Tax expense momentum

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

July 2010

We thank Edward Li and K. Ramesh for sharing their database of 10-K/Q filing dates. We received many helpful comments from anonymous referees, John Hand, Ed Maydew, Lil Mills, Jana Raedy, Doug Shackelford, Dave Weber, and seminar participants at AAA Annual Meetings (2007), Duke/UNC Fall Camp, Goldman Sachs, University of Minnesota, UNC Tax camp, UCLA, and Yale University. We also thank Thomson Financial Services, Inc. for the IBES data provided as part of a broad academic program to encourage earnings expectation research.

Tax expense momentum

Abstract

We investigate the joint hypotheses that a) tax expense contains information about core profitability that is incremental to reported earnings and b) that information is not reflected in stock prices because tax disclosures are complex and opaque. We find that seasonally-differenced quarterly tax expense, our proxy for tax expense surprise, is positively related to future returns. This anomaly is separate from pricing anomalies based on financial statement information, such as earnings momentum, as well as anomalies based on tax variables. Additional investigation reveals that tax expense surprise is related positively to changes in future quarterly earnings and tax expense, and both those future changes are related positively to future returns. Investors appear to underestimate the implications of tax expense surprise for next quarter's earnings and tax expense, and respond with a delay when those predictable implications are disclosed.

Tax expense momentum

1. Introduction

An emerging literature has shown that tax information derived from GAAP financial statements contains value relevant information, both in terms of explaining contemporaneous returns as well as predicting future returns (see Graham et al., 2010). This value-relevant information is incremental to that contained in after-tax net income (referred to as "earnings" hereafter). In this paper, we investigate whether seasonally-differenced quarterly tax expense—our proxy for the surprise or information released in tax expense—predicts future returns. Tax expense, the amount subtracted from pre-tax income to get earnings, consists of current and deferred portions. The former represents taxes estimated to be due on taxable income allocated to this quarter (from the annual tax return), and the latter represents adjustments and estimates for components of this quarter's pre-tax income that are reported as taxable income in other quarters.

We test two joint hypotheses in this study. First, unexpected increases in tax expense are good news, ceteris paribus. While the opposite is suggested by common intuition—unexpected expenses are usually bad news—and the results of some prior research (e.g., Lipe, 1986), there is evidence (e.g., Thomas and Zhang, 2010) supporting the view that tax expense surprises are good news in general, because they proxy for changes in core profitability. Second, investors underreact initially to tax expense surprises and respond fully when the value implications of tax expense surprises are explicitly revealed in subsequent quarters. Investor confusion about the predictable implications of tax expense surprises is understandable. Tax disclosures are complex and opaque (e.g., Dhaliwal et al., 2004) and, as mentioned above, academic research has shown both positive and negative value implications for tax expense surprises. Consistent with investor underreaction, sell-side analysts also appear to underreact to tax disclosures (Weber, 2009).

We find that quarterly tax expense surprise is related positively to next quarter's stock returns, after controlling for earnings surprises, measured as seasonally-differenced quarterly earnings. Our results suggest two channels for this delayed market response: current tax expense surprise is related positively to next quarter's surprises for a) earnings and b) tax expense. Both higher earnings and higher tax expense reported next quarter are perceived as good news. While the recent literature on information contained in tax-related variables has focused on the first channel, our evidence suggests that the second channel is also operative. The ability to predict future tax expense has its own value, separate from any ability to predict future earnings.

Even though next quarter's earnings and tax expense "surprises" are predictable, the market does not anticipate them fully and responds with a delay when that predictable news about the next quarter is revealed.[1] Consistent with this explanation, we find that a disproportionate fraction of abnormal returns earned over the next quarter is concentrated at the subsequent earnings announcement.

We confirm that mispricing related to tax expense surprises is separate from two other pricing anomalies based on tax variables. Lev and Nissim (2004) shows that the ratio of annual "tax income" to earnings is related positively to future returns, where tax income is the tax return analog of earnings; i.e., tax income equals taxable income less taxes due. Schmidt (2006) decomposes earnings changes into two components: the portion that captures changes in effective tax rates (the tax change component) and the remainder. Investors underreact to the tax change component because they underestimate its persistence. As described later, both at the

---

[1] By definition, adjacent period surprises (unexpected news) should be unrelated given efficient markets. Here, however, we allow for the possibility that investors' expectations of earnings and tax expense are systematically biased, which then generates predictable "surprises". See, for example, the explanation in the earnings momentum literature that relies on the positive relation between current and future earnings surprises (e.g., Bernard and Thomas, 1990).

conceptual and empirical levels, our tax expense surprise variable is weakly related to the ratio in Lev and Nissim (2004) and is negatively related to the tax change component in Schmidt (2006).

As with all other stock market anomalies, we cannot rule out the possibility that firm-quarters reporting higher (lower) tax expense become more (less) risky; i.e., the abnormal results we observe are simply returns required to compensate investors for changes in risk. To control for sources of risk discussed in the prior literature we incorporate those risk factors into our analyses. To consider risks that we may not have explicitly controlled for, we confirm that the hedge returns earned in the 120 quarters we study are rarely negative; if the strategy had been risky, we would expect more losses. Also, a risk-based explanation would require unreasonably large but localized risk changes to explain the concentration of abnormal returns around subsequent earnings announcements. Our results may also be artifacts of the databases or experimental procedures employed. We conduct extensive robustness and sensitivity analyses to reduce the likelihood that our results are affected by these potential sources of error.

The rest of the paper is organized as follows. Section 2 reviews the prior literature and develops our hypotheses and Section 3 describes the data and provides summary statistics. Section 4 presents our empirical evidence. We first document the anomaly and confirm that it is separate from other pricing anomalies, and then consider the explanation we propose for the delayed investor response. Section 5 provides a number of robustness checks, and Section 6 concludes.

2. Prior literature and hypothesis development

Our study is related to two lines of research. The first link is a general connection to the extensive literature on anomalous pricing behavior in stock markets (e.g., Hirshleifer, 2001), especially papers documenting a relation between information disclosed in financial statements and future returns. Ball and Brown (1968), an early example of this latter stream, describes a positive relation between changes in annual earnings and subsequent returns. Joy et al. (1977) shows that this earnings momentum is stronger for seasonally-differenced *quarterly* earnings. A parallel literature has emerged on price momentum (e.g., Jegadeesh and Titman, 1993, Chan et al., 1996), which is based on positively correlated returns over adjacent short-term holding periods, extending from three to 12 months.

The second link is to the emerging literature on the value implications of tax disclosures in accounting reports. As described in Graham et al. (2010), there are several dimensions along which studies in this literature can be grouped. One such dimension is whether tax expense surprises are good or bad news. At a simple level, increases in tax expense, similar to increases in other expenses, must be bad news if everything else is held constant. That expected relation is confirmed in early research such as Lipe (1986) since stock returns are related negatively to tax expense surprises.[2]. But tax expense increases could also signal good news if a) tax expense proxies for underlying profitability, and b) book income is a noisy measure of underlying profitability. To be sure, a positive relation between tax expense surprises and stock returns in the presence of controls for book income surprises can only be expected for relatively short windows (quarterly and annual); any observed positive relation should soon dissipate and then turn negative as the width of the window examined increases (see Ohlson and Penman, 1992).[3]

As described in Thomas and Zhang (2010), the evidence generally supports the view that tax expense surprises are good news and there is support for the two above-mentioned conditions

---

2 Some studies focus on surprises in effective tax rates, which is the ratio of tax expense to pre-tax book income. To the extent that studies using tax expense surprises include controls for surprises in pre-tax book income (or surprises in earnings), predicting that tax expense increases are bad (good) news is analogous to predicting that effective tax rate increases are bad (good) news.

3 In the extreme, consider the relation between returns and tax expense over a firm's lifetime. If two firms have the same total pre-tax income, it must be the case that the firm with the lower total tax expense will have higher total after-tax earnings and higher total return.

that are necessary for this empirical finding. Reasons why tax expense might proxy for underlying profitability include the possibility that taxable income, which is related to the current portion of tax expense, is an alternative measure of profitability, albeit one that is computed using tax rules that are not designed to focus on value creation (see, for example, Hanlon et al., 2005, and Ayers et al., 2009). Also, firms might manage the deferred component of tax expense upward (downward) to decrease (increase) reported earnings when underlying profitability is high (low) (e.g., Myers et al., 2007).[4] As a result, higher current and deferred portions of tax expense signal higher underlying profitability.

Conditions under which book income might be a noisier measure of underlying profitability than tax expense include cases where book income contains large price-irrelevant or transitory components, possibly due to write-offs and earnings management. Including (excluding) firms reporting losses, which represent a substantial fraction of sample firms, substantially increases (decreases) the noise associated with book income.

A second dimension along which the emerging literature on the value relevance of tax variables can be grouped is whether or not investors are presumed to appreciate fully the information contained in tax disclosures. Most of this literature does not directly address this question, since those studies presume that stock markets are efficient; only three published studies investigate whether stock prices react with a delay. Given that our paper also investigates market inefficiency, we describe these three studies in more detail to delineate how the hypotheses and tax variable in our study differ from those in the prior studies.[5]

---

4 The valuation allowance and tax reserve (for amounts that are likely to be reversed on audit) are two items of deferred tax expense that involve estimates and are therefore amenable to manipulation.

5 Taxes have also played a different role in prior market inefficiency studies. Rather than be the basis for generating pricing anomalies, taxes have been offered as an explanation for different pricing anomalies. For example, Bernard and Thomas (1989) consider whether differences in investor-level taxation for good and bad news portfolios could explain the earnings momentum results. Similarly, George and Hwang (2007) conclude that long-term return reversals are likely to be driven by personal tax effects ignored in prior research.

Lev and Nissim (2004) and Weber (2009) rely on the same hypothesis and use the same tax variable. The first part of the hypothesis is that the quality of reported book income is low (high) when it is much higher (lower) than tax income, where high quality income is associated with higher future growth in book income. Tax income, which is the tax return analog of after-tax book income, equals taxable income less the tax liability. Consequently, both studies use the ratio of tax income to book income as a measure of the quality of book income. The second part of the hypothesis is that investors underreact to this signal of earnings quality. Lev and Nissim (2004) shows that next year's returns are positively related to the ratio of tax income to book income. Weber (2009) shows that analysts fail to update their earnings forecasts sufficiently in response to this signal, which increases the likelihood that the Lev and Nissim (2004) results are due to investor underreaction, rather than insufficient controls for risk.

Whereas the tax variable in these two studies is a signal of the quality of book income, our tax variable is a proxy for changes in underlying profitability. Empirically, the ratio of tax income to book income is related to the ratio of the current portion of tax expense to book income. That is, the tax variable in these two studies is derived from the *level* of the current portion of tax expense, whereas we use *changes* in the current and deferred portions of tax expense. Not only is the hypothesis in our study different from that in these two prior studies, the tax variables used are likely to be largely unrelated.

The third study, Schmidt (2006), is based on the hypothesis that the effective tax rate (ETR) proxies for the degree of tax planning and tax optimization activities. A reduction in effective tax rates reflects unexpected tax savings from a firm's strategic tax-planning and tax-optimization activities, such as increased use of tax shelters and the utilization of tax rate differentials across countries and states. As a consequence, the tax variable used, referred to as the tax change component, is defined as the product of this year's pre-tax book income and the excess of last year's ETR over this year's ETR. Assuming that investors underestimate the persistence of this tax change component, next year's returns are positively related to this year's tax change component.

At a conceptual level, Schmidt (2006) and our paper are based on diametrically opposite predictions. Schmidt (2006) views a decline in effective tax rates, which translates approximately into a decline in tax expense after controlling for changes in pre-tax book income, as good news because of the greater savings from improved tax planning. In contrast, we view a decline in tax expense as bad news because it implies lower underlying profitability. And at an empirical level, because the tax change component is a function of last year's ETR minus this year's ETR, it should be highly negatively correlated to our measure of tax expense surprise, which is this year's tax expense minus last year's tax expense.

In sum, our paper is clearly different from the three prior studies that link tax variables to future returns. At the level of research hypotheses, we view tax expense as a proxy for underlying profitability, whereas the prior studies view tax variables as a measure of the quality or persistence of book income. In terms of the specific variables employed, tax expense changes in our study should be only weakly related to the ratio of tax income to book income used in Lev and Nissim (2004) and Weber (2009), and it should be strongly negatively related to the tax change component used in Schmidt (2006).

Another difference between our study and the three prior studies is that we use quarterly data whereas those studies use annual data. We use higher frequency data because we believe that each quarter's tax expense holds the potential to provide unique information, some of which is lost when aggregated across quarters in the same fiscal year. And to the extent any underreaction to that information is likely to be quickly corrected, we increase the odds of detecting that correction by focusing on returns over the next quarter, especially at next quarter's earnings announcement. Because the well-established pricing anomaly due to earnings momentum is also based on quarterly data and because tax expense changes are likely to be highly correlated with earnings changes used in earnings momentum studies, we need to control for earnings changes.

Note that the sense in which tax expense changes represent good news differs depending on whether we control for changes in after-tax earnings or control for changes in pre-tax income, as in some prior research (e.g., Lipe, 1986).[6] Consider two firms, A and B, that have the same after-tax earnings surprise of $1.00 per share. Firm A (B) has tax expense surprise of $0.50 ($0.45), which implies pre-tax income surprise of $1.50 ($1.45). That is, even though both firms have the same after-tax earnings surprise, firm A which has the higher tax expense surprise and is viewed as having reported better news has a higher pre-tax income surprise. In contrast, if we had controlled for pre-tax income surprises, firm A with the higher tax expense surprise and better news would have had a *lower* after-tax earnings surprise. As an empirical matter, the good news implied by tax expense surprises is so strong that it is positively related to future returns regardless of whether we control for changes in pre-tax income or after-tax earnings. However, to maintain comparability with the earnings momentum literature, we focus on the incremental information content of tax expense surprises when controlling for after-tax earnings surprises.

Returning to the joint hypotheses that underlie this paper, we believe that a) increases in tax expense should be viewed as good news and b) investors underreact initially to that news but any underreaction is corrected subsequently by the arrival of news about upcoming quarters'

---

6 Since pre-tax income, tax expense, and after-tax earnings are mechanically related, fixing any two of the three variables automatically fixes the third variable.

results. While we recognize that there are competing arguments for why increases in tax expense could be good or bad news, we rely on the results in Thomas and Zhang (2010) to hypothesize that the net effect is a positive relation between tax expense surprises and value changes.

Our second hypothesis, regarding investor underreaction and subsequent correction, is based on the general finding in the stock price anomaly literature that investors tend to underreact to financial disclosures. Those studies suggest that investors do not incorporate fully the future implications of current financial variables, such as earnings changes and accruals, but wait until those implications are explicitly disclosed in future period financial statements. If investors have difficulty projecting the implications of earnings and accruals, projecting the implications of tax variables is a more difficult task.

Tax disclosures in financial reports are complex for a variety of reasons. Not only are tax returns complex, additional complexity is introduced by the rules that translate tax returns to financial reporting. Tax disclosures in financial reports are also opaque for a variety of reasons, including the strategic interests of management to obfuscate the position taken on different tax issues. Weber (2009) provides evidence that this complexity and opacity results in financial analysts not incorporating fully the implications of tax disclosures. And the lack of unanimity among academic researchers about the value implications of tax expense surprises provides further justification for our hypothesis that investors react inefficiently to tax disclosures.

The three predictions that arise from our joint hypotheses are as follows. All three predictions are conditional on controls for earnings surprises.

P1: Tax expense surprises are positively related to future stock returns.

P2: Tax expense surprises are positively related to future earnings surprises.

P3: Tax expense surprises are positively related to future tax expense surprises.

While the first prediction follows directly from the two hypotheses, the second and third predictions represent our efforts to describe specific channels by which the future implications of this quarter's tax expense surprise is revealed explicitly to investors in future measures of profitability. The second prediction is based on future earnings being one future measure of profitability. Since we believe that tax expense is an alternative measure of underlying profitability the third prediction is based on future tax expense reflecting that alternative measure of future profitability.

3. Sample data and descriptive statistics

We obtain data for our primary sample from two sources: a) earnings, tax variables, and other financial variables are taken from quarterly Compustat files, and b) stock return data are gathered from CRSP monthly (and daily) return files. Our sample period is from 1977:I to 2006:IV (the Roman numerals after years refer to fiscal quarters I through IV). Total assets are widely available on Compustat only after 1975, and since we use total assets from four quarters ago as the deflator for most financial variables, our sample period begins with 1977:I.

Our primary explanatory variable is tax expense surprise (ΔT), and is measured as tax expense per share in quarter *q* minus tax expense per share in quarter *q-4*, scaled by assets per share in quarter *q-4*. (See Table 1 for details of how different variables are computed.) Our primary control variable is earnings surprise (ΔE), which is measured as earnings per share in quarter *q* minus earnings per share in *q-4*, scaled by assets per share in quarter *q-4*. To improve comparability across quarters, both earnings per share and tax expense per share are adjusted for stock splits and dividends before computing seasonal differences.

Our main dependent variable is the return over a future three-month holding period (RET_{q+1}), beginning from the fourth month after the end of quarter *q*. We seek to be conservative by waiting three months after the quarter end, to ensure that tax expense is released to the market before the holding period begins. Tax expense is often released at the earnings announcement date noted in Compustat, which is typically a few weeks after the quarter end. We cannot be certain, however, that this is the case for our entire sample, especially earlier in the sample period. For those quarters where tax expense is not released at the earnings announcement date, we can be certain that it is released by the 10-Q or 10-K filing date, which is 45 and 90 days after the quarter-end, respectively.[7, 8]

Table 1 provides descriptive statistics for RET_{q+1}, ΔT, and ΔE, the three main variables of interest, as well as a host of control variables that capture other known pricing anomalies. Three of those control variables that have also been described in the literature as potential risk proxies are: market value of equity (*MV*), book to market ratio (*BM*) and buy and hold returns over the 6-month period leading up to two months after the fiscal quarter-end (*RET_6*).[9] Prior research has shown that future returns are negatively related to *MV* (size effect), positively related to *BM* (book to market effect), and positively related to *RET_6* (price momentum effect).

Turning to controls for other anomalies, we consider changes in effective tax rates (*TCC*), the ratio of tax income to earnings (*TI/E*), cash flow from operations (*CFO/P*), and sales surprises (ΔS).[10] The variable we use to measure changes in quarterly effective tax rates is a

---

7 Recently, the SEC ruled to shorten the statutory due dates to 60 and 35 days for 10-K and 10-Q filings, respectively (SEC Release 33-8128, 2002).

8 We recognize that not all 10-Q and 10-K reports are filed by the required dates and there remains a small probability that tax expense was disclosed after the beginning of our holding period for future returns, RET_{q+1}. We report in Section 5.2 our efforts to investigate any potential upward bias in our estimates of the anomaly because of this effect.

9 By inserting a month between the end of the period used to compute *RET_6* and the beginning of the period used to compute RET_{q+1}, we seek to mitigate potential confounding due to the short-term reversals noted in Jegadeesh (1990) and Lehmann (1990).

10 We also considered forecast error, the difference between earnings per share for quarter q and analysts' forecasts of those earnings (median obtained from IBES), scaled by price, as an alternative proxy for earnings surprise (e.g., Doyle et al., 2006). Given that analyst data on IBES does not cover all sample firms and is not available for the earlier part of our sample period, we were able to obtain forecast errors for less than half of our sample

quarterly analog of the annual measure in Schmidt (2006). We define *TCC* as $(ETR_{q-4} - ETR_q)*PTEPS_q/TAPS_{q-4}$, where *ETR* is the quarterly effective tax rate, computed as tax expense divided by pre-tax income, *PTEPS* is pretax income per share, and *TAPS* is total assets per share. *TCC* is missing if pretax income is non-positive in either quarter *q* or *q-4*. Note that *TCC* has the opposite sign of changes in the effective tax rate, since it is defined as the prior effective tax rate less the current rate, not the current rate less the prior rate. *TCC* converts this difference in effective tax rates into a dollar impact by multiplying it by pre-tax income in the current quarter, and then scales that amount by total assets to allow comparisons across firm-quarters.

To control for the ratio of tax income to earnings, we use the *annual* measure of *TI/E* proposed by Lev and Nissim (2004). Tax income is measured as current tax expense times $(1-\tau)/\tau$, where τ is the top statutory tax rate in that year. We are unable to construct a quarterly version of this variable, because most firms do not provide the data necessary to identify current tax expense for interim quarters and wait until the fourth quarter to report annual amounts.

CFO/P is quarterly cash flow from operations, scaled by price at the end of prior quarter. A cash flow control is included because tax expense surprise may be correlated with operating cash flows, and our anomaly may inadvertently capture the cash flow anomaly (e.g., Lakonishok et al., 1994).[11] We also considered deflating cash flows by lagged total assets rather than price, and find that the results are similar. Since cash flow from operations was widely disclosed only since 1989, this variable is generally missing for the first 12 years of our sample period.

(about 270 thousand firm-quarters). Untabulated results based on substituting analyst forecast errors for seasonal differences reveal that our conclusions regarding tax expense surprise remain unchanged.

11 The cash flow anomaly is related to the accruals anomaly (e.g., Sloan, 1996, and Collins and Hribar, 2000), since earnings equal cash flows plus accruals. That is, future good news appears to be positively (negatively) related to current period cash flows (accruals). We do not include additional controls for the accrual anomaly, since the incremental effect of the accruals anomaly is small, especially at the quarterly level.

Our final control variable, sales surprise, is motivated by the results in Jegadeesh and Livnat (2006), which suggest that sales surprises exhibit an incremental ability to predict future returns, beyond that associated with earnings surprises. The intuition is that earnings increases (decreases) created by sales increases (decreases) are more persistent over the future on average than those created by cost decreases (increases). More generally, sales surprises represent one of three major components of pre-tax income surprises; the other two being surprises in manufacturing costs ($\Delta COGS$) and non-manufacturing costs (ΔSGA). Since tax expense surprise and pre-tax income surprise are perfectly negatively correlated, in the presence of controls for earnings surprise, tax expense surprise could simply be reflecting the ability of sales surprises to predict future returns. As with tax expense and earnings, we assume that sales follows a seasonal random walk process, and use seasonally-differenced quarterly sales to proxy for surprises.[12]

Panel A of Table 1 provides descriptive statistics for our three primary variables and various control variables. To mitigate the effect of outliers, we Winsorize all variables at 1 percent and 99 percent of each quarter's distribution, except for RET_{q+1}, the dependent variable of interest. As reported in the first column of Panel A, the sample size is above six hundred thousand for future returns (RET_{q+1}), tax expense surprise (ΔT), and earnings surprise (ΔE). Sample sizes decline slightly for the three risk proxies: market capitalization (*MV*), book-to-market ratio (*BM*), and prior returns (*RET_6*). They decline substantially for the two tax variables—changes in effective tax rates (*TCC*) and ratio of tax income to earnings (*TI/E*)—because these two variables are undefined for negative values of pre-tax income and earnings,

[12] We also considered controls for the proportion of pre-tax income earned from foreign sources, based on the results in Guenther and Jones (2006), as well as the level of effective tax rates (*ETR*). We find that both variables exhibit a U-shaped relation with tax expense surprise. More important, our results are not altered significantly by the inclusion of these two controls.

respectively.[13] Sample sizes are also reduced substantially for *CFO/P*, since cash flow from operations was not reported by most firms prior to 1989. Sales surprises are, however, widely available indicated by sample sizes similar to those for our primary variables.

Panel B presents pair-wise correlations across our three primary variables and the three risk proxies. Surprises in tax expense and earnings are positively correlated, the Pearson (Spearman) correlation is 0.242 (0.516). Earnings surprises are positively related to future three-month stock returns, consistent with the evidence documented in the earnings momentum literature. Tax expense surprise is significantly related to *MV*, *BM*, and *RET_6*, indicating the importance of including these control variables in our analysis.

Tax expense surprise is also positively related to future stock returns. While the Pearson correlations suggest that earnings surprise is correlated more highly with future returns than tax expense surprise is (0.025 vs. 0.032), the Spearman correlations suggest that tax expense surprise exhibits a slightly higher correlation (0.047 vs. 0.045). Given the strong correlation between surprises in earnings and tax expense, however, it is unclear from these pair-wise correlations whether the positive correlation between tax expense surprises and future stock returns is incremental to the well-known positive correlation between earnings surprises and future returns.

To investigate the effect of potential non-linearity on the correlations between tax expense surprise and the different control variables, we sort our sample each quarter into deciles of tax expense surprise as well as into deciles for all other variables (except future returns) and compute mean values of decile ranks for those other variables for each tax expense surprise decile. Those results are reported in Panel C. Results in column 1 indicates that the positive

[13] The reduction in sample size because of the requirement that earnings and pre-tax income be positive is substantial and becomes more severe over time. For example, firm-quarters dropped for the *TI/E* variable because of negative earnings account for 28.69% of the sample for the overall 1977-2006 period, and the percentage is increasing over time (6.80%, 26.14%, 30.49%, and 32.51% for 1970s, 1980s, 1990s, and 2000s, respectively).

correlation between tax expense surprises and future returns is fairly monotonic across the tax expense surprise deciles, and that correlation can be represented as a 3.90 percent hedge return over three months, from investing long (short) in the highest (lowest) tax expense surprise decile (=6.24% - 2.34%).

We also considered future returns over subsequent 3-month holding periods (e.g., RET_{q+2}, which contains abnormal returns for the 7th, 8th, and 9th months after the quarter-end, and so on). Untabulated results show that the relation between tax expense surprise and returns over the second window (RET_{q+2}) is positive but only half as strong as that observed between tax expense surprise and the first 3-month holding period (RET_{q+1}). Abnormal returns for the third and fourth holding periods decline to zero thereafter. Given this declining pattern, we focus only on the first holding period when computing future returns.

Results in column 2 suggest that the overall positive relation between tax expense and earnings surprises reported in Panel B is monotonic across the tax expense surprise deciles. The relations between tax expense surprise and *MV* and *BM*, reported in columns 3 and 4, suggest a non-linear relation at the decile level that is masked by the overall positive and negative correlations reported in Panel B. Column 5 reveals a strong monotonic positive relation between tax expense surprise and *RET_6*.

Before considering the relation between tax expense surprise and the remaining controls for previously documented anomalies, we report in columns 6 and 7 of Panel C the relations with next quarter's surprises for tax expense and earnings. The results in column 6 reveal that tax expense surprise is positively autocorrelated, and this relation is monotonic. The results in column 7 suggest that tax expense surprises are strongly positively related to earnings surprises in the next quarter. These two positive relations are consistent with the second and third predictions for delayed investor response: perhaps stock prices do not fully incorporate this predictable relation between current tax expense surprises and future earnings and tax expense surprises. Results reported in Section 4.2 provide more evidence regarding this explanation.

The results reported in column 8 show that *TCC* is monotonically negatively related to changes in tax expense. This relation is expected since *TCC* is based on the negative of seasonally-differenced effective tax rates, whereas tax expense surprise (ΔT) is based on seasonally-differenced tax expense. This strong negative relation suggests that the tax expense anomaly could not be reflecting the abnormal returns associated with *TCC.* The results for *TI/E* reported in column 9 suggest an inverted U-shaped relation with tax expense surprise, and the results in column 10 indicate a shallower U-shaped relation between *CFO/P* and tax expense surprise. Finally, the results in column 11 indicate that tax expense surprise is strongly positively related to sales surprise. Overall, the results in columns 9 through 11 suggest that the tax expense anomaly is unlikely to be reflecting the abnormal returns associated with *TI/E* and *CFO/P*, but it could be related to the anomaly associated with sales surprises.[14]

4. Results

4.1 Main results

We use both regression and decile portfolio analyses. To identify the incremental information contained in tax expense surprises (ΔT) over that in earnings surprises (ΔE) we include ΔE as an additional explanatory variable to our regressions. When conducting decile portfolio analyses, we use *residual* ΔT, which is the residual from regression (1) below. Each quarter, we estimate the regression across all firms and calculate residual ΔT for each firm. We

[14] We also investigated the presence of industry concentration in tax expense surprise deciles. We find that certain 2-digit SIC codes (such as codes 73, 36, and 35) are overrepresented in extreme deciles. However, since that overrepresentation is reasonably symmetric across top and bottom tax expense surprise deciles, we do not expect industry membership to bias our results.

then create decile portfolios based on *residual* ΔT each quarter, similar to the decile portfolios created for ΔT and ΔE in Panel C of Table 1

$$\Delta T = \beta_0 + \beta_1 \Delta E + \varepsilon \qquad (1)$$

Table 2 contains the time-series means of future stock returns across ten deciles for each of the three variables (see columns 1, 2, and 3). The Fama-MacBeth t-statistics for the hedge portfolio results reported in the bottom row (D10 – D1) are based on the time-series distribution of the mean hedge portfolio returns across the 120 quarters in our sample. The results in the first column are the same as those reported in column 1 of Table 1, Panel C, with an average hedge portfolio return of 3.90 percent (t=11.26). A similar sort based on ΔE generates an average return of 4.62 percent (t=13.70) for the D10-D1 hedge portfolio in column 2.[15] The third column in Table 2, which provides the main results in this Table, reveals that returns for deciles of *residual* ΔT increase from 2.90 percent for D1 to 5.45 percent for D10. The hedge portfolio return differential between high and low *residual* ΔT deciles of 2.56 percent is lower than that based on ΔT but is statistically significant (t-statistic of 7.83) and economically significant (equivalent to an annualized return of about 10 percent).

Roughly speaking, ΔE-related information in ΔT accounts for only a third of the predictive power of ΔT for future stock returns (computed as (3.90 percent-2.56 percent)/3.90 percent). Therefore, although surprises in tax expense and earnings are positively related to each other, much of the information contained in tax expense surprises regarding future stock returns is separate from that contained in earnings surprises.

[15] While the significant positive correlation between earnings surprise and future returns observed in Table 2 is consistent with that documented in the earnings momentum literature, it should be noted that the three-month holding period considered here (which begins three months after the quarter end) is not designed to maximize future returns generated by that strategy. Specifically, the future returns from the earnings momentum strategy are greater if the holding period begins immediately after the quarter's earnings announcement and ends immediately after the next quarter's earnings announcement.

One way to estimate whether earnings and tax expense surprise contain incremental information about future returns is to check if the profits earned by a strategy that uses both signals exceeds the profits earned by either strategy alone. To investigate this approach, we sort our sample into quintiles of earnings and tax expense surprise and find that the mean return earned by the portfolio in the top quintile of earnings and tax expense surprise is 6.60% percent versus 1.59% percent for the bottom quintile of earnings and tax expense surprise. The resulting hedge return of 5.01% percent is greater than the corresponding hedge returns based on extreme quintiles of tax expense and earnings surprise (inferred by combining the top two and bottom two rows in columns 1 and 2, respectively, in Table 2).

To confirm that our results in Table 2 are robust to controls for potential risk factors, we estimate the following four-factor model for *monthly* returns on each earnings surprise decile:

$$R_{it} - R_{ft} = a + b_{iM}(R_{Mt} - R_{ft}) + s_i SMB_t + h_i HML_t + m_i MOM_t + \varepsilon_{it} \qquad (2)$$

where $R_{Mt} - R_{ft}$, *SMB*, and *HML* are as defined in Fama and French (1996), and *MOM* is the momentum factor defined in Carhart (1997). The four factor data are from Kenneth French's website. The intercept (*a*) provides an estimate of the monthly abnormal returns earned by each ΔT decile and residual ΔT decile, after controlling for these four factors.

Table 3 presents parameter estimates for the four-factor model for ΔT deciles and *residual* ΔT deciles in Panels A and B, respectively. In Panel A, the intercept increases fairly monotonically from -0.346 percent for D1 to 0.723 percent for D10. After controlling for the market return, size, book-to-market, and momentum factors, the D10-D1 hedge portfolio based on ΔT deciles yields a monthly return of 1.069 percent (t=10.39). The results in Panel B for *residual* ΔT deciles remain quite strong: hedge portfolio return of 0.739 percent (t=7.05), which is equivalent to an annualized return of over 9 percent.[16]

Table 4 provides results of regression analyses designed to detect the incremental effect of tax expense surprise on future returns, after controlling for earnings surprise as well as other variables that capture pricing anomalies described in the prior literature, including the two anomalies related to tax variables (*TCC* and *TI/E*). Unlike the prior tables where decile portfolios are used to measure tax expense surprise, in this Table we consider the untransformed values of tax expense surprise. As in Table 2, we estimate the regressions each quarter, and report mean coefficient estimates and related Fama-MacBeth t-statistics.

Results of the simple regression in column 1 confirm that the coefficient on tax expense surprise remains highly significant (t-stat of 11.08) prior to incorporating any controls. This conclusion is unchanged when we include controls for size, book-to-market, and price momentum in column 2. Adding controls for earnings surprises in column 3 decreases the coefficient estimate on tax expense surprise, but the statistical significance remains substantial (t-statistic of 9.06). The higher coefficient on tax expense surprise (0.661) relative to the coefficient on earnings surprise (0.216) confirms that tax expense surprise would be positively related to future returns even if we replaced earnings surprises with surprises in pre-tax income (see discussion in Section 2 on two ways to view the good news in tax expense surprise).

---

[16] Since using residual tax expense surprise to form portfolios in Table 3 effectively controls for earnings surprise, there is no need to provide additional controls for earnings momentum. However, we conducted an additional analysis (results not tabulated) based on replacing the price momentum factor (MOM) with an earnings momentum factor (PMN), obtained from Shivakumar Lakshmanan of London Business School. Our results show a decline in hedge returns for the tax expense surprise strategy from 1.069 in Table 3 Panel A to 0.758 (t=6.95). The hedge return is 0.767 (t=7.16) if both MOM and PMN are included. For the residual tax expense strategy, the hedge return is 0.431(t=4.02) if both MOM and PMN are included. Note that PMN is the return difference between the top and bottom earnings momentum deciles, while MOM is the return difference between the top *three* and bottom *three* price momentum deciles.

Columns 4 and 5 provide the results of investigating whether the anomaly associated with tax expense surprise is subsumed by the two tax variables, *TCC* and *TI/E*. While the t-statistics associated with both tax variables confirm a significant ability to predict future returns, the key finding is that tax expense surprise continues to remain statistically significant (both coefficient estimates and t-statistics for ΔT are larger in columns 4 and 5, relative to column 3). The positive coefficient for *TCC* is counterintuitive at first, because of the strong negative relation between *TCC* and ΔT observed in column 8 of Table 1, Panel C. If ΔT is positively related to future returns *TCC* should be negatively related. Further investigation reveals that the coefficient switches to a negative value (coefficient = −0.372 with a t-statistic of −3.11) when ΔT is dropped from column 4.[17] Apparently, the positive coefficient on *TCC* in column 4 is due to other components that are orthogonal to ΔT.

The results in column 6 suggest that the coefficient on tax expense surprise is significant despite controls for the level of cash flows from operation (*CFO/P*). It's not surprising that the ability of tax expense surprise to predict future returns is not diluted by the inclusion of controls for *TI/E* and *CFO/P* (columns 5 and 6 of Table 4), since there is no monotonic relation between tax expense surprise and *TI/E* and *CFO/P* in columns 9 and 10 of Table 1, Panel C.

Finally, we consider surprises in sales (ΔS) and surprises in selling, general, and administrative expense (ΔSGA) in columns 7 and 8 and include all controls in column 9. While sales surprises are our primary concern, given the results of Jegadeesh and Livnat (2006), we also provide results for one expense category.[18] The results in column 7 confirm the sales

---

[17] While a negative coefficient on *TCC* is inconsistent with the prediction in Schmidt (2006), there are substantial differences between the two sets of samples and analyses that limit comparisons between the two sets of results.

[18] We do not consider both surprises in SGA and surprises in Cost of Goods Sold in column 9 because of the severe multicollinearity caused by regressors that are linearly dependent (ΔS-$\Delta COGS$-$\Delta SGA \approx \Delta T + \Delta E$). We do not include CFO/P in column 9 because of missing data before 1989. We confirm that ΔT remains highly significant (t-statistic=4.81) if we include CFO/P to column 9 and estimate it over the 74 quarters with available data.

surprise anomaly, indicated by a significant coefficient on *ΔS* (t-statistic of 3.56). We find, however, only a marginal reduction in the significance of the coefficient on tax expense surprise (t-statistic of 8.27), relative to column 3. Controlling for *ΔSGA* has little impact on the coefficient on tax expense surprise. Finally, the coefficient on tax expense surprises remains highly positive and significant even when all controls are jointly included in column 9.

In sum, the results are consistent across the portfolio approach (Table 2), the four-factor model approach (Table 3), and the regression approach (Table 4); they all support our first prediction that tax expense surprises are positively related to future stock returns, even after controlling for contemporaneous earnings surprises and other factors that are potentially related to tax expense surprise and known to predict future stock returns.

4.2. Why are tax expense surprises related to future stock returns?

We investigate next our second and third predictions regarding the two potential channels by which investors correct their prior underreaction to information in tax expense surprises. Under the first channel, higher tax expense surprise this quarter implies higher earnings surprise next quarter. Under the second channel, higher tax expense surprise this quarter implies higher tax expense surprise next quarter. For both channels, the ability of this quarter's tax expense to predict next quarter's earnings and tax expense surprise is incremental to the ability of this quarter's earnings surprise to predict those two future surprises.

These predictions are based on our hypothesis that complexity and opacity of tax expense disclosures limit the ability of investors to see the predictable relations between current period tax expense surprises and next quarter's earnings surprise and tax expense surprise. Stock prices respond in a delayed manner, however, to that information as the market becomes aware of earnings and tax expenses for future quarters. While some of that news is released before the earnings announcement (via channels such as management guidance and analyst forecasts) a substantial amount of the news is released at the earnings announcement.

Table 5 contains the results of regression analyses designed to investigate information released via these two channels. Columns 1 and 2 describe regressions of earnings surprises for the next quarter and announcement returns ($ARET_{q+1}$) during the 3-day period when those earnings are disclosed, respectively, on this quarter's tax and earnings surprise and three factors that potentially proxy for risk: size, book to market, and price momentum. Those results are consistent with the first information channel we propose. The coefficient on tax expense surprise (ΔT) is positive and significant in the first column, which suggests that tax expense surprise today exhibits an incremental ability to predict next quarter's earnings surprise. Comparing the coefficient on tax expense surprise (ΔT) in the second column of Table 5 (0.141) with the corresponding coefficient in Table 4, column 3 (0.661) suggests that 21 percent of the abnormal return earned over the next quarter (RET_{q+1}) is earned over three days, which represents only 5 percent of the 62 trading days in the 3-month holding period considered in Table 4.

The results in column 3 of Table 5 lay the groundwork for the second channel by showing that tax expense surprise exhibits an incremental ability to predict next quarter's tax expense surprise, after controlling for earnings surprise this quarter as well as the three risk proxies. Columns 4 and 5 describe returns over the next quarter (RET_{q+1}) and returns during the 3-day period when next quarter's earnings are announced ($ARET_{q+1}$), respectively. We include next quarter's earnings surprise (ΔE_{q+1}) as an additional regressor to control for the first channel. Note the higher hurdle we impose on the second channel: the portion of next quarter's tax expense predicted by this quarter's tax expense has to not only be incremental to the ability of this quarter's earnings surprise to predict next quarter's tax expense but that predictable portion must also contain value-relevant information excluded in *next* quarter's earnings.

The results reported in column 4 of Table 5 confirm that tax expense surprises explain delayed stock price movements over the next quarter, even after we control for earnings surprises for both this quarter and next quarter.[19] Also, a disproportionate share of that delayed response occurs at the next quarter's earnings announcement; the ratio of the coefficients in columns 5 and 4 is about 14 percent (0.072/0.513), whereas the 3-day announcement period represents only 5 percent of the 3-month holding period.

In addition to supporting our explanation for why investors react with a delay to tax expense surprise, observing that abnormal returns are concentrated around narrow 3-day windows reduces the likelihood that the anomaly is due to mismeasured risk. To explain the observed abnormal returns as being due to changes in expected returns, not only would there need to be substantial but temporary changes in risk over brief 3-day windows, risk would need to increase for firms with positive tax expense surprises but decrease for firms with negative tax expense surprises.

In sum, the results in Table 5 are consistent with our explanation for why investors do not immediately appreciate the full implications of current period tax expense surprise. We find support for two potential channels by which information contained in current period tax expense surprise is reflected with a delay in subsequent stock returns. The first channel is that tax expense surprise predicts next quarter's earnings surprise, which is positively related to next quarters' returns. As a result, that information is reflected in stock prices when future earnings are

[19] Note that the sign of the coefficient on current book income (ΔE_q) switches from positive to negative when future earnings surprise is included in columns 4 and 5 of Table 5. As described in Ball and Bartov (1996), this switch in sign (relative to the case when future earnings surprise is excluded) is expected because earnings surprises are positively autocorrelated at the first lag.

revealed to the market. The second channel is that tax expense surprise predicts next quarter's tax expense surprise, which is incrementally positively related to next quarter's returns, beyond information reflected in next quarter's earnings surprise. Evidence consistent with the second channel reinforces our hypothesis that tax expense surprise is a proxy for fundamental profitability, and it contains information about fundamental profitability incremental to that contained in reported earnings.

5. Robustness checks

5.1 Frequency of hedge strategy losses observed over time

One standard approach to investigate whether a risk-based explanation exists for an anomaly is to repeat the analysis over different subperiods and check the frequency of losses. That is, separate from confirming that the mean of these subperiod hedge portfolio returns is significantly different from zero, observing very few loss subperiods reduces the likelihood that the abnormal returns are in fact a compensation for some risk associated with the investment strategy. A risky strategy, by definition, should be associated with losses that are sufficient to compensate for the mean positive abnormal returns observed.

We calculate the mean hedge portfolio returns (decile 10 less decile 1) for the fiscal quarters ending in each calendar quarter between 1977:I and 2006:IV for three measures of surprise: a) seasonally-differenced tax expense (ΔT), b) seasonally-differenced earnings (ΔE), and c) the residuals from quarterly regressions of seasonally-differenced tax expense on seasonally-differenced earnings (*residual* ΔT). The results (not tabulated here) reveal that of the 120 quarters covered in our sample period losses are observed in 16, 14, and 23 quarters for ΔT,

ΔE, and *residual* ΔT, respectively.[20] These findings suggest that our evidence is consistent with market mispricing, and is unlikely to reflect an appropriate reward for a risky investment strategy (caused by the long positions being more risky than the short positions in this strategy).

5.2. The effect of 10-Q/K late filings

In the analyses so far, we measure future stock returns starting from the fourth month after a firm's fiscal quarter-end by assuming that tax expense is disclosed by that time. A potential concern is that some firms a) may not disclose tax expense at their earnings announcement date and b) may file their 10-Q and 10-K reports later than the beginning of our holding period. As a result, the information required to implement a trading strategy may not be available at the beginning of the holding period for some firm-quarters in our sample. To address this concern, we obtained filing dates for 10-Qs and 10-Ks filed electronically on EDGAR (the data are available beginning in 1996) and focus on those observations with filings made within the 3-month window between the quarter end and the beginning of the holding period for future returns (RET_{q+1}). We refer to this set of observations as "subsample A" and are reasonably certain that the data necessary to compute tax expense is filed prior to our portfolio formation date. We are able to identify 226,704 firm-quarter observations for this sample, compared to 273,776 observations for the full sample from 1996 to 2006.[21] We group observations not in subsample A into "non-subsample A", which includes both on-time filings (for which we could not obtain filing dates) and late filings.

We report in Table 6 the results for the full sample, subsample A and non-subsample A over the 1996-2006 time period. When using the return measure in the main analysis (RET_{q+1},

[20] While the losses are generally small in magnitude, two large losses are observed during the 4th quarter of 2000 and the 3rd quarter of 2001 for all three variables.

[21] Of the 236,111 observations for which we could obtain filing dates, 9,407 had filings that were made later than three months after the quarter end.

which starts from the fourth month after a firm's fiscal quarter end), we find that the effect of tax expense surprises is significant for the full sample in the 1996-2006 period, but the magnitude is smaller than that for the overall 1977-2005 period (the D10-D1 hedge return is 2.10 percent for the 1996-2006 subperiod, relative to 3.90 percent reported in Table 2 for the overall period). Apparently the strategy has been less profitable over more recent years. More relevant to our robustness check, we find that the D10-D1 hedge returns for our subsample A are higher than those for the "non-subsample A" (2.37 percent versus 0.94 percent), and the subsample A results are still statistically significant.[22]

Since the RET_{q+1} holding period return begins well after tax expense is released to the stock market for subsample A, the hedge returns reported in the third column of Table 6 understate the ability of tax expense surprises to predict future returns. The average (median) number of days between the fiscal quarter-end and 10-Q/K filing dates is 51 (45) for Subsample A. We re-examine the ability of tax expense surprises to predict future returns for this subsample by measuring the three-month return starting from three days after the 10-Q/K filing date ($FRET_{q+1}$).

Columns 4 and 5 in Table 6 report portfolio results using $FRET_{q+1}$ for Subsample A based on tax expense surprise (ΔT) and residual tax expense surprise (*residual* ΔT), respectively. The D10-D1 hedge return for extreme tax expense surprise deciles is 3.29 percent (t=6.41), which is higher than the three hedge returns based on RET_{q+1} reported in columns 1, 2, and 3. The hedge return of 2.25 percent reported in column 5 for *residual* ΔT confirms that the ability of tax expense to predict future returns remains even after controlling for earnings surprises. This

[22] We report in the bottom four rows of Table 6 the results of a similar analysis based on splitting the overall sample and two subsamples into three groups based on tax expense surprise (as opposed to deciles). Those results confirm the results based on deciles reported in the top half of this Table.

hedge return of 2.25 percent for Subsample A is both economically and statistically significant (t=4.25).[23]

The two conclusions from Table 6 are as follows. First, while the presence of late filings (past the 90-day limit after the quarter-end by which 10-Q/K reports should be filed) could potentially bias our results in the direction of finding a relation between tax expense surprises and future returns, our results suggest that this bias does not exist. Also, we find hedge portfolio returns that are economically and statistically significant for a subset of firm-quarters that filed their reports in advance of the beginning of our holding period. Second, our overall results reported in earlier Tables are likely to be understated because our holding period begins many days after the 10-Q/K filing date.

These two conclusions are based on the conservative assumption that tax expense is first released at the 10-Q/K filing date. Given that tax expense is typically released at the earnings announcement date, well in advance of the 10-Q/K filing dates, we feel comfortable stating that our results understate the ability of tax expense surprises to predict future returns.

5.3 Alternative specifications of residual ΔT.

In our main analysis, we estimate *residual* ΔT based on cross-sectional regressions of ΔT on ΔE. It is possible that fitting the same model to all industries generates residuals that retain some of the information in earnings surprises. To investigate potential bias in hedge portfolio returns caused by heterogeneity across industries in the relation between ΔT and ΔE, we estimate regression (1) separately for each industry-quarter, where firms are grouped into industries based

[23] To allow for the possibility that most investors may not be able to process the information released in 10-K/Q filings until a few days after the filing (D'Souza et al., 2007), we repeat the analysis in columns 4 and 5 of Table 6 by delaying the three-month return window by one and two weeks after the filing date (instead of the three day delay in Table 6). We find that the results remain relatively unchanged. For example, the hedge returns in column 5 of Table 6 decline slightly from 2.25 percent (t=4.25) to 2.04 percent (t=3.89) and 1.97 percent (t=3.49) for delays of one and two weeks, respectively.

on 2-digit SIC codes. The results of that analysis (the D10 – D1 hedge return = 2.36%, with a t-statistic of 7.95) are very similar to those reported in the third column, suggesting that variation across industries in the relation between ΔT and ΔE does not bias upward our results based on *residual* ΔT.[24]

By using *residual* ΔT, which is based on linear regressions of tax expense surprise on earnings surprise, we are effectively assuming that future returns can be described by a linear function of surprises in earnings and tax expense. To address the possibility that the true functional relation is non-linear, we adopt a conditional portfolio approach. Specifically, we first sort the sample into ten deciles based on earnings surprise and then sort each earnings surprise decile into ten portfolios (1 to 10) based on tax expense surprise. We then collect all ten portfolio 1's from each earnings decile and create a new tax expense surprise decile 1. We repeat the same process for portfolio 2's and so on to generate the remaining tax expense deciles. Earnings surprise should be relatively constant across these tax expense surprise deciles. We find that the hedge portfolio return for extreme ΔT deciles constructed in this manner is 1.41 percent (t=5.67). Note that the hedge return is expected to be lower here than in Table 2 because the spread in tax expense surprise between D1 and D10 is smaller for each earnings surprise decile than for the whole sample.

5.4 Does tax expense momentum vary by fiscal quarters?

Firms compute quarterly tax expense by estimating the effective tax rate (ETR) that is expected to be applicable for the whole year (Schmidt, 2006). In the first quarter, firms estimate annual ETR and multiply it by pre-tax income to calculate tax expense. In the second quarter,

---

[24] We find no relation between the hedge returns earned in different quarters and the spread between the levels of mean tax surprise in the highest and lowest tax surprise deciles. That is, the magnitude of hedge returns earned across different quarters appears to be unrelated to the magnitude of tax surprise in those quarters.

firms re-estimate annual ETR and then multiply it by year-to-date pre-tax income to calculate year-to-date tax expense. Finally, firms subtract the first quarter's tax expense from year-to-date tax expense to calculate the second quarter's tax expense. The same method applies to the third and fourth quarters. As indicated in this estimation process, tax expense contains less forward looking information and more backward looking adjustments as the fiscal year progresses. Specifically, tax expense in the first quarter contains profitability information not only for that quarter but also for the following three quarters. Because of the nature of this computation, the persistence of tax expense surprises should decline from the first fiscal quarter to the fourth.

To the extent that forward looking information and more persistent tax expense surprises are more likely to have a stronger relation with future stock returns, we expect the positive correlation between tax expense surprises and future stock returns to be stronger early in the fiscal year. Table 7 reports regression results across four fiscal quarters. Consistent with our expectation, the coefficient on tax expense surprises decreases monotonically from 0.997 in the first quarter to 0.507 in the fourth quarter.

5,5 Does tax expense momentum vary by firm size?

One way to distinguish whether documented anomalies are due to market mispricing is to investigate if observed mispricing is greater when information uncertainty and limits to arbitrage are greater (e.g., Korajczyk and Sadka 2004; Zhang 2006). Table 8 recasts the overall hedge portfolio results reported in the bottom row of Table 2 to show the hedge portfolio returns that are earned for three subsamples based on size (market value of equity). These size subsamples are obtained by sorting firms into large, medium, and small groups each calendar quarter. Consistent with the results reported in the earnings surprise anomaly literature (e.g., Foster et al., 1984), the results reported in the middle column for ΔE confirm that the hedge portfolio returns are the highest for small firms (5.14 percent) and lowest for large firms (1.74 percent). More relevant to this study, we find that the hedge portfolio returns for the tax expense surprise variable (reported in the first column for *ΔT*) and the hedge portfolio returns for the *residual ΔT* variable (reported in the right-most column) follow the same pattern. These results are consistent with the anomaly we document being due to mispricing, and inconsistent with risk-based explanations.

5. Conclusion

The consistent profitability of a long (short) investment in stocks reporting positive (negative) surprises based on quarterly earnings, commonly referred to as earnings momentum, has been one of the more intriguing and enduring stock market anomalies. In this paper we consider a related investment strategy based on quarterly tax expense surprises. Our results indicate that this strategy also generates consistent future returns, and the information underlying this strategy is incremental to that contained in earnings, as well as that contained in variables underlying various other stock market anomalies documented in the prior literature (such as price momentum, accruals, size, and book-to-market) as well as anomalies based on two tax variables (the ratio of tax income to earnings and the income effect of changes in effective tax rates).

Not only is it good news to disclose a higher tax expense today, holding constant the level of earnings surprise today, the fact that higher tax expense today implies higher earnings as well as higher tax expense in the next quarter is also good news. We posit that tax disclosures are not easily deciphered and investors do not fully appreciate these implications for future earnings and tax expense. While they initially underreact to the information contained in tax expense surprise, prices respond subsequently as news is released about the earnings and tax expense that will be disclosed next quarter. Consistent with this hypothesis, we find that tax expense surprises predict future surprises for both earnings and tax expense and a disproportionate fraction of the market's delayed reaction is concentrated at subsequent earnings announcements, when both items are typically disclosed.

References

Ayers, B., Jiang, X., & Laplante, S. 2009. Taxable income as a performance measure: the effects of tax planning and earnings quality. Contemporary Accounting Research , 26, 15-54.

Ball, R., and E. Bartov. 1996. How naive is the stock market's use of earnings information? Journal of Accounting and Economics 21, 319-337.

Ball, R. and P. Brown. 1968. An empirical evaluation of accounting income numbers. Journal of Accounting Research 2, 159-178.

Bernard, V. and J. Thomas. 1989. Post-earnings-announcement drift: delayed price response or risk premium. Journal of Accounting Research, 27: 1-36.

Bernard, V. and J. Thomas. 1990. Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. Journal of Accounting and Economics, 13, 305-341

Carhart, M. 1997. On persistence in mutual fund performance. Journal of Finance 52, 57-82.

Chan, L., N. Jegadeesh, and J. Laknishok. 1996. Momentum strategies. Journal of Finance 51, 1681-1713.

Collins, D. and Hribar, P. (2000). "Earnings-based and accrual-based market anomalies: one effect or two?" *Journal of Accounting and Economics* 29, 101-124.

Dhaliwal, D., C. Gleason, and L. Mills. 2004. Last chance earnings management: Using the tax expense to achieve earnings targets. Contemporary Accounting Research 21, 431-458.

Doyle, J. T., R. J. Lundholm, and M. T. Soliman. 2006. The Extreme Future Stock Returns Following I/B/E/S Earnings Surprises. Journal of Accounting Research 44 (5), 849-887.

D'Souza, J., K. Ramesh, and M. Shen. 2007. Determinants of the speed of information dissemination by capital market information intermediaries. Michigan State University, Working Paper.

Fama, E. and K. French. 1996. Multifactor explanations of asset pricing anomalies. Journal of Finance 51, 55-84.

Fama, E. and J. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, Journal of Political Economy 38, 607-636.

Foster, G., C. Olsen and T. Shevlin, 1984, Earnings Releases, Anomalies, and the Behavior Of Security Returns, The Accounting Review 59, 574-603.

George, T.J. and C.Y. Huang. 2007. Long-term return reversals: Overreaction or Taxes? Journal of Finance 62, 2865-96.

Graham, J., J. Raedy, and D. Shackelford. 2010. Research in Accounting for Income Taxes. Working paper, University of North Carolina.

Guenther, D. and D. Jones. 2006. Valuation implications of changes in firms' effective tax rates. Working paper, University of Oregon.

Hanlon, M., S.K. Laplante, and T. Shevlin. 2005. Evidence for the possible information loss of conforming book income and taxable income. Journal of Law and Economics, 68, 407-442.

Hirshleifer, D. 2001. Investor psychology and asset pricing. Journal of Finance. 56, 1533-97.

Jegadeesh, N. 1990. Evidence of predictable behavior of security returns. Journal of Finance 45, 881-898.

Jegadeesh, N. and J. Livnat. 2006. Revenue surprises and stock returns. Journal of Accounting and Economics 41, 147-71.

Jegadeesh, N. and S. Titman. 1993. Returns to buying winners and selling losers: implications for stock market efficiency. Journal of Finance 48, 65-91.

Joy, O.M., R. Litzenberger and R. McEnally, 1977, The Adjustment of Stock Prices to Announcements of Unanticipated Changes in Quarterly Earnings, Journal of Accounting Research 15, 207-225.

Korajczyk, R. and R. Sadka. 2004. Are Momentum Profits Robust to Trading Costs? Journal of Finance 59, 1039-1082

Lakonishok, J., A. Shleifer, and R.W. Vishny. 1994. Contrarian investment, extrapolation, and risk. Journal of Finance. 69, 1541-78.

Lehmann, B. 1990. Fads, martingales, and market efficiency. Quarterly Journal of Economics 105, 1-28.

Lev, B. and D. Nissim. 2004. Taxable income, future earnings, and equity values. The Accounting Review 79, 1039-1074.

Lipe, R. 1986. The information contained in the components of earnings. Journal of Accounting Research. 24 (Supplement), 37-68.

Myers, J., L. Myers, and D. Skinner. 2007. Earnings momentum and earnings management. Journal of Accounting, Auditing, and Finance 22, 249-284.

Ohlson, J. and S. Penman. 1992. Disaggregated Accounting Data as Explanatory Variables for Returns. Journal of Accounting, Auditing, and Finance 4, 553-73.

Schmidt, A. 2006. The persistence, forecasting, and valuation implications of the tax change component of earnings. The Accounting Review 81, 589-616.

Sloan, R. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review 71, 289-315.

Thomas, J. and X. F. Zhang. 2010. Valuation of tax expense. Working paper. Yale University.

Weber, D. 2009. Do Analysts and Investors Fully Appreciate the Implications of Book-Tax Differences for Future Earnings? Contemporary Accounting Research, 26, 1175-1206.

Zhang, X. F. 2006. Information uncertainty and stock returns. Journal of Finance 61, 105-137.

Table 1
Descriptive statistics

Panel A: Univariate statistics

Variable[a]	N[b]	Mean	Stdev	Min	Q1	Median	Q3	Max
RET_{q+1}	604,067	0.039	0.330	-0.993	-0.113	0.013	0.148	17.737
ΔT	604,067	0.001	0.012	-0.076	-0.001	0.000	0.003	0.083
ΔE	602,587	0.002	0.057	-0.656	-0.006	0.001	0.009	0.456
MV	586,745	1,214.73	4,819.23	0.34	25.89	106.95	525.82	84,558.8
BM	574,131	0.765	0.661	0.000	0.343	0.600	0.973	8.267
RET_6	602,054	0.070	0.417	-0.900	-0.153	0.029	0.222	8.182
TCC	377,667	0.000	0.006	-0.089	-0.001	0.000	0.001	0.061
TI/E	430,754	0.713	0.815	-2.853	0.223	0.723	0.999	12.92
CFO/P	365,741	0.016	0.121	-1.074	-0.013	0.014	0.042	1.683
ΔS	601,807	0.024	0.110	-0.488	-0.011	0.008	0.050	0.802

Panel B: Correlation matrix for primary variables and first set of control variables (Pearson correlations are shown above the main diagonal and Spearman correlations are shown below)

	RET_{q+1}	ΔT	ΔE	MV	BM	RET_6
RET_{q+1}	1	0.025**	0.032**	-0.008**	0.057**	0.001
ΔT	0.047**	1	0.242**	0.014**	-0.062**	0.138**
ΔE	0.045**	0.516**	1	0.001	-0.040**	0.127**
MV	0.056**	0.078**	0.044**	1	-0.126**	0.017**
BM	0.067**	-0.123**	-0.148**	-0.314**	1	-0.126**
RET_6	0.041**	0.202**	0.221**	0.157**	-0.110**	1

** Significant at the 1% level.

Panel C: Properties of deciles based on tax expense surprise (*ΔT*).

ΔT deciles	*ΔT*	RET_{q+1}	Mean decile ranks for									
			$ΔE_q$	*MV*	*BM*	*RET_6*	$ΔT_{q+1}$	$ΔE_{q+1}$	*TCC*	*TI/E*	*CFO/P*	$ΔS_q$
		1	2	3	4	5	6	7	8	9	10	11
D1	-2.00%	2.34%	2.69	4.82	5.72	4.27	3.85	3.94	7.42	4.99	5.44	4.22
D2	-0.52%	2.95%	3.57	5.58	6.07	4.81	4.32	4.50	6.97	5.47	5.79	4.69
D3	-0.18%	3.54%	4.39	5.93	6.15	5.18	4.71	4.88	6.70	5.27	5.79	4.85
D4	-0.04%	3.40%	4.96	5.67	6.02	5.34	4.93	5.17	6.19	4.56	5.40	4.77
D5	0.00%	4.10%	5.46	4.56	5.29	5.17	5.07	5.54	5.48	2.85	4.46	4.81
D6	0.04%	4.53%	5.41	6.06	6.03	5.74	5.49	5.39	5.30	5.07	5.64	5.15
D7	0.14%	4.85%	6.00	6.31	5.68	5.97	5.94	5.73	5.03	5.80	5.91	5.85
D8	0.33%	5.20%	6.68	6.28	5.26	6.17	6.45	6.14	4.69	6.22	6.00	6.45
D9	0.69%	5.70%	7.42	5.88	4.99	6.38	6.96	6.53	4.28	6.46	5.97	6.94
D10	2.24%	6.24%	8.08	5.21	4.63	6.41	7.37	6.86	3.64	6.61	5.84	7.33

Notes

a. Variable definitions (data # refer to Quarterly Compustat Data item numbers, unless noted otherwise):

RET_{q+1}	Three-month buy-and-hold stock returns starting from the 4th month after a firm's fiscal quarter end (from CRSP monthly files).
ΔT	Changes in tax expense, measured as tax expense per share (#6/(#17*#15)) in quarter q minus tax expense per share in quarter q-4, scaled by assets per share (#44/(#17*#15) in quarter q-4.
ΔE	earnings surprise, measured as earnings per share (#8/(#17*#15)) in quarter q minus earnings per share in quarter q-4, scaled by assets per share in quarter q-4.
MV	Market value of equity at fiscal quarter-end (#14*#61).
BM	Book-to-Market ratio measured as book value of equity (#60) divided by its market value at the end of fiscal quarter q (*MV*).
RET_6	The buy-and-hold 6-month stock returns leading up to two months after a firm's fiscal quarter end.
TCC	Tax change component of earnings as defined in Schmidt (2006), but using quarterly data. It equals $(ETR_{q-4} – ETR_q)*PTEPS_q/TAPS_{q-4}$, where *ETR* is effective tax rate, defined as total tax expense (#6) divided by pre-tax income (#23) (requiring pre-tax income to be positive). $PTEPS_q$ is pretax income per share (#23/(#17*#15)) in quarter *q*, and $TAPS_{q-4}$ is total assets per share in quarter *q-4*.
TI/E	The ratio of tax income to earnings (#8) as defined in Lev and Nissim (2004) (requiring earnings greater than zero), where tax income equals current tax expense multiplied by $(1-\tau)/\tau$. Current tax expense is measured as the sum of current federal (#63) and foreign (#64) income taxes, or, when either of these amounts is missing, as the difference between total tax expense (#16) and the deferred portion of the income tax expense (#50). The top statutory tax rate (τ) is 48% from 1971 to 1978, 46%from 1979 to 1986, 40% in 1987, 34% from 1988 to 1992, and 35% since 1993. Deferred tax expense is set to be zero if missing. All data for this variable are taken from annual Compustat files.
CFO/P	Cash flow from operations per share scaled by stock price from prior quarter-end.
ΔS	Sales surprise, measured as sales per share (#2/(#17*#15)) in quarter q minus sales per share in quarter q-4, scaled by assets per share in quarter q-4.

b. The sample includes all firm-quarter observations with no missing future returns and changes in tax expense. There are 604,067 firm-quarter observations from 1977:I to 2006:IV. Each calendar quarter, all variables except RET_{q+1} are Winsorized at 1% and 99%.

Table 2
Future returns for different surprise deciles based on tax expense and earnings

	Ten portfolios sorted by ΔT	Ten portfolios sorted by ΔE	Ten portfolios sorted by residual ΔT
	1	2	3
D1	2.34%	1.32%	2.90%
D2	2.95%	2.28%	3.26%
D3	3.54%	3.14%	3.92%
D4	3.40%	3.68%	4.20%
D5	4.10%	4.45%	4.05%
D6	4.53%	4.77%	4.17%
D7	4.85%	4.88%	4.44%
D8	5.20%	5.48%	4.60%
D9	5.70%	6.13%	4.99%
D10	6.24%	5.94%	5.45%
D10 – D1	3.90% (11.26)	4.62% (13.70)	2.56% (7.83)

The table reports mean future three-month stock returns, beginning the fourth month after fiscal quarter-end (RET_{q+1}), across ten deciles based on tax expense surprise (ΔT), earnings surprise (ΔE) , and residual tax expense surprise after controlling for earnings surprise (residual ΔT). ΔT and ΔE are seasonally-differenced per-share quarterly tax expense and earnings, respectively, scaled by per-share total assets from four quarters ago. See Table 1 for detailed variable definitions. Residual tax expense surprise is calculated as the residual from regressing ΔT on ΔE in each quarter (see equation (1)). For the third column, we estimate these regressions across all firms when calculating residual ΔT. Each calendar quarter, we sort firms into ten deciles based on ΔT, ΔE, or residual ΔT, and portfolio returns are average stock returns of firms in each decile. The sample period includes 120 quarters from 1977:I to 2006:IV. The portfolio returns are the average of quarterly mean returns over 120 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 3
Tax expense surprise and future stock returns, with risk controls based on a four-factor model

Panel A: Ten deciles based on tax expense surprise

	Intercept	$R_{Mt}-R_{ft}$	*SMB*	*HML*	*MOM*	Adj. R^2
D1	-0.346 (-2.90)	1.015 (34.36)	0.965 (25.37)	0.156 (3.45)	-0.327 (-12.17)	0.885
D2	-0.204 (-2.45)	0.991 (47.90)	0.803 (30.14)	0.342 (10.84)	-0.243 (-12.93)	0.923
D3	0.006 (0.08)	0.960 (48.85)	0.727 (28.74)	0.354 (11.82)	-0.214 (-12.00)	0.922
D4	-0.091 (-0.83)	0.918 (33.57)	0.705 (20.03)	0.388 (9.30)	-0.190 (-7.66)	0.846
D5	0.426 (2.00)	0.867 (16.46)	1.132 (16.69)	-0.045 (-0.56)	-0.265 (-5.53)	0.716
D6	0.254 (2.45)	0.973 (37.87)	0.548 (16.55)	0.395 (10.07)	-0.192 (-8.19)	0.858
D7	0.345 (4.47)	0.950 (49.67)	0.586 (23.81)	0.334 (11.47)	-0.084 (-4.83)	0.916
D8	0.436 (5.72)	1.009 (53.52)	0.630 (25.99)	0.269 (9.36)	-0.085 (-4.94)	0.930
D9	0.489 (5.69)	1.065 (50.01)	0.754 (27.54)	0.237 (7.31)	-0.068 (-3.49)	0.927
D10	0.723 (6.15)	1.106 (37.97)	0.930 (24.82)	0.045 (1.02)	-0.116 (-4.40)	0.900
D10 – D1	1.069 (10.39)	0.090 (3.54)	-0.035 (-1.07)	-0.110 (-2.84)	0.211 (9.10)	0.267

Panel B: Ten deciles based on residual tax expense surprise

	Intercept	$R_{Mt}-R_{ft}$	*SMB*	*HML*	*MOM*	Adj. R^2
D1	-0.183 (-0.94)	1.003 (28.74)	1.069 (23.80)	0.082 (1.55)	-0.308 (-9.70)	0.858
D2	-0.072 (-0.64)	0.984 (35.30)	0.935 (26.06)	0.186 (4.37)	-0.257 (-10.13)	0.887
D3	0.173 (1.59)	0.970 (35.87)	0.895 (25.71)	0.180 (4.36)	-0.249 (-10.13)	0.889
D4	0.299 (3.22)	0.934 (40.65)	0.772 (26.12)	0.270 (7.72)	-0.237 (-11.34)	0.900
D5	0.166 (1.90)	0.906 (41.91)	0.605 (21.74)	0.460 (13.96)	-0.163 (-8.27)	0.884
D6	0.199 (2.24)	0.901 (40.88)	0.642 (22.64)	0.315 (9.36)	-0.138 (-6.90)	0.889
D7	0.264 (3.34)	0.962 (49.10)	0.708 (28.11)	0.188 (6.29)	-0.143 (-8.00)	0.927
D8	0.325 (3.78)	0.991 (46.53)	0.785 (28.64)	0.152 (4.68)	-0.158 (-8.14)	0.924
D9	0.384 (3.88)	1.038 (42.34)	0.866 (27.45)	0.124 (3.33)	-0.137 (-6.15)	0.914
D10	0.556 (4.40)	1.077 (34.43)	0.995 (24.72)	0.016 (0.33)	-0.181 (-6.37)	0.889
D10 – D1	0.739 (7.05)	0.074 (3.07)	-0.073 (-2.36)	-0.066 (-1.80)	0.126 (5.75)	0.132

The table reports the coefficient estimates of the four-factor model for monthly returns for each of the ten tax expense surprise (ΔT) or ten residual tax expense surprise (residual ΔT) deciles. ΔT and ΔE are seasonally-differenced per-share quarterly tax expense and earnings, respectively, scaled by per-share total assets from four quarters ago. See Table 1 for detailed variable definitions. Residual ΔT is calculated as the residual from regressing tax expense surprise (ΔT) on earnings surprise (ΔE) in each quarter (see equation (1)). The four factor model estimated is:

$$R_{it}-R_{ft}=a+b_{iM}(R_{Mt}-R_{ft})+s_iSMB_t+h_iHML_t+m_iMOM_t+\varepsilon_{it},$$

where $R_{Mt}-R_{ft}$, *SMB*, and *HML* are as defined in Fama and French (1996), and *MOM* is the momentum factor as defined in Carhart (1997). The intercept represents the monthly excess return for each residual ΔT decile, after controlling for the effect of all four factors. The four factor data are from Kenneth French's website. ΔT and residual ΔT each quarter are matched with stock returns in months t+4, t+5, and t+6, where month t is the month of the quarter end. Each quarter, we sort firms into ten deciles based on ΔT in Panel A and residual ΔT in panel B, and portfolio returns are average stock returns of firms in each decile. The sample period includes 360 months from July 1977 to June 2007; White heteroskedasticity-adjusted t-statistics are in parentheses.

Table 4
Regressions of future returns on tax expense surprise and control variables

	1	2	3	4	5	6	7	8	9
Intercept	0.042 (4.55)	0.064 (4.63)	0.063 (4.59)	0.067 (6.16)	0.058 (5.32)	0.062 (3.28)	0.063 (4.61)	0.062 (4.71)	0.063 (6.03)
ΔT	0.912 (11.08)	0.902 (12.35)	0.661 (9.06)	0.932 (10.00)	0.714 (9.88)	0.612 (6.99)	0.584 (8.27)	0.634 (8.48)	0.728 (6.42)
ΔE			0.216 (6.47)	0.157 (2.96)	0.203 (4.69)	0.147 (6.00)	0.204 (6.32)	0.231 (6.09)	0.254 (3.31)
TCC				0.588 (4.32)					0.409 (2.25)
TI/E					0.003 (3.40)				0.003 (2.57)
CFO/P						0.078 (4.67)			
ΔS							0.035 (3.56)		0.021 (1.91)
ΔSGA								0.077 (2.21)	0.72 (1.58)
Log(MV)		-0.004 (-2.13)	-0.003 (-2.03)	-0.004 (-3.11)	-0.003 (-2.39)	-0.004 (-1.72)	-0.003 (-2.07)	-0.003 (-2.03)	-0.004 (-3.19)
Log(BM)		0.011 (3.59)	0.012 (3.74)	0.008 (2.72)	0.008 (2.68)	0.011 (2.57)	0.012 (3.85)	0.013 (4.40)	0.010 (3.47)
RET_6		0.019 (3.08)	0.017 (2.71)	0.020 (3.55)	0.023 (4.09)	0.011 (1.39)	0.016 (2.62)	0.017 (2.73)	0.018 (3.13)
Adj. R^2	0.003	0.032	0.034	0.034	0.035	0.029	0.035	0.032	0.036

This table describes regressions of three-month future stock returns, beginning the fourth month after fiscal quarter-end (RET_{q+1}), on tax expense surprise (*ΔT*) and control variables. *ΔT* is measured as tax expense per share in quarter q minus tax expense per share in quarter q-4, scaled by assets per share in quarter q-4. Similar definitions apply to earnings surprise (*ΔE*), sales surprise (*ΔS*), cost of goods sold surprise (*ΔCOGS*), and selling, general, and administrative surprise (*ΔSGA*). *TCC* is the quarterly version of the tax measure in Schmidt (2006), and it equals $(ETR_{q-4} – ETR_q) * PTEPS_q/TAPS_{q-4}$, where *ETR* is the effective tax rate, *PTEPS* is pretax income per share, and *TAPS* is total assets per share. *TI/E* is the ratio of tax income to earnings, from Lev and Nissim (2004). *CFO/P* is per share cash flow from operations scaled by price. *MV* is the market value of equity at the end of fiscal quarter; *BM* is the book-to-Market ratio; and *RET_6* is the buy-and-hold 6-month stock returns leading up to two months after the fiscal quarter end. See Table 1 for detailed variable definitions. The sample period includes 120 quarters from 1977:I to 2006:IV. The coefficient estimates are the average of quarterly estimates over 120 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 5
The implications of tax expense surprise for future earnings and future earnings announcement returns

	Dependent Variable				
	ΔE_{q+1}	$ARET_{q+1}$	ΔT_{q+1}	RET_{q+1}	$ARET_{q+1}$
	1	2	3	4	5
Intercept	0.004 (6.40)	0.007 (7.54)	0.000 (3.71)	0.062 (4.65)	0.007 (7.54)
ΔT_q	0.163 (16.82)	0.141 (7.20)	0.286 (37.94)	0.513 (7.28)	0.072 (4.15)
ΔE_q	0.276 (37.20)	0.010 (1.14)	0.006 (4.96)	-0.040 (-1.34)	-0.097 (-7.35)
ΔE_{q+1}				0.983 (11.50)	0.407 (12.90)
$Log(MV)_q$	-0.001 (-10.41)	-0.001 (-5.94)	-0.000 (-4.04)	-0.003 (-1.77)	-0.001 (-5.00)
$Log(BM)_q$	-0.003 (-15.50)	0.003 (8.83)	-0.001 (-11.41)	0.014 (4.89)	0.004 (12.33)
RET_6_q	0.012 (23.18)	0.007 (8.71)	0.004 (27.07)	0.005 (0.77)	0.002 (2.82)
Adj. R^2	0.134	0.006	0.125	0.047	0.028

This table contains regressions explaining next quarter's earnings surprises (ΔE_{q+1}) earnings announcement returns ($ARET_{q+1}$), tax expense surprise (ΔT_{q+1}), and future three-month stock returns beginning the fourth month after fiscal quarter-end (RET_{q+1}). Earnings surprises and tax expense surprises are seasonally-differenced earnings and tax expense per share, respectively, scaled by total assets per share in quarter q-4. $ARET_{q+1}$ is measured as raw returns minus value-weighted market returns over the three-day [-1, 1] period, where day 0 is quarter *q+1*'s earnings announcement date. *MV* is the market value of equity at the end of fiscal quarter; *BM* is the book-to-Market ratio; and *RET_6* is the buy-and-hold 6-month stock returns leading up to two months after the fiscal quarter end. See Table 1 for detailed definitions. The sample period includes 120 quarters from 1977:I to 2006:IV. The coefficient estimates are the average of quarterly estimates over 120 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 6
Robustness check: the effect of late 10-Q/K filing dates

Deciles based on tax expense surprise (ΔT)	RET_{q+1}			$FRET_{q+1}$	
	1	2	3	4	5
	Full sample	Non-subsample A	Subsample A	Subsample A	Subsample A (residual ΔT)
D1	3.17%	3.42%	3.16%	2.75%	3.30%
D2	3.13%	3.57%	3.10%	2.67%	3.01%
D3	3.62%	3.82%	3.73%	3.15%	3.82%
D4	3.22%	3.15%	2.83%	2.34%	4.20%
D5	4.59%	4.49%	5.47%	5.37%	4.03%
D6	4.22%	4.36%	4.24%	3.39%	3.49%
D7	4.60%	4.73%	4.61%	4.34%	3.57%
D8	5.07%	5.08%	5.03%	4.56%	4.26%
D9	5.06%	4.98%	5.10%	4.99%	4.25%
D10	5.27%	4.36%	5.53%	6.04%	5.55%
D10 – D1	2.10% (3.66)	0.94% (1.38)	2.37% (3.94)	3.29% (6.41)	2.25% (4.25)
Analysis based on splitting samples into 3 groups, based on tax expense surprise					
Bottom 30%	3.30%	3.60%	3.33%	2.84%	3.38%
Middle 40%	4.19%	4.25%	4.22%	3.99%	3.90%
Top 30%	5.17%	4.67%	5.31%	5.51%	4.90%
Top - Bottom	1.86% (4.35)	1.07% (2.20)	1.99% (4.48)	2.67% (7.20)	1.52% (3.68)

Out of 273,776 firm-quarter observations from 1996 to 2006 (referred to as "Full sample"), we identify a subset of 226,704 observations with available 10-Q/K filing dates from EDGAR that are within three months of the fiscal quarter end (subsample A). All observations from this period not in subsample A are referred to as "non-subsample A". RET_{q+1} is the three-month return starting from three months after the fiscal quarter-end. $FRET_{q+1}$ is the three-month return starting from three days after the 10-Q/K filing date (available only for Subsample A). Each calendar quarter, we sort firms into ten deciles based on tax expense surprise (ΔT), except for the last column (for which we sort by residual tax expense surprise), and portfolio returns are average stock returns of firms in each decile. ΔT is seasonally-differenced per-share quarterly tax expense, scaled by per-share total assets from quarter q-4. See Table 1 for detailed variable definitions. Residual tax expense surprise is calculated as the residual from regressing ΔT on earnings surprise (ΔE) in each quarter (see equation (1)). The sample period includes 44 quarters from 1996:I to 2006:IV. The portfolio returns are the average of quarterly mean returns over 44 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics. This analysis is repeated in the bottom four rows based on splitting the full sample and two subsamples into terciles of ΔT (as opposed to deciles).

Table 7
Robustness check: tax expense momentum across fiscal quarters

	Fiscal quarter			
	First	Second	Third	Fourth
Intercept	0.058 (4.43)	0.064 (4.58)	0.065 (4.72)	0.074 (5.39)
ΔT	0.997 (5.29)	0.979 (5.97)	0.731 (5.13)	0.507 (4.63)
ΔE	0.303 (3.88)	0.223 (3.55)	0.244 (3.72)	0.211 (3.97)
Log(MV)	-0.004 (-2.41)	-0.004 (-2.28)	-0.002 (-1.11)	-0.004 (-1.97)
Log(BM)	0.013 (4.38)	0.009 (2.73)	0.017 (5.00)	0.012 (3.12)
RET_6	0.019 (2.55)	0.016 (2.35)	0.010 (1.44)	0.017 (2.54)
Adj. R^2	0.032	0.033	0.037	0.032

This table describes regressions of three-month future stock returns, beginning the fourth month after fiscal quarter-end (RET_{q+1}), on tax expense surprise (ΔT) and control variables across four fiscal quarters. ΔT is measured as tax expense per share in quarter q minus tax expense per share in quarter q-4, scaled by assets per share in quarter q-4. Earnings surprise (ΔE) is defined similarly. *MV* is the market value of equity at the end of fiscal quarter; *BM* is the book-to-Market ratio; and *RET_6* is the buy-and-hold 6-month stock returns leading up to two months after the fiscal quarter end. See Table 1 for detailed variable definitions. The sample period includes 120 quarters from 1977:I to 2006:IV. The coefficient estimates are the average of quarterly estimates over 120 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 8
Robustness check: portfolio analysis by firm size

	Ten portfolios sorted by ΔT	Ten portfolios sorted by ΔE	Ten portfolios sorted by residual ΔT
	Small firms		
D1	2.34%	1.95%	3.42%
D10	8.20%	7.09%	7.23%
D10 – D1	5.87% (13.59)	5.14% (9.63)	3.81% (8.50)
	Medium firms		
D1	1.85%	0.51%	2.51%
D10	5.82%	4.84%	4.96%
D10 – D1	3.97% (8.83)	4.33% (9.59)	2.45% (5.95)
	Large firms		
D1	3.09%	2.22%	2.99%
D10	4.45%	3.97%	4.20%
D10 – D1	1.36% (2.97)	1.74% (3.82)	1.21% (3.04)

The table provides separately for each size group (small, medium and large firms), the extreme decile returns and related hedge portfolio returns for investment strategies based on tax expense surprise (ΔT), earnings surprise (ΔE) , and residual changes in tax expense (residual ΔT). ΔT and ΔE are seasonally-differenced per-share quarterly tax expense and earnings, respectively, scaled by per-share total assets from four quarters ago. See Table 1 for detailed variable definitions. Residual ΔT is calculated as the residual from regressing tax expense surprise (ΔT) on earnings surprise (ΔE) in each quarter (see equation (1)). Each calendar quarter, we first sort firms into three groups based on firm size (market value of equity). Then each group is further partitioned into ten deciles based on ΔT, ΔE, and residual ΔT, and portfolio returns are average stock returns of firms in each decile. The sample period includes 120 quarters from 1977:I to 2006:IV. The portfolio returns are the average of quarterly mean returns over 120 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.