Valuation of tax expense

Jacob Thomas
Yale University
School of Management
(203) 432-5977
jake.thomas@yale.edu

Frank Zhang
Yale University
School of Management
(203) 432-7938
frank.zhang@yale.edu

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Abstract

Both intuition and evidence suggest that tax expense reflects value lost to taxes paid. Inconsistent with this traditional valuation role for tax expense, some recent research finds that tax expense surprise, especially its current component, is *positively* associated with stock returns, suggesting that tax expense can also proxy for underlying profitability. We propose that a) this profitability role emerges when pre-tax income reflects profitability poorly and b) the observed coefficient on tax expense surprise reflects the net effect of the two opposing roles. As a result, variation across samples and specifications in the coefficient on tax expense surprise is determined by variation in the following three factors: a) the portion of profitability not explained by pre-tax income, b) the ability of tax expense to reflect that residual profitability (creating a positive relation with returns), and c) the ability of tax expense to reflect value lost to taxes paid (creating a negative relation with returns). As the three effects are not easily separated, researchers investigating each effect using return regressions should interpret observed coefficients with caution.

Keywords: value-relevance of tax variables; tax expense surprise, earnings response coefficient; effective tax rates.

Data Availability: Data are publicly available from sources identified in the article.

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] More recent results (e.g., Ohlson and Penman, 1992), however, suggest the opposite view: higher tax expense surprise is good news even though it implies *lower* net income surprise when surprises in revenues and other expenses are held constant. This apparent contradiction motivates us to investigate possible reasons for variation in the coefficient on tax expense surprise in return regressions.

The intuition for why higher tax expense is bad news is that it implies value lost in the form of additional tax payments. Consider a hypothetical tax law change which unexpectedly increases tax rates. The value lost to additional taxes paid should be associated with lower returns and higher tax expense. Similarly, tax planning which lowers tax expense should be viewed as good news (e.g., Schmidt, 2006).[2] And there is evidence to support this intuition. In addition to Lipe (1986), other studies (e.g., Guenther and Jones 2006) find negative coefficients on surprises in tax expense and effective tax rates (ratio of tax expense to pre-tax income).

The opposite view that higher tax expense is good news is not as prevalent, possibly because it is unintuitive and evidence consistent with it is often indirect and not emphasized. Ohlson and Penman (1992) find a positive coefficient on tax expense in regressions of stock returns on levels of revenues and various expenses, but the unexpected positive sign is not

[1] Some expenses, such as those related to Research & Development and certain write-offs, have been shown to be positively related to stock returns. Revenues and other expenses are not held constant, however, in those cases.

[2] Consistent with this intuition, tax departments are evaluated on (e.g., Robinson et al., 2010) and tax department managers are compensated for (e.g., Armstrong et al., 2011) their ability to lower effective tax rates.

discussed. More recently, studies investigating the incremental value-relevance of taxable income, beyond that of book income, document a significant positive coefficient on unexpected taxable income (e.g., Hanlon et al, 2005). Even though tax expense is not taxable income, taxable income in these studies is derived substantially from the current portion of tax expense, and those results suggest that tax expense surprise might also be positively related to returns. We confirm that both the current and deferred components of tax expense surprise are in general positively related to returns.

Rationales have been offered in the prior literature (e.g. Lev and Nissim, 2004) for a positive coefficient on both components. The current component of tax expense reflects taxable income reported on the tax return, which is an alternative measure of profit based on tax rather than GAAP rules. Reasons why taxable income could reflect underlying profitability not reflected in pre-tax income include: a) tax rules generate value-relevant information not generated by GAAP rules, and b) tax rules are applied more homogeneously than GAAP rules.[3] (As explained later, underlying profitability news is related to revisions in the market's estimates of future after-tax earnings). The deferred portion of tax expense could represent a signal that is positively related to underlying profitability. Consider, for example, firms attempting to conceal declining profitability by understating deferred tax expense and overstating pre-tax income.

To explain why the sign of the coefficient on tax expense surprise varies across studies, we accept both sets of arguments mentioned above, which justify positive and negative relations, and propose that tax expense can at the same time assume both roles in return regressions. While tax expense naturally reflects the value lost in tax payments, it also serves as a proxy for

[3] Readers familiar with the preparation of corporate tax returns might dispute this rationale. Tax rules are not designed to and corporations do not seek to convey value-relevant information via taxable income. But that does not eliminate the possibility that taxable income provides incremental information about profitability. More important, even if levels of taxable income do not reflect profitability levels, *changes* in taxable income could still be informative about changes in profitability.

profitability and reflects value gained. However that proxy-for-profitability role becomes relevant only if pre-tax income reflects underlying profitability poorly. Also, while low value relevance of pre-tax income is necessary for tax expense to reflect profitability, it is not sufficient. Tax expense might also reflect profitability poorly in some cases.

To review our explanation, the coefficient on tax expense surprise in a regression of returns on surprises in pre-tax income and tax expense reflects the net effect of the following three factors: a) the portion of profitability not explained by pre-tax income, b) the ability of tax expense to reflect that residual profitability (creating a positive relation with returns), and c) the ability of tax expense to reflect the value lost to taxes paid (creating a negative relation with returns). As a result, variation across studies in the sign and magnitude of the coefficient on tax expense is due to variation in the relative strength of these three factors across the samples and regression specifications selected in those studies.

We make predictions based on variation in the three factors we posit jointly determine the observed coefficient on tax expense. Many of our predictions illustrate the importance of the first factor: the amount of residual variation in returns not explained by pre-tax income. When the value relevance of pre-tax income surprise is high (low), there is less (more) opportunity for tax expense surprise to assume its proxy-for-profitability role and the coefficient on tax expense surprise is more likely to be negative (positive). Other predictions illustrate the tension between the second and third factors. When tax expense is better able to reflect profitability (value lost to taxes), representing the second (third) factor, the coefficient on tax expense surprise is more likely to be positive (negative).

Our results based on analyses of different samples and specifications support these predictions. The main implication of these results is that researchers should be careful when

linking an underlying construct to the coefficient on tax expense (or its components or even related tax variables such as components of book-tax differences) obtained from return regressions. Given that the three factors we identify are correlated with each other and not easy to control for, it is hard for researchers to isolate the effect of interest. For example, researchers studying the ability of tax expense and its components to reflect the value lost to taxes should recognize that much of the variation they observe may be due to unrelated variation in a non-tax factor: the value-relevance of pre-tax income. Similarly, researchers studying the ability of tax variables to proxy for profitability should recognize that the coefficient is also affected by the value-relevance of pre-tax income and the ability of tax expense to reflect value lost to taxes paid. Some researchers might conclude that they prefer to use other specifications, rather than the return specifications we study. Others may conclude that a particular "clean" subsample is appropriate for their investigation because they do not believe that separate controls for the three factors would affect their results. But we leave that choice to researchers.

The second major takeaway from our results relates to the specification and sample we label the "general case," which refers to cross-sectional regressions of returns on changes in annual pre-tax income and tax expense estimated over all firms with available data. Contrary to intuition and results of early research (e.g., Lipe, 1986), the coefficient on tax expense surprise is positive for this general case, which implies that the proxy-for-profitability role of tax expense generally dominates its traditional role. As predicted by our explanation, this result appears to be driven by the low value relevance of pre-tax income in the general case. While this weak link between returns and pre-tax income surprise may also appear to be counterintuitive and inconsistent with early research (e.g., Ball and Brown, 1968), it is now a well-established result

(e.g., Lev, 1989). Recognizing that tax expense assumes its proxy-for-profitability role in the general case is useful as it may explain other seemingly unintuitive results.[4]

The rest of this paper is organized as follows. Section 2 provides a review of related prior literature and Section 3 describes our sample and the general case result. Section 4 investigates our predictions about variation across subsamples and regression specifications. Section 5 describes some analyses probing the robustness of our results and Section 6 concludes.

2. PRIOR RESEARCH AND EMPIRICAL PREDICTIONS

2.1 Prior literature.

To understand better the role played by tax expense in returns regressions, we turn to the decomposition of unexpected returns into its two components (e.g., Campbell 1991): (1) cash flow news, or current-period revisions in expectations of future dividends; and (2) discount rate news, or current-period revisions in expectations of future discount rates. Regressions of unexpected returns on (after-tax) earnings surprise rely on the assumption that news about current period earnings is related positively to cash flow news, but is unrelated to discount rate news. (After-tax earnings is referred to hereafter as earnings.) If so, it can be shown that the coefficient on earnings surprise, commonly referred to as the earnings response coefficient (ERC), reflects the relation between unexpected earnings this period and news about underlying or long-term profitability, represented by the present value of revisions in expectations of future period residual earnings (e.g., Liu and Thomas, 2000).[5]

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[4] For example, Thomas and Zhang (2011) find that predictions of next quarter's tax expense surprise are positively related to next quarter's returns, even after controlling for earnings surprise for both this quarter and the *next*.

[5] Prior research has shown that the ERC is affected both by a) factors that should in theory describe the relation between unexpected earnings and the present value of revisions in future period residual earnings, such as growth prospects (e.g., Collins and Kothari 1989) and the extent to which GAAP follows mark-to-market accounting (e.g., Ramakrishnan and Thomas 1998), and b) empirical factors that reflect the "measurement error" associated with unexpected earnings, such as price-irrelevant components of unexpected earnings (e.g., Beaver et al. 1980) caused by GAAP rules and certain types of earnings management.

When earnings surprise in return regressions is replaced by surprises in pre-tax income and tax expense, the coefficients on pre-tax income surprise and tax expense surprise would similarly reflect the corresponding relations between those surprises and cash flow news. Because earnings equal pre-tax income less tax expense, an intuitive prediction is that the coefficient on pre-tax income (tax expense) surprise should be positive (negative) and the magnitudes of those coefficients would reflect the corresponding relations between a dollar of surprise for each component and revisions in expectations of future residual earnings. Ceteris paribus, a higher tax expense implies an increase in current and future cash tax payments. This is the traditional role for tax expense in valuation regressions: higher tax expenses are bad news.

And when decomposing pre-tax income into revenues and expenses, analogous reasoning suggests that higher revenues are good news to shareholders whereas higher expenses 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.

Although 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.[6] Consistent with the traditional role, an unexpected decline in effective tax rates, which translates roughly into tax expense decreases when pre-tax income is held constant, is 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

[6] This emphasis on effective tax rates better reflects tax practice (see footnote 2) but it reduces sample size substantially, because many firm-years are deleted if observed effective tax rates in the current or prior year are outside reasonable bounds.

strategic tax-planning and tax-optimization activities, which include tax shelters and the utilization of tax rate differentials across countries and states.[7]

Some studies regress market value of equity, rather than returns, 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 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.

Market value regressions have also been estimated on book value of equity and flow variables that capture pre-tax income and tax effects by Bell and Gyeszly (2010). An interesting twist in that study is the focus on cash taxes paid, rather than tax expense or the current portion of tax expense. The results suggest that increased cash taxes paid are negatively associated with market value, when controlling for pre-tax income.

While these empirical results and intuition support the view that higher tax expense surprise is bad news, consistent with the traditional role for tax expense, there is empirical support for the opposite view. Ohlson and Penman (1992) find a positive coefficient on tax expense levels when annual returns are regressed on annual levels of revenue and different

[7] 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.

expenses.[8] Lev and Thiagarajan (1993) document a positive relation between changes in effective tax rates and current returns, where tax rates are computed using only the *current* portion of the *federal* tax expense.[9] In effect, a lower taxable income for federal tax purposes is viewed as being bad news. That inference is supported by recent research that investigates book-tax differences and whether taxable income is incrementally value-relevant beyond GAAP income (e.g., Hanlon et al., 2005, Chen et al., 2007, and Ayers et al., 2009). Regressions of returns on changes in pre-tax income and estimates of taxable income indicate a significant positive coefficient on taxable income changes. Ayers et al. (2009) show 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).

The explanations provided in prior research for why higher surprises in the current and deferred components of tax expense surprise are good news, rather than the bad news expected by the traditional role of tax expense, rely on the thesis that tax expense proxies incrementally for underlying profitability, beyond any ability of pre-tax income to proxy for profitability.

That possibility appears to be stronger for the case of the current component, which is derived from taxable income, or the profit reported under tax rules (e.g., Hanlon et al., 2005, Lev and Nissim, 2004, and Weber, 2009). Even though tax rules emphasize various governmental and political objectives, rather than value relevance, it is possible that an alternative computation of profit is incrementally informative about underlying profitability. Note that even though

[8] The choice of levels of revenues and expenses (e.g., Easton and Harris, 1991) versus first differences to capture surprises in those items 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.

[9] 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).

taxable income might systematically understate profitability, *changes* in taxable income might still be informative about changes in underlying profitability, especially if tax rules are applied more consistently over time, relative to GAAP rules. Also, the higher consistency with which tax rules are applied across firms should result in more homogeneity, which increases value relevance in cross-sectional regressions. 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 profits, it is possible that this increased flexibility results in greater measurement error and heterogeneity which dilutes the value-relevance of accounting profits.[10]

Although a positive link between the deferred component of tax expense and underlying profitability is less obvious than that for the current component, prior research has suggested that lower deferred tax expense might be viewed as bad news because it signals a decline in the "quality" of reported earnings. The deferred component of tax expense is presumed to be used for earnings management (e.g. Dhaliwal et al., 2004, Frank and Rego, 2006, Schrand and Wong, 2003, and Hanlon, 2005), and even though a lower tax expense results in higher after-tax earnings, it could be viewed as bad news if investors believe that tax expense was managed downward and that effort to manage earnings increases the likelihood that pre-tax income surprise is managed upward or expectations of future pre-tax incomes have fallen.

2.1 Our predictions.

Both strands of the prior literature, one emphasizing the traditional role of tax expense and the other emphasizing the proxy-for-profitability role, appear to have evolved independently,

[10] 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.

with little interaction. And the explanations provided for the opposite results observed in the two literatures are also independent, though not mutually exclusive. To explain this observed variation across studies in the sign and magnitude of the coefficient on tax expense surprise, we propose that both sets of explanations are relevant, and the coefficient on tax expense reflects the net impact of the two opposing effects. We also propose that the proxy-for-profitability role only becomes relevant when pre-tax income reflects profitability poorly.

Stated differently, we posit that the coefficient on tax expense surprise reflects the net effect of three factors: a) the portion of profitability not explained by pre-tax income, b) the ability of tax expense to reflect that residual profitability, and c) the ability of tax expense to reflect the value lost to taxes paid. The first factor suggests that a proxy-for-profitability role for tax expense emerges when the link between pre-tax income and profitability is weak. The second factor suggests that while a weak link between profitability and pre-tax income is necessary for tax expense to assume its proxy-for-profitability role, it is not sufficient: tax expense may or may not be able to incrementally reflect profitability, beyond that weak relation between pre-tax income and profitability. The third factor suggests that tax expense surprise will also assume its traditional role, and reflect value lost to taxes.

The observed coefficient on tax expense surprise reflects the net effect of the positive relation with returns arising from the proxy-for-profitability role associated with the first and second factors and the negative relation arising from the traditional role associated with the third factor. Variation in the coefficient on tax expense surprise is due to variation in these three factors across the samples and specifications selected in different studies.

To investigate the validity of our proposition, we make the following testable predictions. Each prediction focuses on one of the three factors mentioned above, and we extend those predictions to specific variables that proxy for those factors.

Prediction 1 (P1). The coefficient on tax expense surprise is negatively related to the ability of pre-tax income surprise to reflect underlying profitability, ceteris paribus. The ability of a variable to reflect underlying profitability, also referred to as value relevance, is represented by a positive relation between surprises for that variable and returns. We use the magnitude of the positive coefficient on pre-tax income surprise to measure its ability to reflect its value relevance. We use a variety of attributes to capture expected variation in the value relevance of pre-tax income. We predict the coefficient on tax expense (value relevance of pre-tax income) is

P1A: higher (lower) if current or lagged earnings is negative;
P1B: higher (lower) if the magnitude of pre-tax income surprise is higher;
P1C: lower (higher) for firm-specific time-series regressions relative to cross-sectional regressions;
P1D: lower (higher) for "core" pre-tax income surprise, which excludes one-time items; and
P1E: lower (higher) if the regression specification is "undeflated" to reduce the weight of low price firms.

The basis for consideration of these attributes is as follows. The results in Hayn (1995), relating to the lower value-relevance of losses, suggest that the value-relevance of pre-tax income declines if pre-tax income surprise is derived from firm-years reporting losses (P1A). The results documenting a non-linear relation between returns and earnings surprises (e.g., Freeman and Tse, 1989) suggest that the value-relevance of pre-tax income is highest for small magnitudes of pre-tax income surprise and declines as pre-tax income surprise becomes more positive or more negative (P1B). To the extent that the relation between returns and earnings is more homogenous within firms than it is across firms, the value relevance of pre-tax income surprise should be higher for firm-specific time-series regressions, relative to cross-sectional

regressions estimated over different firms (P1C).To the extent that the relation between returns and earnings surprise is weaker for one-time items, such as write-offs, than it is for other earnings components (e.g., Elliott and Hanna, 1996), deleting one-time items and focusing on core pre-tax income should increase the value relevance of pre-tax income surprise (P1D).

The last attribute—using an undeflated specification—is based on evidence suggesting differential managerial smoothing of earnings per share (EPS). DeGeorge et al. (1999) document a remarkable finding: the magnitude of seasonally-differenced quarterly EPS remains relatively invariant to scale, measured as levels of share price or quarterly EPS. As shown by Cheong and Thomas (2011), this is because managers suppress natural scale variation in the volatility of EPS by differential smoothing, with high price firms smoothing EPS volatility much more than low price firms. The impact of such differential smoothing is that the magnitude of price-deflated changes in earnings is negatively related to scale. As a result, regressions of returns on price-deflated EPS surprise that pool all firms exhibit very low slopes, close to zero, because the slopes are influenced heavily by the very low slopes of low price firms. (The pooled slope is a weighted average of the low slopes for low price firms and the higher slopes for high price firms, but the weights depend on the variances of earnings surprise for the different subsamples, and those variances are much higher for low price firms.) Estimating undeflated regressions of value changes, rather than returns, on EPS surprise results in higher slopes. In essence, undeflated regressions should increase the value relevance of earnings (P1E).

Prediction 2 (P2). The coefficient on tax expense surprise is positively related to the ability of tax expense surprise to incrementally reflect underlying profitability, beyond that reflected by pre-tax income surprise, ceteris paribus. To make it more meaningful empirically, we cast this prediction in terms of attributes that capture expected variation in this proxy-for-

profitability role for tax expense. Specifically, we expect the coefficient on tax expense and the value relevance of tax expense to be

P2A: lower if current or lagged tax expense is negative;
P2B: lower if the magnitude of tax expense surprise is higher; and
P2C: higher for the current component of tax expense surprise, relative to the deferred component.

The basis for the first two attributes for variation in the value relevance of tax expense is similar to that described for the value relevance of pre-tax income in Prediction 1. That is, based on Hayn (1995) we expect negative values of tax expense to be less value relevant (P2A), and based on Freeman and Tse (1989) we expect lower value relevance for large tax expense surprises (P2B). The third attribute is based on our judgment (see discussion in Section 2.1) of the relative strength of the rationales provided in prior research for the ability of the current and deferred components of tax expense to proxy for profitability. The current component is derived from an alternative measure of profitability, computed under tax rules, and is thus likely to proxy for underlying profitability in ways that GAAP pre-tax income may not. The argument for why the deferred component of tax expense might proxy for profitability is more indirect, as it is based on being an inverse signal of earnings quality. If so, the value relevance of the current component should be higher than that for the deferred component (P2C).

Prediction 3 (P3). The coefficient on tax expense surprise is negatively related to the ability of tax expense surprise to reflect value lost to unexpected taxes paid in current and future years, ceteris paribus. At a conceptual level, this prediction is self-evident and should not require empirical validation. At a practical level, however, it is not easy to a) control for variation related to P1 and P2, which is important given the correlations among the three effects, and b) find attributes that capture expected variation in this traditional role for tax expense that can be

measured using machine-readable data.[11] Given that our objective here is limited to illustrating that this third factor is relevant, rather than investigating an exhaustive list of attributes along which it varies, we focus on two relatively straight-forward attributes. Specifically, we expect the coefficient on tax expense surprise (ability of tax expense to reflect value lost to taxes) to be

P3A: lower (higher) in years with substantial changes in statutory tax rates; and
P3B: higher (lower) if there are tax loss carryforwards.

The first attribute captures the essence of the traditional role for tax expense: a change in tax rates should be positively related to changes in tax expense and negatively related to returns. We focus on the substantial decline in top statutory tax rates associated with the Tax Reform Act of 1986 (TRA86), from 46 percent in 1986 to 34 percent in 1988, and compare those years with years before and after the rate change. Holding constant other aspects of TRA, the good news associated with the tax rate decline should be incorporated by investors into stock returns over the period during which details of TRA86 were first proposed and then finalized (e.g., Givoly and Hayn, 1992). We predict that the negative relation suggested by the traditional role between those returns and associated changes in tax expense should be more evident than that for tax expense surprise in general. Recall that the general relation between tax expense surprise and returns reflects both negative (traditional role) and positive (proxy-for-profitability role) elements. Given the large magnitude of tax rate changes around TRA86, the traditional role for tax expense should be more evident for 1987 and 1988 relative to adjacent years (P3A).

The basis for the second attribute is that the relation between tax expense and value lost to taxes is weaker for firm-years with tax loss carryforwards. For example, the value impact of the level of tax loss carryforwards, which is a function of when the carryforwards will be used, if at all, and the relevant discount rates, is not properly reflected in tax expense. The weaker ability

[11] Tax researchers (e.g., Raedy et al., 2010) have hand-collected data from tax footnotes to obtain measures of different tax variables. We do not take that route here given our limited objectives.

of tax expense to reflect value lost in taxes for firm-years with tax loss carryforwards should result in a weaker (less negative or more positive) observed relation between returns and tax expense surprise (P3B).

In the empirical analysis that follows, we first investigate the general case based on cross-sectional regressions of annual returns on annual changes in pre-tax income and tax expense for all firms with available data. We then investigate whether those results vary across alternative specifications and alternative samples, based on the three predictions described above.

3. SAMPLE AND GENERAL CASE RESULT

We obtain data for our overall sample from two sources: a) annual Compustat files for earnings, tax, and other financial variables, and b) CRSP monthly return files for stock return data. Our sample contains 175,031 firm-years between 1978 and 2009 (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 (year $t+1$). 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 percent and 99 percent 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 income (ΔPTI_t). At times we consider the separate effects of the income statement variables that determine pre-tax income by replacing ΔPTI_t 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 different 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 general case 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. This positive correlation should not be interpreted, however, as suggesting that increases in tax expense contain *incremental* good news, beyond that provided by changes in pre-tax income, because changes in tax expense and pre-tax income are strongly positively related.

Finally, the relations between returns and the three variables we use as controls for expected returns are only partially consistent with prior research. Specifically, we find a positive Spearman correlation for lagged market capitalization and a negative Pearson (and insignificant Spearman) correlation for lagged returns, which are inconsistent with the negative relation with size (size effect) and the positive relation with lagged returns (momentum effect) documented in the literature.[13] We do not believe these inconsistencies impact our results, as the inclusion or exclusion of the three control variables has little effect on the variables of primary interest.

Table 2 contains the mean coefficients from estimating 32 annual regressions of returns on changes in profit measures and changes in tax expense. Column 1 refers to the simple regression of returns on changes in (after-tax) earnings, as described by equation (1) below.

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

[12] The coefficients on changes in pre-tax income and tax expense for our general case 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).

[13] The second inconsistency is likely due to the momentum effect being weakest for the annual windows we consider here, relative to the monthly and quarterly windows also considered in the Finance literature.

The slope coefficient on ΔE_t, or ERC, is 0.195 and the R^2 is 2.1 percent. While this ERC and R^2 are generally lower than the corresponding values observed in prior research, it has long been established that both ERCs and associated values of R^2 are quite low. For example, Lev (1989) reviews a number of extant studies and concludes that "The correlation between earnings and stock returns is very low, sometimes negligible." The ERC values are often well below 1 and R^2 values often below 5 percent. To be sure, some studies document a strong return/earnings relationship, but sample selection and treatment of outliers plays an important role. We investigate these two effects later.

Including the three control variables that explain returns increases the slope coefficient on ΔE_t slightly to 0.201 (see results reported in column 2), and also increases the adjusted R^2 from 2.1 percent to 5.0 percent. Consistent with prior research, the coefficients on $Log(MV_{t-1})$ and BM_{t-1}, are negative and positive, respectively, though the former is not statistically significant. The coefficient on RET_{t-1} is negative but insignificant, which is inconsistent with prior research documenting significant positive momentum in adjacent period returns.

Column 3 in Table 2, which represents our results for the general case, repeats the analysis in column 2 but replaces changes in net income in equation (1) with changes in pre-tax income (ΔPTI) and changes in tax expense (ΔTAX), as described by equation (2) below.

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

The results in column 3 of Table 2 indicate clearly that the proxy-for-profitability role for tax expense dominates its traditional role for the general case considered here. The coefficient on tax expense surprise is positive (0.584) and the t-statistic of 8.66 is higher than that on pre-tax income surprise. Note that the magnitudes of β_1 and β_1 are not directly comparable when both surprises are proxying for news about underlying profitability. If both surprises had similar

effects and the tax rate is 35 percent, the coefficient on tax expense surprise (β_2) will be about three times (100/35) that on pre-tax income surprise, ceteris paribus.[14]

We return to the general case results in Section 5 to confirm the robustness of the large positive coefficient observed here on tax expense surprise. We consider next our main empirical analyses, which are designed to investigate whether the coefficient on tax expense varies across samples and specifications as described by our three predictions.

4. EVIDENCE RELATING TO THE THREE PREDICTIONS

4.1 Prediction P1.

To review the first prediction (P1), we expect the coefficient on tax expense surprise to be negatively related to the value relevance of pre-tax income surprise, and we propose five cases (A through E) where we expect variation in the value relevance of pre-tax income surprise to be reflected as inverse variation in the coefficient on tax expense surprise. Our prediction for the first case we consider (P1A) is that firms reporting losses in either the current or lagged year will have less value-relevant pre-tax income surprise (e.g., Hayn, 1995) which should in turn result in higher (more positive or less negative) coefficients on tax expense surprise.

The results reported in columns 4 and 5 of Table 2 are consistent with prediction 1A. Firm-years with negative earnings in either year *t* or *t-1* are referred to as the Loss subsample, and all remaining firm-years are included in the Profit subsample. The Loss subsample, which contains just over 35 percent of our overall sample, is associated with a lower coefficient on pre-tax income surprise and a higher coefficient on tax expense surprise.[15] The coefficient on tax

[14] The magnitude of pre-tax income (tax expense) surprise will be 100/65 (35/65) of the magnitude of underlying profitability surprise, which will cause the ratio of β_1/β_2 to be 35/100.

[15] The fraction of firms reporting losses in adjacent periods (persistent losses) appears to have grown over time. 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.

expense surprise for the Profit subsample is no longer positive (it is negative but insignificant), which suggests that the dominance of the proxy-for-profitability role observed for the general case (column 3) is driven by firms reporting losses in either year *t* or *t-1*.[16]

Prediction 1B expects the value-relevance of pre-tax income surprise to decline for more extreme values of surprise (e.g., Freeman and Tse, 1989), which should result in higher values of the coefficient on tax expense surprise. We consider two ways to vary the impact of extreme values of pre-tax income surprise: a) truncate larger sections of the left and right tails of the pre-tax income surprise distribution, and b) partition the sample into quintiles based on magnitudes, or absolute values, of pre-tax income surprise.

Panel A of Table 3 contains the results of estimating equation (2) on subsamples derived from truncating the top and bottom 1, 2, 5, 10, and 25 percent of the distribution of pre-tax income surprise. The first column, which is based on the overall sample with no truncation, is identical to column 3 of Table 2. Moving across from left to right, the value relevance of pre-tax income surprise—indicated by the magnitude of the coefficient on *ΔPTI*—increases monotonically with the extent of truncation, from 0.151 for the overall sample to 4.422 when firm-years in the top and bottom 25 percent of pre-tax income surprise are eliminated.

As expected by prediction 1B, the coefficient on tax expense surprise declines monotonically from 0.584 for the overall sample to -0.803 for the most truncated subsample. Eliminating extreme values of pre-tax income surprise increases the value relevance of pre-tax income, which translates into a lower opportunity for tax expense to proxy for profitability. The negative and significant coefficients on tax expense surprise in the two right-most columns suggest that the proxy-for-profitability role is suppressed substantially for those two subsamples.

[16] We also consider partitions based on the sign of pre-tax income. The subsample of Loss firms is much smaller and the difference between results for Profit and Loss subsamples is also smaller.

Table 4 contains the results of estimating equation (2) on subsamples created by forming quintiles based on the distribution of magnitudes (or absolute values) of pre-tax income surprise each year. To control for variation in the second factor (variation in the ability of tax expense to proxy for profitability), we also form quintiles based on the distribution of magnitudes of tax expense surprise (see prediction P2B). Panel A of Table 4 shows the frequency distributions in the 25 cells created by intersecting the two sets of quintiles. Firm-years with the lowest magnitudes of *ΔPTI* in the first quintile (Q1) are projected to have the highest value relevance and firm-years in Q5 with extreme negative and positive values of *ΔPTI* are projected to have the lowest value relevance. Similarly, *ΔTAX* is projected to have the highest (lowest) ability to proxy for profitability for firm-years with the lowest (highest) magnitudes of *ΔTAX* in quintiles Q1 (Q5).

Given the positive correlation between magnitudes of the two surprises, there is disproportionate clustering along the main diagonal, with relatively few observations in most off-main diagonal cells. One exception is the cell in the top, right-hand corner, which suggests that while firms with extreme values of *ΔPTI* (low value relevance of *ΔPTI*) also most often have extreme values of *ΔTAX* they have an unusually high number of observations with small magnitudes of *ΔTAX* (high value relevance of *ΔTAX*).

Prediction 1B suggests that the coefficient on *ΔTAX* should increase in each row as we move from the left-most column with the highest value relevance of *ΔPTI* to the right-most column with the lowest value relevance of *ΔPTI*. The results reported in Panel B of Table 4 generally support that prediction. There are some exceptions, but many of those exceptions relate to cells with relatively few observations, as described in Panel A. The one outstanding exception

is the large negative coefficient (albeit only marginally significant) observed in the right-most column for the first row.

Prediction 1C is based on the conjecture that within-subsample homogeneity is greater for time-series observations estimated separately for each firm, relative to cross-sectional regressions estimated across firms for each year. Greater homogeneity should increase the value relevance of pre-tax income surprise, which would lower the coefficient on tax expense surprise as it reduces the likelihood that tax expense can proxy for profitability. Table 5 contains coefficient estimates from a subsample of 26,629 firm-years which represents 815 firms with at least 30 years' data available between 1978 and 2009 to estimate equation (2). The left (right) half of that table describes the coefficient estimates from the annual cross-sectional (firm-specific time-series) regressions. The results are consistent with Prediction 1C. The mean coefficient on pre-tax income surprise is almost seven times as high in the time-series regressions, relative to cross-sectional regressions, and the mean coefficient on tax expense surprise is smaller for the time-series regressions, and not significantly different from zero.

Prediction 1D is based on the prior result that one-time components of reported earnings are of lower value relevance than "core" or recurring components (e.g., Elliott and Hanna, 1996). To identify one-time items, we focus on the difference between GAAP EPS as reported on COMPUSTAT and "Actual" EPS as reported on IBES, for a subsample of 71,206 firm-years with non-missing values of required data between 1985 and 2009. We assume that the IBES number, which represents the EPS components that analysts seek to forecast, contains core or recurring components of earnings and the difference represents one-time or non-recurring items. Column 1 in Table 6 contains the results of estimating equation (2) on this IBES subsample, and column 2 presents the results when changes in pre-tax income are separated into core

(*ΔPTI_CORE*) and one-time (*ΔPTI_ONE*) components.[17] Consistent with prediction 1D, the coefficient on surprises in core pre-tax income is higher than that on one-time items. More important, the coefficient on tax expense surprise in column 2 is half that in column 1, which suggests that the higher value-relevance exhibited by the two components of pre-tax income surprise in column 2 leaves less room for tax expense surprise to proxy for profitability.

To investigate prediction 1E, we return to the general case regressions based on equation (2), but multiply all three variables by lagged price to get undeflated values of those variables. In effect, we regress annual changes in price per share (cum dividend) on changes in pre-tax income and tax expense per share. The results reported in Table 7 confirm the results in Cheong and Thomas (2011): the coefficient on pre-tax income surprise is now 4.259, which is considerably higher than the 0.151 reported for the deflated regression reported in column 3 of Table 2. Consistent with prediction 1E, the coefficient on tax expense surprise for the undeflated regression is much lower than that reported for the deflated regression (-1.153 versus 0.584).

4.2 Prediction P2.

To review the second prediction, the coefficient on tax expense should increase with the ability of tax expense to proxy for profitability, holding constant the value relevance of pre-tax income surprise and the ability of tax expense to project value lost to taxes. Prediction P2A investigates whether the proxy-for-profitability role for tax expense is diminished for the *Negative tax expense* subsample, which contains firm-years with negative tax expense in either the current or lagged year. The remaining firm years are labeled the *Positive tax expense* subsample. The first two columns in Table 8 show that the coefficient on tax expense surprise is much smaller for the *Negative tax expense* subsample (coeff.=0.170, t=2.68) than for the *Positive*

[17] Given that the COMPUSTAT and IBES EPS numbers are after-tax measures of earnings, we compute the core and one-time components of pre-tax income as follows: a) *PTI_ONE* is GAAP EPS minus IBES EPS divided by (1-35 percent), and b) *PTI_CORE* is *PTI* minus *PTI_ONE*.

tax expense subsample (coeff.=1.243, t=8.73). Note that the coefficients on pre-tax income surprise and the associated t-statistics are quite similar between these two subsamples.

Prediction P2B considers whether the proxy-for-profitability role for tax expense is diminished for extreme values of tax expense surprise. As with prediction 1B, we consider two ways to investigate the impact of varying the magnitude of tax expense surprise: a) truncate larger sections of the left and right tails of the tax expense surprise distribution, and b) partition the sample into quintiles based on tax expense surprise.

The results in Panel B of Table 3 describe how the coefficient on tax expense surprise varies as we eliminate more observations from both tails of the tax expense surprise distribution. The results in the left-most column provide the benchmark reported in Table 2, column 3, for the overall sample with no truncation. As the extent of truncation increases from the top and bottom 1 percent of the distribution (in the second column) to the extreme 25 percent of the distribution (in the right-most column), the coefficient on tax expense surprise increases monotonically from 1.220 to 11.673. These results are consistent with prediction 2B. Interestingly, despite the correlation between surprises in tax expense and pre-tax income, deleting extreme values of tax expense surprise has very little impact on the coefficient of pre-tax income surprise: it remains within a relatively narrow range across the six columns.

The results reported in the different rows of Panel B of Table 4 describe how the coefficient on tax expense surprise varies with the magnitude of tax expense surprise. The top row (Q1) contains firm-years with the smallest magnitudes of ΔTAX, for which the proxy-for-profitability role of tax expense should be strongest, and the bottom row (Q5) contains firm-years with the most extreme values of ΔTAX, for which the proxy-for-profitability role should be weakest. Holding constant the value relevance of pre-tax income by focusing on one column at a

time, prediction 2B suggests that the coefficient on tax expense should decline from top to bottom. Similar to the results reported for prediction 1B, the results generally support this prediction. While there are some exceptions, most of those exceptions relate to off-the-main-diagonal cells with relatively few firm-years.

Prediction 2C refers to the superior ability of the current component of tax expense surprise to proxy for profitability, relative to the deferred component. Panel C in Table 3 contains results for estimating equation (2) after splitting tax expense surprise into its two components. To investigate the impact on the coefficients of those two components as we increase the value relevance of pre-tax income surprise (see P1B), we also report results for subsamples creating by deleting more firm-years from the tails of the pre-tax income surprise distribution.

The results are consistent with prediction P2C. While both coefficients decline as the value relevance of pre-tax income surprise increases (going from left to right), the coefficient on the current component is always substantially higher (or less negative) than that on the deferred component. Although the coefficient on the deferred component of tax expense surprise is positive and significant for the overall sample it turns negative at relatively low levels of truncation, indicating that the proxy-for-profitability role for the deferred component is low and diminishes quickly as the value relevance of pre-tax income increases.

In contrast, the coefficient on the current component of tax expense remains positive and significant in all but the right-most column, where the coefficient is insignificantly negative. Consistent with the conclusions in Hanlon et al. (2005), the current component of deferred tax, which is based on profit calculated under tax rules, contains considerable ability to proxy for underlying profitability. But consistent with our predictions, this ability to proxy for profitability

is a function of how well pre-tax income reflects profitability. When the value relevance of pre-tax income is sufficiently high, as in the right-most column, even the current component of tax expense is unable to proxy for profitability.

We also explore firm-specific time-series regressions estimated on the sample of 815 firms considered in Table 5 to examine our predictions. One advantage of time-series regressions is that we can estimate firm-specific coefficients on *ΔPTI* and *ΔTAX* and then link these coefficients to firm-specific characteristics. In Table 9, we report the results of regressions of the coefficients on *ΔTAX* on the coefficients on *ΔPTI* and other firm characteristics related to our predictions. The coefficient on *ΔPTI* (column 1) relates to the different cases included under P1, and the coefficients on *NEG_TAX* and the *magnitude of ΔTAX* (columns 2 and 3) relate to predictions P2A and P2B. *NEG_TAX* represents the fraction of years for each firm when tax expense is negative. The corresponding coefficients in column 4 describe the incremental effects of each prediction, when controlling for the remaining predictions' effects on the *ΔTAX* coefficient.

The results in column 1 and column 4 indicate that the coefficients on *ΔPTI* and *ΔTAX* are highly negatively correlated, with a t-statistic of -26.04. This result confirms P1, as it suggests that the value relevance of pre-tax income limits the proxy-for-profitability role of tax expense. The results for *NEG_TAX* and the *magnitude of ΔTAX* in columns 2, 3, and column 4 are consistent with predictions P2A and P2B. According to prediction P2A the ability of tax expense to proxy for profitability should be lower when it is negative, which should result in a negative relation between the coefficient on *ΔTAX* and *NEG_TAX*. According to prediction P2B, the ability of tax expense to proxy for profitability should decline with the magnitude of *ΔTAX*,

which suggests a negative relation between the coefficient on *ΔTAX* and the average magnitude of *ΔTAX* for that firm.

4.3 Prediction P3.

To review P3, the negative relation between returns and tax expense surprise associated with the traditional role of tax expense, where it reflects the value lost in taxes paid, should be stronger for years with large tax rate changes (P3A) and weaker for years with tax loss carryforwards (P3B). To investigate P3A, we compare the substantial tax rate declines in 1987 and 1988 associated with TRA86, with the two earlier years (1985 and 1986) and two later years (1989 and 1990).[18] According to P3A the coefficient on tax expense surprise should be more negative (less positive) in 1987 and 1988.

The results reported in Table 10 confirm that prediction. To incorporate market reactions to deliberations that preceded the passage of TRA86 (see Section 2.2), we widen the window over which returns are accumulated to include the 2 prior years. We assume that returns over this three-year period (*RET_3Y*) will reflect market anticipation of the upcoming tax rate declines. The results in the different columns in Table 10 show that 1987 and 1988 are the only two years with negative coefficients on *ΔTAX*. While those coefficients are not significantly different from zero, they are significantly lower than the average of the positive coefficients in the adjacent years (t-statistic is −3.36 and −4.72 for 1987 and 1988, respectively).

To investigate P3B we compare subsamples of firm-years with and without tax loss carryforwards. The subsample labeled *With tax loss carryforwards* contains firm-years with

[18] While all firms experience an overall tax rate decline from 46 to 34 percent under TRA86, the allocation of that 12 percent to 1987 and 1988 varies across fiscal year-ends (e.g., Scholes et al., 1992). As the first group of firms to experience a tax rate decline were firm-years ending in June, 1987, we continue to use the Compustat definition of year (e.g., 1987 includes all fiscal years ending between 6/1987 and 5/1988) for this analysis also. Given our focus on the dollar amounts reported for changes in tax expense, rather than effective tax rates, this variation across firms with different fiscal year-ends is not an issue.

positive tax loss carryforward values reported on Compustat for year t or year t-1. The remaining firm-years are included in the *Without tax loss carryforward* subsample, which refers to zero or missing tax loss carryforward in both year t and year t-1.

Given that firm-years with tax loss carryforwards are more likely to report losses, which implies lower value relevance for pre-tax income surprises (P1A), there is a concern that the proxy-for-profitability role for tax expense is not held constant across the two subsamples. One way to control for the proxy-for-profitability role is to limit its relevance by focusing on the subsample of firms for which we eliminate extreme values of pre-tax income surprise. That is, we use the truncated sample in the right-most column of Panel A of Table 3 (truncation at the top and bottom 25 percent of ΔPTI), for which we believe the proxy-for-profitability is smallest and the third factor (value lost to taxes) is most evident.[19] The last two columns in Table 8 show that the coefficient on tax expense surprises is higher (less negative) for the subsample with tax loss carryforwards (coeff.=-0.757, t=-2.92) than for the subsample without tax loss carryforwards (coeff.=-1.184, t=-2.24).

5. SENSITIVITY ANALYSES

This section describes analyses designed to probe whether a) the general case results in column 3 of Table 2 are robust to alternative specifications and samples (reported in Section 5.1) and b) we are able to document variation along dimensions other than those considered in our three predictions (reported in Section 5.2). Our investigation of the general case results is similar to that conducted in Hanlon et al. (2005) to determine whether their main result—relating to the significant positive coefficient on changes in taxable income—is observed for alternative

[19] For the sample without any truncation, we find a higher coefficient on tax expense surprise for the *Without tax loss carryforward* sample, consistent with the idea that the presence of a loss carryforward proxies for profitability. As we drop more extreme observations, this difference declines and then reverses (as reported in Table 8) when we drop 25% of observations on each side.

specifications and samples. We undertake the second set of analyses as part of an effort to find evidence that might be useful in formulating alternative hypotheses for variation in the coefficient on tax expense surprise.

5.1 Robustness of general case result.

Our first analysis considers the impact of replacing pre-tax income in equation (2) with its underlying revenue and expense components. To the extent that the coefficient on pre-tax income effectively masks variation in the valuation coefficients associated with component revenue and expense items, the coefficient on tax expense in equation (2) could be altered when the different components 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.

$$RET_t = \gamma_0 + \gamma_1 \Delta SALE_t + \gamma_2 \Delta COGS_t + \gamma_3 \Delta SGA_t + \gamma_4 \Delta DEP_t + \gamma_5 \Delta INT_t + \gamma_6 \Delta OTHERS_t + \gamma_7 \Delta TAX_t + e_t \quad (3)$$

Untabulated 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 column 3 of Table 2. Third, the magnitudes of the 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 and on changes in any other expense item.

We also estimate firm-specific time-series regressions based on equation (3), to supplement the Table 5 results that are based on equation (2). Our objective is to determine whether separating pre-tax income surprise into its revenue and expense components lowers further the coefficient on tax expense surprise. For comparison purposes, we also estimate cross-sectional regressions on the same sample of firm-years. We find a negative, but insignificant, mean coefficient on tax expense surprise for the time-series regression, and the coefficients on revenue and expense surprises are generally larger in magnitude for the time-series specification, relative to the cross-sectional specification. These results are consistent with prediction P1C, which expects more value relevance for pre-tax income (and its revenue and expense components) for time-series regressions, and a lower coefficient on tax expense surprise.

Our second set of analyses considers different regressions specifications. We find a positive coefficient on tax expense surprise generally, except for the specification where we regress market values (rather than returns) on equity book values and the levels of pre-tax income and tax expenses. The coefficient on tax expense is strongly negative for that specification. Other specifications we consider include regressions of returns on the levels of pre-tax income (or its revenue and expense components) and tax expense, for which the coefficient on tax expense is strongly positive.

To investigate the effect of potential non-linearity in the relation between tax expense surprise and stock returns, we compute 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 (4) 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.

$$\Delta TAX_t = \delta_0 + \delta_1 \Delta IBT_t + \eta_t \quad (4)$$

Untabulated results indicate that mean returns increase almost monotonically from 9.69 percent for the decile with the lowest residual tax surprise to 40.49 percent for the decile with the highest residual tax surprise. To the extent that residual tax expense surprise captures the incremental effect of tax expense surprise after controlling for surprises in pre-tax income, documenting a strong positive relation between residual tax expense and returns suggests that the conclusions from Table 2 are robust and reflect a systematic relation.

We conducted other sensitivity analyses to confirm the robustness of our general case results. For example, we find similar results when we use lagged total assets per share ($TAPS_{t-1}$) rather than lagged share price as a deflator. We also added other regressors to equation (2) such as changes in tax loss carryforwards. In every analysis (results not tabulated here), we find that the coefficient on tax expense surprise is positive and very significant.

5.2 Variation across other factors unrelated to our predictions.

Our next set of analyses considers variation in results for regressions based on equation (2) across subsamples derived from factors other than those underlying our three predictions. We partition our sample into two subperiods, based on governing GAAP rules for tax accounting—APB#11 (1978-1991) and FAS 109 (1992-2009)—and find similar results in both regimes. We find similar results when we repeat the regressions separately on small, medium, and large partitions, based on market capitalization at the end of the prior fiscal year. Similar results are obtained when we partition the sample each year into quintiles based on a) share price, b) book-to-market ratio, and c) sales growth. We also examined the year-by-year results underlying

column 3 in Table 2 but could not discern any apparent trends in the coefficients on *ΔPTI* and *ΔTAX*.

Finally, we repeat the analysis for 63 2-digit SIC industries to determine if variation in the coefficients on *ΔPTI* and *ΔTAX* are related to industry characteristics. Most industries are associated with a positive coefficient on tax expense surprise, similar to the overall sample results. Even for the eight industries associated with a negative coefficient, none are statistically significant at the five percent level. Scrutiny of those industries does not suggest any patterns consistent with those industries being associated with tax expenses that reflect better the traditional role (value lost to taxes) for tax expense.

We are unable to formulate any alternative hypotheses for our results based on these and other analyses that we conducted to uncover possible evidence of variation in the tax expense surprise coefficient along different dimensions unrelated to our three predictions.

6. CONCLUSION

We investigate two seemingly contradictory sets of results regarding the valuation implications of tax expense surprise, holding constant surprises in pre-tax income. One set of results suggests that more tax expense is bad news; i.e., a regression of returns on surprises in pre-tax income and tax expense indicates a negative coefficient on tax expense surprise. This negative relation with value is consistent with intuition as tax expense should reflect the value lost to taxes paid and represents the traditional valuation role for tax expense. The other set of results are consistent with the opposite view: more tax expense is good news. The two opposite sets of results appear to have evolved independently in the literature and the apparent contradiction has not been emphasized. One possible reason why the contradiction is not

emphasized is that many of the results in the second set document a positive relation between returns and surprise in the current component of tax expense, rather than total tax expense.

We first confirm that the second set of results is representative of the general case for cross-sectional regressions of returns on surprises in pre-tax income and tax expense estimated over all firm-years. Also, the coefficients on both components of tax expense for the general case are reliably positive. Apparently, tax expense proxies incrementally for underlying after-tax profitability, beyond that reflected in pre-tax income, where higher current and deferred tax expense represent higher, rather than lower, underlying profitability. The prior literature suggests that the current portion of tax expense might reflect profitability because it is derived from taxable income—the profit measure computed under tax rules, and the deferred portion might reflect profitability because it might be inversely related to earnings quality, which is itself negatively related to value.

We then propose an explanation for variation in the sign and magnitude of the coefficient on tax expense surprise across different samples and regression specifications. The observed coefficient represents the net effect of the two conflicting roles that tax expense can assume—proxy for profitability and traditional measure of value lost to taxes—but the strength of the proxy-for-profitability role is inversely related to the extent that pre-tax income reflects profitability. If pre-tax income surprise is related strongly to news about underlying profits (represented by revisions in the market's expectations of future earnings), we expect the traditional role to dominate and the coefficient on tax expense surprise should be negative. If, however, pre-tax income surprise is only weakly related to news about underlying profits, an opportunity is created for tax expense surprise to proxy for unexplained news about underlying

profits. That opportunity is realized in cases where tax expense is in fact related strongly to underlying profit news, and in those cases the coefficient on tax expense surprise is positive.

Our explanation suggests three predictions relating to variation in the coefficient on tax expense surprise based on a) variation in the ability of pre-tax income surprise to reflect profitability, b) variation in the ability of tax expense surprise to proxy for profitability, and c) variation in the ability of tax expense surprise to reflect value lost in taxes paid. Our results are consistent with all three predictions. Consistent with our explanation, the positive coefficient on tax expense observed for the general case is due to pre-tax income surprise being weakly related to returns.

Overall, our results suggest that the coefficient on tax expense and its components or on components of book-tax differences be interpreted with caution, because it reflects the net effect of three factors. As the relative importance of these factors varies across samples and specifications, inferences are clouded unless researchers can control for the separate impact of each factor.

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*.
ΔPTI_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*).
RET_3Y_t	The three-year buy-and-hold stock return up to the end of the 3rd month after a firm's fiscal year-end

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Table 1
Descriptive statistics

Panel A: Univariate statistics

Variable	N	Mean	Stdev	Min	Q1	Median	Q3	Max
RET_t	175031	0.171	0.884	-0.999	-0.245	0.050	0.375	58.68
ΔE_t	175031	0.034	1.141	-23.29	-0.031	0.006	0.037	19.09
ΔPTI_t	175031	0.039	1.218	-22.80	-0.041	0.009	0.053	19.92
ΔTAX_t	175031	0.004	0.110	-1.193	-0.008	0.000	0.013	1.380
$\Delta CTAX_t$	175031	0.002	0.060	-0.589	-0.003	0.000	0.008	0.949
$\Delta DTAX_t$	175031	0.002	0.094	-1.760	-0.006	0.000	0.007	1.746
$\Delta SALE_t$	174775	-0.081	3.167	-86.43	-0.046	0.045	0.196	43.87
$\Delta COGS_t$	174774	-0.058	2.691	-88.43	-0.032	0.024	0.136	43.58
ΔSGA_t	142233	-0.031	0.858	-25.48	-0.009	0.012	0.047	7.095
ΔDEP_t	166464	-0.003	0.176	-3.861	-0.002	0.002	0.009	2.866
ΔINT_t	150855	-0.007	0.253	-7.013	-0.004	0.000	0.007	2.636
$\Delta OTHERS_t$	119999	-0.001	0.513	-7.510	-0.013	0.000	0.014	8.807
MV_{t-1}	171393	1522.8	6391.8	0.50	25.3	109.9	566.4	117626
BM_{t-1}	171331	0.729	0.672	-1.641	0.315	0.575	0.953	7.644
RET_{t-1}	173126	0.168	1.307	-0.995	-0.222	0.050	0.349	408.26

Panel B: Correlation matrix for key variables Pearson (Spearman) correlations are shown above (below) the main diagonal. 170,971 firm-year observations with non-missing variables

	RET_t	ΔE_t	ΔPTI_t	ΔTAX_t	MV_{t-1}	BM_{t-1}	RET_{t-1}
RET_t	1	0.096**	0.101**	0.103**	-0.025**	0.118**	-0.050**
ΔE_t	0.308**	1	0.961**	0.263**	-0.007**	-0.011**	-0.022**
ΔPTI_t	0.312**	0.960**	1	0.375**	-0.007**	-0.003	-0.021**
ΔTAX_t	0.238**	0.527**	0.655**	1	-0.008**	0.055**	-0.001
MV_{t-1}	0.023**	-0.054**	-0.057**	-0.010**	1	-0.107**	0.007**
BM_{t-1}	0.164**	-0.014**	-0.010**	0.017**	-0.292**	1	-0.112**
RET_{t-1}	-0.003	0.038**	0.040**	0.093**	0.172**	-0.184**	1

** Significant at the 1 percent 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. ΔPTI_t is change in pre-tax income 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). All variables are described in more detail in the Appendix. The sample includes 175,031 firm-year observations with non-missing RET_t , ΔPTI_t, and ΔTAX_t from 1978 to 2009. Each year, all variables except for return variables are Winsorized at 1 percent and 99 percent, 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	5
Sample	All	All	All	Profit	Loss
Intercept	0.170 (3.59)	0.149 (1.85)	0.149 (1.85)	0.242 (4.62)	0.172 (1.76)
ΔE_t	0.195 (5.80)	0.201 (5.57)			
ΔPTI_t			0.151 (4.48)	1.851 (9.28)	0.038 (3.06)
ΔTAX_t			0.584 (8.66)	-0.134 (-0.64)	0.133 (4.67)
$Log(MV_{t-1})$		-0.011 (-1.43)	-0.011 (-1.36)	-0.019 (-3.99)	-0.041 (-4.12)
BM_{t-1}		0.079 (4.13)	0.073 (3.82)	0.062 (3.79)	0.046 (2.92)
RET_{t-1}		-0.035 (-0.88)	-0.037 (-0.92)	-0.064 (-1.81)	-0.091 (-1.89)
Adj. R^2	0.021	0.050	0.059	0.122	0.037
# of observations	175,031	175,031	175,031	106,930	64,109

This Table describes regressions of contemporaneous returns (RET_t) on earnings surprises (ΔE_t) and its components (ΔPTI_t and ΔTAX_t). We also include three controls for expected returns: MV_{t-1}, BM_{t-1}, and RET_{t-1}. Profit firms are defined as those with positive earnings before extraordinary items in both years *t-1* and *t*. Loss firms are defined as those with negative earnings before extraordinary items in year *t-1* or *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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. All 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). All variables are described in more detail in the Appendix. The sample includes 175,031 firm-year observations from 1978 to 2009. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent. The coefficient estimates are averages of annual estimates over 32 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 3
Sample truncation and splitting tax expense into current and deferred components

Panel A: Truncation on *ΔPTI*

	No truncation	Top and bottom 1%	Top and bottom 2%	Top and bottom 5%	Top and bottom 10%	Top and bottom 25%
Intercept	0.149 (1.85)	0.148 (1.89)	0.130 (1.68)	0.124 (1.62)	0.107 (1.49)	0.045 (0.71)
ΔPTI_t	0.151 (4.48)	0.303 (6.14)	0.654 (10.22)	1.294 (14.08)	2.144 (16.80)	4.422 (18.70)
ΔTAX_t	0.584 (8.66)	0.580 (7.99)	0.340 (5.04)	0.103 (1.01)	-0.223 (-2.01)	-0.803 (-4.39)
CONTROLS	YES	YES	YES	YES	YES	YES
Adj. R^2	0.059	0.069	0.085	0.097	0.099	0.092
# of obs.	175,031	171,503	168,002	157,491	139,991	87,493

Panel B: Truncation on *ΔTAX*

	No truncation	Top and bottom 1%	Top and bottom 2%	Top and bottom 5%	Top and bottom 10%	Top and bottom 25%
Intercept	0.149 (1.85)	0.143 (1.79)	0.137 (1.71)	0.127 (1.56)	0.111 (1.33)	0.093 (1.00)
ΔPTI_t	0.151 (4.48)	0.187 (5.24)	0.182 (5.23)	0.167 (5.13)	0.157 (5.07)	0.148 (4.73)
ΔTAX_t	0.584 (8.66)	1.220 (12.82)	2.257 (14.37)	3.875 (14.52)	5.947 (14.42)	11.673 (6.81)
CONTROLS	YES	YES	YES	YES	YES	YES
Adj. R^2	0.059	0.068	0.075	0.076	0.073	0.061
# of obs.	175,031	171,567	168,065	157,555	140,051	87,517

Panel C: Truncation on ΔPTI and tax expense surprise split into current and deferred components.

	No truncation	Top and bottom 1%	Top and bottom 2%	Top and bottom 5%	Top and bottom 10%	Top and bottom 25%
Intercept	0.149 (1.85)	0.148 (1.88)	0.130 (1.68)	0.123 (1.61)	0.106 (1.47)	0.045 (0.70)
ΔPTI_t	0.142 (4.51)	0.288 (6.44)	0.626 (10.70)	1.230 (14.36)	2.051 (17.29)	4.325 (19.16)
$\Delta CTAX_t$	1.720 (9.20)	1.780 (9.84)	1.434 (8.54)	1.129 (5.59)	0.756 (3.25)	-0.195 (-0.85)
$\Delta DTAX_t$	0.218 (3.57)	0.182 (2.69)	-0.067 (-0.85)	-0.286 (-3.20)	-0.544 (-5.56)	-1.030 (-5.48)
CONTROLS	YES	YES	YES	YES	YES	YES
Adj. R^2	0.065	0.076	0.091	0.101	0.102	0.092
# of obs.	175,031	171,392	167,889	157,396	139,904	87,428

This table describes regression results when truncating the sample based on pre-tax income surprises (ΔPTI_t) or tax surprises (ΔTAX_t). In panels A and C, each year we truncate the sample at different levels based on ΔPTI_t, whereas in panel B we truncate the sample based on ΔTAX_t. The regression model is:

$$RET_t = \beta_0 + \beta_1 \Delta IBT_t + \beta_2 \Delta TAX_t + \beta_3 \log(MV_{t-1}) + \beta_4 BM_{t-1} + \beta_5 RET_{t-1} + \varepsilon_t$$

Where 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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. In Panel C, we split ΔTAX_t into its two components: $\Delta CTAX_t$ is change in current tax expense per share. $\Delta DTAX_t$ is change in deferred tax expense per share. All surprise measures are scaled by stock price at the end of the 3rd month of the current fiscal year. The regressions include controls for the following three variables that explain returns. 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). All variables are described in more detail in the Appendix. The sample period is from 1978 to 2009. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent for the original sample. The coefficient estimates are averages of annual estimates over 32 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 4
Two-way sort by the informativeness of pre-tax income surprises and tax expense surprises

Panel A: # of observations

		Value relevance of *ΔPTI*				
		Q1 (High)	Q2	Q3	Q4	Q5 (Low)
Proxy for profitability role of *ΔTAX*	Q1 (High)	352	181	165	173	223
	Q2	549	298	104	81	63
	Q3	139	506	304	85	61
	Q4	39	85	472	396	102
	Q5 (Low)	16	24	49	360	646

Panel B: Mean *ΔTAX* coefficient (t-statistic)

		Value relevance of *ΔPTI*				
		Q1 (High)	Q2	Q3	Q4	Q5 (Low)
Proxy for profitability role of *ΔTAX*	Q1 (High)	-17.191 (-0.97)	68.89 (2.06)	52.72 (1.31)	88.37 (1.32)	-250.74 (-1.85)
	Q2	-1.732 (-1.49)	0.643 (0.34)	9.710 (2.33)	0.792 (0.22)	12.45 (1.81)
	Q3	-2.846 (-3.13)	-1.058 (-0.94)	2.110 (1.31)	2.188 (1.29)	5.137 (2.91)
	Q4	-1.890 (-3.07)	-1.732 (-2.97)	-0.576 (-1.34)	1.126 (2.71)	3.518 (5.62)
	Q5 (Low)	-3.777 (-1.26)	2.610 (0.85)	-0.795 (-5.11)	-0.615 (-3.85)	0.426 (7.19)

This Table reports the coefficients on *ΔTAX* from the regressions of contemporaneous returns (RET_t) on pre-tax income surprises (ΔPTI_t), tax expense surprises (ΔTAX_t) for subsamples partitioned on the value relevance of pre-tax income surprises and the ability of tax expense surprise to proxy for profitability. 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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. Both surprise measures are scaled by stock price at the end of the 3rd month of the current fiscal year. We also include three controls for expected returns: MV_{t-1}, BM_{t-1}, and RET_{t-1}. 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). All variables are described in more detail in the Appendix. Each year, we independently sort all firms into quintiles based on the magnitude of surprises in pre-tax income and tax expense and cross those two sets of quintiles to form 25 subsamples. We assume that the value relevance of pre-tax income and the ability of tax expense to proxy for profitability are highest (lowest) when the magnitudes of surprise are lowest (highest). The sample includes 175,031 firm-year observations from 1978 to 2009. Each year, all variables except for returns are

Winsorized at 1 percent and 99 percent. The coefficient estimates are averages of annual estimates over 32 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 5
Cross-sectional vs. time-series regressions

	Cross-sectional regressions			Time-series regressions		
	Mean	t	Median	Mean	t	Median
Intercept	0.210	4.18	0.200	0.556	11.42	0.498
ΔPTI_t	0.160	3.19	0.068	1.153	7.06	0.658
ΔTAX_t	0.832	5.55	0.760	0.468	0.21	0.011
$Log(MV_{t-1})$	-0.015	-3.25	-0.012	-0.093	-12.07	-0.068
BM_{t-1}	0.050	4.06	0.063	0.220	9.73	0.165
RET_{t-1}	-0.064	-1.34	-0.012	-0.069	-9.00	-0.072
Adj. R^2	0.091	9.17	0.077	0.205	29.20	0.172

This Table describes cross-sectional and time-series regressions of contemporaneous returns (RET_t) on pre-tax income surprises (ΔPTI_t) and tax expense surprises (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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. Both 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). All variables are described in more detail in the Appendix. The sample includes 815 firms with at least 30 years' data available from 1978 to 2009, with a total of 26,629 firm-year observations. The left three columns report results of cross-sectional regressions and the right three columns report results of time-series regressions. The t-statistics are equal to $\sqrt{n}*(mean/stdev)$, where *n*, *mean*, and *stdev* are the number, mean, and standard deviation of the distribution of estimated coefficients in each setting.

Table 6
Separate one-time items from pre-tax income

	1	2
Intercept	0.128 (1.26)	0.133 (1.30)
ΔPTI_t	0.471 (6.79)	
ΔPTI_CORE		0.766 (6.44)
ΔPTI_ONE_t		0.477 (7.27)
ΔTAX_t	0.622 (5.96)	0.307 (2.02)
$Log(MV_{t-1})$	-0.007 (-0.65)	-0.007 (-0.69)
BM_{t-1}	0.054 (1.70)	0.050 (1.56)
RET_{t-1}	-0.031 (-0.55)	-0.039 (-0.66)
Adj. R^2	0.094	0.102

This Table describes regressions of contemporaneous returns (RET_t) on pre-tax income surprises (ΔPTI_t) and tax expense surprises (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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. ΔPTI_ONE_t is the change in one-time items per share, where one-time items are defined as the difference between Compustat earnings before extraordinary items and I/B/E/S actual earnings divided by (1-35%), to gross up after-tax amounts into pre-tax amounts. ΔPTI_CORE_t is ΔPTI_t minus ΔPTI_ONE_t. All 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). All variables are described in more detail in the Appendix. The sample includes 71,206 firm-year observations with non-missing I/B/E/S actual earnings data from 1985 to 2009. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent. The coefficient estimates are averages of annual estimates over 25 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 7
Regressions with un-deflated variables

	Dependent variable = stock price changes
Intercept	-21.89 (-2.52)
ΔPTI_t	4.259 (3.69)
ΔTAX_t	-1.153 (-0.34)
$Log(MV_{t-1})$	2.580 (2.29)
BM_{t-1}	10.59 (2.88)
RET_{t-1}	-0.607 (-0.14)
Adj. R^2	0.005

This Table describes regressions of contemporaneous price changes (ΔP_t) on earnings surprise components (ΔPTI_t and ΔTAX_t). ΔP_t is the 12-month price change (cum dividend) from the end of the 3rd month of the current fiscal year to the end of the 3rd month of the following year. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. Both surprise measures are undeflated. 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 ΔP_t (from the end of the 2nd month of the prior year to the end of the 2nd month of the current fiscal year). All variables are described in more detail in the Appendix. The sample period is from 1978 to 2009. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent. The coefficient estimates are averages of annual estimates over 32 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 8
Partitions on tax expense and tax loss carryforward

	Negative tax expense	Positive tax expense	With tax loss carryforward	Without tax loss carryforward
Intercept	0.021 (0.30)	0.189 (2.25)	0.014 (0.16)	0.102 (2.12)
ΔPTI_t	0.179 (4.63)	0.126 (4.13)	4.108 (11.54)	5.216 (14.13)
ΔTAX_t	0.170 (2.68)	1.243 (8.73)	-0.757 (-2.92)	-1.184 (-2.24)
$Log(MV_{t-1})$	-0.009 (-1.38)	-0.015 (-1.86)	0.004 (0.58)	-0.000 (-0.04)
BM_{t-1}	0.078 (5.49)	0.093 (4.04)	0.091 (3.81)	0.038 (2.04)
RET_{t-1}	-0.064 (-1.38)	-0.049 (-1.28)	-0.056 (-1.81)	-0.082 (-2.77)
Adj. R^2	0.074	0.063)	0.069	0.116

This Table describes regressions of contemporaneous returns (RET_t) on pre-tax income surprises (ΔPTI_t) and tax expense surprises (ΔTAX_t). Negative tax expense firms are defined as those with negative tax expense in year *t-1* or *t*. Positive tax expense firms are defined as those with positive tax expenses in both years *t-1* and *t*. Firms with tax loss carryforward are defined as those with positive tax loss carryforward (TLCF) in year *t* or year *t-1* as reflected in Compustat. Firm-years without tax loss carryforward include those with missing or zero tax loss carryforward in year *t* and year *t-1*. The TLCF samples are restricted to the 25% truncation subsample, based on the distribution of ΔPTI_t, in the last column in Panel A of Table 3. The value relevance of pre-tax income surprise is highest for this subsample, which allows tax expense surprise to better reflect the value lost to taxes. 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. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. All 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). All variables are described in more detail in the Appendix. The sample includes 175,031 firm-year observations from 1978 to 2009. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent. The coefficient estimates are averages of annual estimates over 32 years; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 9
Variation in tax expense surprise coefficients from firm-specific time-series regressions

	1	2	3	4
Intercept	2.940 (11.34)	1.167 (2.50)	1.313 (3.14)	4.332 (11.81)
Coefficient on ΔPTI_t	-1.763 (-26.04)			-1.795 (-26.85)
NEG_TAX		-1.954 (-1.29)		-3.049 (-2.65)
Magnitude of ΔTAX_t			-15.56 (-2.09)	-21.57 (-3.81)
Controls for size, B/M and momentum	YES	YES	YES	YES
Adj. R^2	0.454	0.001	0.004	0.471

The dependent variable is the coefficient on tax expense surprises (ΔTAX_t) from firm-specific time-series regressions of contemporaneous returns (RET_t) on pre-tax income surprises (ΔPTI_t) and tax expense surprises (ΔTAX_t). The regressions include controls for the following three variables that explain returns. 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 coefficient on ΔPTI_t is from the same time-series regressions. *NEG_TAX* is the percentage of years with negative tax expense for each firm. The magnitude of ΔTAX_t is the average of the absolute values of ΔTAX_t across years for each firm. The sample includes 815 firms with at least 30 years' data available from 1978 to 2009. We run OLS regressions of the coefficient on ΔTAX_t on other firm-specific variables, with 815 observations in each regression. The coefficient on ΔTAX_t and ΔPTI_t are Winsorized at 1% and 99%.

Table 10
Regressions of 3-year returns on surprises in pre-tax income and tax expense around the tax rate declines associated with TRA86.

	1985	1986	1987	1988	1989	1990
Intercept	-0.206 (-3.48)	-0.146 (-2.25)	-0.154 (-2.91)	-0.236 (-5.34)	-0.213 (-4.67)	-0.007 (-0.14)
ΔPTI_t	0.010 (0.61)	-0.012 (-0.70)	-0.007 (-0.43)	0.010 (0.97)	-0.006 (-0.56)	-0.024 (-2.62)
ΔTAX_t	0.442 (2.73)	0.716 (4.12)	-0.025 (-0.17)	-0.202 (-1.64)	0.324 (2.54)	0.484 (4.03)
$Log(MV_{t-1})$	0.074 (7.32)	0.114 (9.95)	0.065 (6.76)	0.042 (5.46)	0.030 (3.77)	0.040 (4.54)
BM_{t-1}	0.497 (16.27)	0.402 (8.60)	0.294 (8.23)	0.326 (10.32)	0.268 (8.07)	0.088 (2.77)
RET_{t-1}	0.041 (2.09)	-0.084 (-3.01)	0.071 (1.73)	0.049 (1.80)	0.021 (0.78)	-0.041 (-1.07)
Adj. R^2	0.077	0.046	0.026	0.030	0.018	0.009
# of observations	3571	3816	3874	3891	4095	4315

This Table describes regressions of three-year returns (RET_3Y_t) on pretax income surprises (ΔPTI_t) and tax expense surprises (ΔTAX_t) across years around the Tax Reform Act of 1986 (TRA86). TRA86 reduced the top statutory tax rate for calendar tax years from 46% in 1986 to 40% for 1987 and then to 34% for 1988. RET_3Y_t is the buy-and-hold stock return over the three years leading up to the end of the 3rd month after fiscal year-end. ΔPTI_t is change in pre-tax income per share. ΔTAX_t is change in tax expense per share. All surprise measures are scaled by stock price at the end of the 3rd month of the current fiscal year. MV_{t-3} is the market value of equity at the end of fiscal year t-3. BM_{t-3} is the book-to-market ratio at at the end of fiscal year t-3. RET_{t-3} is 12-month stock return over the period that ends one month before the beginning of the accumulation period for RET_3Y_t. We run annual regression each year from 1985 to 1990. Each year, all variables except for returns are Winsorized at 1 percent and 99 percent.