Correlation matrix for variables measuring profits, tax expense, and expected return (Pearson correlations are shown above the main diagonal and Spearman correlations are shown below, 158,831 firm-year observations with non-missing variables)

	RET_t	ΔE_t	ΔIBT_t	ΔTAX_t	MV_{t-1}	BM_{t-1}	RET_{t-1}
RET_t	1	0.088**	0.097**	0.111**	-0.019**	0.095**	-0.042**
ΔE_t	0.308**	1	0.961**	0.256**	-0.007**	-0.018**	-0.021**
ΔIBT_t	0.312**	0.960**	1	0.371**	-0.008**	-0.008**	-0.022**
ΔTAX_t	0.248**	0.537**	0.666**	1	-0.006	0.055**	-0.001
MV_{t-1}	0.035**	-0.048**	-0.051**	-0.001	1	-0.114**	0.011**
BM_{t-1}	0.160**	-0.007**	-0.003	0.025**	-0.293**	1	-0.105**
RET_{t-1}	0.012**	0.033**	0.034**	0.084**	0.198**	-0.175**	1

** Significant at the 1% level.

RET_t is the 12-month buy-and-hold stock return from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year. ΔE_t is change in earnings per share. ΔIBT_t is change in income before tax per share. ΔTAX_t is change in tax expense per share. $\Delta CTAX_t$ is change in current tax expense per share. $\Delta DTAX_t$ is change in deferred tax expense per share. Changes in earnings can also be expressed as changes in its components: $\Delta SALE_t$ is change in sales per share, $\Delta COGS_t$ is change in cost of goods sold per share, ΔSGA_t is change in selling, general, and administrative expense per share, ΔDEP_t is change in depreciation expense per share, ΔINT_t is change in interest and related expense per share. $\Delta OTHER_t$ is change in other expense per share ($=\Delta SALE_t - \Delta COGS_t - \Delta SGA_t - \Delta DEP_t - \Delta INT_t - \Delta TAX_t - \Delta E_t$). MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock return with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). The sample includes all firm-year observations with non-missing RET_t , ΔIBT_t, and ΔTAX_t from 1978 to 2007. Each year, all variables except for return variables are Winsorized at 1% and 99%, and all earnings and earnings component variables are scaled by stock price at the end of the 3rd month of the current fiscal year.

Table 2
Regressions of returns on surprises in earnings, pre-tax income, and tax expense

	1	2	3	4
Intercept	0.168 (4.00)	0.169 (2.05)	0.165 (3.93)	0.169 (2.05)
ΔE_t	0.269 (5.53)	0.280 (5.45)		
ΔIBT_t			0.208 (4.39)	0.220 (4.38)
ΔTAX_t			0.730 (10.64)	0.666 (9.45)
$Log(MV_{t-1})$		-0.012 (-1.52)		-0.012 (-1.45)
BM_{t-1}		0.082 (4.08)		0.076 (3.76)
RET_{t-1}		0.005 (0.37)		0.004 (0.27)
Adj. R^2	0.022	0.050	0.035	0.061
# of obs.	162,705	158,831	162,705	158,831

This table describes regressions of contemporaneous returns (RET_t) on earnings surprises (ΔE_t) and its components (ΔIBT_t and ΔTAX_t). RET_t is the 12-month buy-and-hold stock return from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year. ΔE_t is change in earnings per share. ΔIBT_t is change in income before tax per share. ΔTAX_t is change in tax expense per share. All three surprise measures are scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock return with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). The sample period is from 1978 to 2007. Each year, all variables except for returns are Winsorized at 1% and 99%. The coefficient estimates are averages of annual estimates over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 3
Returns for residual tax expense surprise deciles, controlling for pre-tax income surprise

	RET_t	ΔTAX_t	ΔIBT_t
D1	8.02%	-0.122	0.083
D2	8.56%	-0.030	0.001
D3	10.16%	-0.011	0.013
D4	10.63%	-0.003	0.011
D5	9.20%	0.000	0.000
D6	11.30%	0.003	-0.003
D7	19.42%	0.008	0.004
D8	25.12%	0.016	0.012
D9	31.59%	0.035	0.037
D10	39.71%	0.150	0.197
D10 – D1	31.69% (10.37)	0.272 (15.87)	0.114 (2.78)

The table reports mean 12-month buy-and-hold stock returns (RET_t) from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year across ten deciles based on residual tax expense surprise (residual ΔTAX_t) after controlling for income before tax surprise (ΔIBT_t). Residual tax expense surprise is calculated as the residual from regressing ΔTAX_t on ΔIBT_t in each year (see equation (3)). ΔTAX_t is change in tax expense per share and ΔIBT_t is change in income before tax per share, both scaled by stock price at the end of the 3rd month of the current fiscal year. Each year, we sort firms into ten deciles based on residual ΔTAX, and compute mean stock returns of firms in each decile, as well as means for ΔTAX_t and ΔIBT_t. The sample includes 162,705 firm-year observations from 1978 to 2007. The values reported in the Table are time-series averages of annual means for the different deciles over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 4
Regressions of returns on the revenue and expense components of earnings surprise

	1	2
Intercept	0.163 (3.67)	0.186 (2.29)
$\Delta SALE_t$	0.265 (3.24)	0.273 (3.27)
$\Delta COGS_t$	-0.226 (-2.99)	-0.233 (-3.00)
ΔSGA_t	-0.142 (-2.18)	-0.139 (-2.28)
ΔDEP_t	-0.473 (-4.02)	-0.437 (-3.77)
ΔINT_t	-0.544 (-4.07)	-0.565 (-4.26)
$\Delta OTHERS_t$	-0.104 (-3.67)	-0.119 (-4.16)
ΔTAX_t	0.848 (12.45)	0.795 (10.94)
$Log(MV_{t-1})$		-0.014 (-1.79)
BM_{t-1}		0.070 (3.87)
RET_{t-1}		-0.006 (-0.51)
Adj. R^2	0.048	0.070

This table describes regressions of 12-month buy-and-hold stock returns (RET_t), measured from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year, on the following components of changes in earnings per share (ΔE_t): $\Delta SALE_t$ is change in sales per share, $\Delta COGS_t$ is change in cost of goods sold per share, ΔSGA_t is change in selling, general, and administrative expense per share, ΔDEP_t is change in depreciation expense per share, ΔINT_t is change in interest and related expense per share , $\Delta OTHER_t$ is change in other expense per share ($=\Delta SALE_t - \Delta COGS_t - \Delta SGA_t - \Delta DEP_t - \Delta INT_t - \Delta TAX_t - \Delta E_t$). All earnings component changes are scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock returns with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). The sample includes 111,539 and 108,749 firm-year observations with non-missing variables from 1978 to 2007 in models 1 and 2, respectively. Each year, all variables except for returns are Winsorized at 1% and 99%.The coefficient estimates are the average of annual estimates over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 5
Regressions of future earnings surprises on tax expense surprises

Panel A: Surprises based on future pre-tax earnings (ΔIBT_{t+1})

	1	2
Intercept	0.083 (5.16)	0.082 (5.11)
ΔIBT_t	-0.243 (-5.36)	-0.271 (-5.39)
ΔTAX_t		0.267 (2.00)
Adj. R^2	0.040	0.044

Panel B: Surprises based on future after-tax earnings (ΔE_{t+1})

	1	2
Intercept	0.074 (4.84)	0.073 (4.79)
ΔE_t	-0.266 (-5.55)	-0.292 (-5.87)
ΔTAX_t		0.402 (4.68)
Adj. R^2	0.045	0.049

This table describes regressions of earnings surprises in year *t+1* on earnings surprises and tax surprise (ΔTAX) in year *t*. The results in Panels A and B describe changes in pre-tax (ΔIBT) and after-tax (ΔE) earnings per share, respectively. Surprises for all income statement variables are computed as first differences, scaled by stock price at the end of the 3rd month of the current fiscal year. The sample includes 145,409 firm-year observations from 1978 to 2006. Each year, all variables are Winsorized at 1% and 99%.The coefficient estimates are averages of annual estimates over 29 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 6
Regressions of returns on surprises in pre-tax income and tax expense components

	1	2
Intercept	0.162 (3.91)	0.169 (2.05)
ΔIBT_t	0.196 (4.46)	0.208 (4.43)
$\Delta CTAX_t$	2.074 (10.30)	1.985 (10.42)
$\Delta DTAX_t$	0.259 (3.61)	0.208 (2.91)
$Log(MV_{t-1})$		-0.012 (-1.45)
BM_{t-1}		0.073 (3.60)
RET_{t-1}		0.000 (0.02)
Adj. R^2	0.042	0.068

This table describes regressions of 12-month contemporaneous stock returns (RET_t), measured from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year, on income before tax surprise (ΔIBT), current tax surprise ($\Delta CTAX$), and deferred tax surprise ($\Delta DTAX$). ΔIBT_t is change in income before tax per share, $\Delta CTAX_t$ is change in current tax expense per share, and $\Delta DTAX_t$ is change in deferred tax expense per share, all scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock return with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). The sample includes 162,705 and 158,831 firm-year observations with non-missing variables from 1978 to 2007 in columns 1 and 2, respectively. Each year, all variables except for returns are Winsorized at 1% and 99%.The coefficient estimates are averages of annual estimates over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 7
Time-series regressions: reconciling with Lipe (1986)

Panel A: time-series versus cross-sectional regressions

	Time-series regressions (as in Lipe (1986))			Cross-sectional regressions (Fama-MacBeth)		
	Mean	t	Median	Mean	t	Median
Intercept	0.009	1.80	0.016	0.006	0.27	-0.010
$MRET_t$	0.858	27.85	0.808	1.102	13.38	1.117
$\Delta SALE_t$	3.490	11.23	2.288	1.265	6.77	1.116
$\Delta COGS_t$	-3.964	-9.42	-2.567	-1.243	-6.64	-1.116
ΔSGA_t	-2.462	-6.38	-1.751	-1.011	-4.97	-0.619
ΔDEP_t	-3.236	-3.29	-1.774	-1.282	-2.87	-1.282
ΔINT_t	-5.085	-4.81	-3.093	-2.222	-4.41	-1.942
$\Delta OTHERS_t$	-1.233	-4.05	-0.757	-0.106	-1.40	-0.093
ΔTAX_t	-1.866	-3.06	-1.010	0.040	0.33	0.042
Adj. R^2		0.349			0.209	

Panel B: Robustness of time-series regression results.

	Earnings surprise components are					
	Converted to decile rankings			Winsorized at the lowest and highest value for each firm		
	Mean	t	Median	Mean	t	Median
Intercept	-0.060	-2.84	-0.039	0.010	1.96	0.016
$MRET_t$	0.920	26.50	0.803	0.859	28.05	0.790
$\Delta SALE_t$	0.422	6.18	0.439	1.537	7.67	1.371
$\Delta COGS_t$	-0.240	-4.11	-0.245	-2.192	-5.70	-1.490
ΔSGA_t	0.023	0.80	0.016	-0.301	-0.85	-0.534
ΔDEP_t	-0.025	-1.32	-0.015	-0.870	-0.73	-0.492
ΔINT_t	-0.146	-7.39	-0.106	-4.230	-3.52	-2.875
$\Delta OTHERS_t$	-0.015	-0.82	-0.028	-0.099	-0.30	-0.068
ΔTAX_t	0.232	9.43	0.230	2.676	5.78	1.546
Adj. R^2		0.295			0.333	

This table describes regressions of 12-month contemporaneous stock returns, from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year (RET_t), on value-weighted market returns ($MRET_t$) and the following components of earnings surprises: change in sales per share ($\Delta SALE_t$), change in cost of goods sold per share ($\Delta COGS_t$), change in selling, general, and administrative expense per share (ΔSGA_t), change in depreciation expense per share (ΔDEP_t), change in interest and related expense per share (ΔINT_t), change in tax expense (ΔTAX), and change in other expense per share ($\Delta OTHER_t = \Delta SALE_t - \Delta COGS_t - \Delta SGA_t - \Delta DEP_t - \Delta INT_t - \Delta TAX_t - \Delta E_t$). All earnings surprise components are scaled by stock price at the end of the 3rd month of the current fiscal year. The sample includes 367 firms with non-missing earnings surprise components data from 1978 to 2007, with a total of 11,010 firm-year observations. In Panel A, the left three columns report results of time-series regressions as in Lipe (1986) and the right three columns report results of cross-sectional regressions as in Fama & MacBeth (1973). In Panel B, the left three columns report results of time-series regressions using decile rankings of earnings surprises components, and the right three columns report results of time-series regressions after Winsorizing the lowest and highest values for each earnings surprise component for each firm.

Table 8
Levels regressions: reconciling with Ohlson and Penman (1992)

	1	2
Intercept	0.219 (2.66)	0.205 (2.46)
IBT_t	0.157 (2.98)	
$SALE_t$		0.094 (2.88)
$COGS_t$		-0.100 (-3.03)
SGA_t		-0.076 (-2.19)
DEP_t		0.081 (1.50)
INT_t		-0.139 (-3.14)
$OTHERS_t$		-0.223 (-4.00)
TAX_t	1.207 (8.92)	1.557 (12.53)
$Log(MV_{t-1})$	-0.025 (-3.09)	-0.026 (-3.12)
BM_{t-1}	0.058 (3.05)	0.053 (3.85)
RET_{t-1}	-0.023 (-1.42)	-0.024 (-1.76)
Adj. R^2	0.069	0.077

This table describes regressions of 12-month contemporaneous stock returns, from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year (RET_t), on components of earnings per share (E_t), which can be viewed either as pre-tax earnings per share (IBT_t) less tax expense per share (TAX_t), or as Sales per share ($SALE_t$) less the following expenses per share: $COGS_t$ is cost of goods sold per share , SGA_t is selling, general, and administrative expense per share, DEP_t is depreciation expense per share, INT_t is interest and related expense per share,. $OTHER_t$ is other expense per share (=$SALE_t$ - $COGS_t$ - SGA_t - DEP_t - INT_t - TAX_t - E_t). All earnings numbers and its components are scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock return with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). The sample includes 159,221 and 111,750 firm-year observations with non-missing variables from 1978 to 2007 in columns 1 and 2, respectively. Each year, all variables except for return variables are Winsorized at 1% and 99%.The coefficient estimates are averages of annual estimates over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 9
Robustness checks: regression of returns on pre-tax income & tax expense surprises

Panel A: Using lagged total assets per share, not lagged price per share, as the deflator

	1	2
Intercept	0.156 (3.76)	0.138 (1.76)
$\Delta IBT_t / TAPS_{t-1}$	0.831 (9.13)	0.857 (10.51)
$\Delta TAX_t / TAPS_{t-1}$	2.636 (10.56)	2.622 (10.34)
$Log(MV_{t-1})$		-0.010 (-1.23)
BM_{t-1}		0.094 (4.79)
RET_{t-1}		-0.007 (-0.50)
Adj. R^2	0.067	0.095
# of observations	162,705	158,831

Panel B: Sub-samples partitioned on firm size (market capitalization)

	Small firms	Medium firms	Large firms
Intercept	0.396 (3.56)	0.085 (0.92)	0.086 (1.27)
ΔIBT_t	0.094 (2.84)	0.406 (5.46)	0.741 (13.22)
ΔTAX_t	0.296 (5.09)	0.690 (7.39)	0.178 (1.20)
$Log(MV_{t-1})$	-0.088 (-4.11)	0.001 (0.05)	0.001 (0.13)
BM_{t-1}	0.043 (2.45)	0.093 (3.68)	0.074 (2.03)
RET_{t-1}	-0.035 (-1.22)	0.013 (1.08)	0.021 (1.33)
Adj. R^2	0.036	0.079	0.103
# of observations	52,931	52,953	52,947

Panel C: Sub-samples partitioned on income before tax (IBT), effective tax rate (ETR), and tax expense (TAX)

	Subsample A (IBT_t, $IBT_{t-1}>0$, $0<ETR_t$, $ETR_{t-1}<1$)	Non-subsample A	Subsample B (IBT_t, $IBT_{t-1}>0$)	Non-subsample B	Subsample C (TAX_t, $TAX_{t-1}>0$)	Non-subsample C
Intercept	0.249 (4.80)	0.187 (1.92)	0.257 (4.88)	0.198 (2.02)	0.233 (3.84)	0.187 (1.88)
ΔIBT_t	2.240 (12.14)	0.109 (3.07)	2.161 (10.93)	0.093 (2.94)	0.681 (6.90)	0.105 (2.87)
ΔTAX_t	0.053 (0.31)	0.189 (3.99)	-0.183 (-0.93)	0.148 (3.16)	2.321 (12.18)	0.172 (3.58)
$Log(MV_{t-1})$	-0.018 (-3.71)	-0.033 (-3.41)	-0.019 (-3.89)	-0.043 (-4.50)	-0.017 (-3.05)	-0.035 (-3.34)
BM_{t-1}	0.062 (3.41)	0.058 (3.24)	0.060 (3.41)	0.049 (2.98)	0.071 (3.95)	0.059 (3.01)
RET_{t-1}	-0.030 (-2.15)	-0.028 (-2.08)	-0.028 (-2.45)	-0.043 (-2.57)	-0.019 (-1.31)	-0.024 (-1.76)
Adj. R^2	0.141	0.042	0.130	0.041	0.111	0.043
# of observations	88,635	70,196	100,478	58,353	99,714	59,117

This table describes robustness checks relating to regressions of contemporaneous stock returns (RET_t) on changes in pre-tax income (ΔIBT_t) and tax expense (ΔTAX_t). In Panel A, both items are scaled by lagged total assets per share ($TAPS_{t-1}$). In the remaining panels, both items are scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-1} is the market value of equity at prior fiscal year end. BM_{t-1} is the book-to-market ratio at prior fiscal year end. RET_{t-1} is prior year's 12-month stock return with a one-month lag relative to RET_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). In Panel B, we partition the sample into three equal-size groups each year based on market value of equity at prior fiscal year end. In Panel C, we create three sets of sample partitions. Subsample A includes all firm-years with positive income before tax in both years *t* and *t-1* (IBT_t, $IBT_{t-1}>0$) and effective tax rates ($ETR_t=TAX_t/IBT_t$) between 0 and 1 in years *t* and *t-1* ($0<ETR_t$, $ETR_{t-1}<1$). Non-subsample A contains all other firm-years. Subsample B includes all firm-years with positive income before tax in both years *t* and *t-1* (IBT_t, $IBT_{t-1}>0$) and Non-subsample B contains all other firm-years. Subsample C includes all firm-years with positive tax expense in both years *t* and *t-1* (TAX_t, $TAX_{t-1}>0$) and Non-subsample C contains all other firm-years. The sample period is from 1978 to 2007. Each year, all variables except for returns are Winsorized at 1% and 99%. The coefficient estimates are averages of annual estimates over 30 years; t-statistics in parentheses are Fama-MacBeth t-statistics.