Tax expense surprises and future returns

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Abstract

We investigate whether surprises in quarterly tax expense predict future returns, after controlling for surprises in after-tax book income. We find that seasonally-differenced quarterly tax expense, our proxy for tax expense surprise, is positively related to future returns over the next two quarters. We confirm that this anomalous link is separate from other anomalies documented in the prior literature, such as size, book-to-market, accruals, and price momentum, as well as two anomalies related to tax variables. While higher expense might intuitively imply bad news, in this case higher tax expense signals good news as it is positively related to pre and after-tax income. Our results suggest that this good news is incorporated in stock prices with a delay because investors do not recognize fully the ability of tax expense surprises to predict two key variables that are released in the next two quarters—future book income and future tax expense.

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Tax expense surprises and future returns

1. Introduction

We examine whether seasonally-differenced quarterly tax expense—our proxy for the surprise or information released in tax expense—predicts future returns. We focus on tax expense surprise because it holds the potential to both contain considerable value-relevant information and yet not be appreciated fully by investors. Prior research suggests that the incremental information in tax expense, beyond that contained in book income, arises from a number of sources. The current portion of tax expense reflects tax due on profits computed under an alternative income measurement system, as defined by tax rules. And the component of the deferred portion of tax expense that reflects efforts to manage book income, either to signal managers' expectations of future income or for opportunistic purposes, might provide information about the firm's financial health, beyond that in book income. More generally, since tax expense is derived from pre-tax income it could provide information that is included in pre-tax income but excluded in book income. We believe that some of this information contained in tax expense may be reflected in stock prices with a delay because tax disclosures are too complex to be fully understood by most investors (e.g., Dhaliwal et al., 2004).

Our study draws upon two extensive literatures. The first considers different ways in which tax variables are related to current stock price and future book income. One strand of this literature describes the importance of understanding differences in the persistence of different components of tax expense; for example, some tax expense components may be managed to affect reported book income (e.g., Lev and Thiagarajan, 1993, Dhaliwal et al, 2004, and Gleason and Mills, 2007). Another strand focuses on the information contained in deviations of book income from tax income, where tax income represents the after-tax profit computed under tax rules (e.g., Plesko, 2007). More recently, efforts have been made in both strands of this literature

to determine whether future returns are related to the persistence of tax expense components (e.g., Schmidt, 2006) and deviations of book income from tax income (e.g., Lev and Nissim, 2004). The results suggest that the stock market does not fully appreciate the information contained in tax variables that will be reflected in future book income. A major difference between this research and our paper is that we investigate quarterly, rather than annual, tax data.[1]

Our motivation to consider quarterly data and focus on seasonally-differenced quarterly tax expense as our measure of surprise is derived from the second literature we draw upon, which investigates the earnings momentum anomaly based on seasonally-differenced quarterly book income (e.g., Joy, Litzenberger, and McEnally, 1977). The results of that research suggest that the stock market misinterprets the implications of current book income surprise for future quarters' book income and is thus predictably surprised when those future numbers are revealed.

Since book income is derived as the net effect of two more fundamental variables—pre-tax income and tax expense—the three variables are interrelated. One implication of this interrelation is that we need to control for book income surprise to separate out the incremental information contained in tax expense surprise. Another implication is that any incremental information we document for tax expense surprise, while controlling for book income surprise, can also be viewed as incremental information contained in pre-tax income surprise.

Our results indicate that quarterly tax expense surprise predicts future stock returns, even after we control for book income surprises. This relation is strong and positive for the next two quarters, and then declines to an insignificant level after that. We consider two reasons why tax expense surprises contain incremental information about future fundamentals. First, as suggested

[1] Some prior research has leveraged the information contained in quarterly effective tax rates. For example, Dhaliwal et al. (2004) investigate year-end management of tax expense by comparing the effective tax rates at the end of the third and fourth quarters, and Schmidt (2006) breaks up the annual change in effective tax rates into the change implied by the rate at the end of the first quarter and the change between the first quarter and the year-end.

in recent research on stock market anomalies based on tax variables, tax expense surprise may contain information about future book income that is not contained in current book income surprise. Second, tax expense surprise may capture fundamental information that is not reflected in future book income reported over the next two quarters, but is reflected in other financial variables. One such financial variable we consider is future tax expense. Our results suggest that both channels play a role: current tax expense surprise contains incremental information (beyond that in current book income surprise) about surprises in both book income and tax expense over the next two quarters, and both pieces of incremental information are related to predictable movement in future returns. Not only is it good news to disclose a higher tax expense today, the fact that higher tax expense today implies higher tax expense in the next two quarters is itself good news.

Some may find it counterintuitive that higher tax expense is good news and that tax expense is in effect a "fundamental" in its own right, similar to book income. Unlike other expenses, tax expense is derived from pre-tax income, and is thus positively related to both pre-tax income and after-tax book income. Even when the level of book income is held constant, higher tax expense implies that pre-tax income must be higher by the same amount.[2] Because of this interrelation among pre-tax income, tax expense, and book income, we could restate our main result as follows: it is good news to observe that tax expense and pre-tax income are higher by the same amount, even though there is no net effect of these two increases on the "bottom line" measure represented by book income.[3]

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[2] The view that higher tax expense and higher effective tax rates (ratio of tax expense to pre-tax income) is good news, in the presence of controls for book income, is also generally supported by the evidence in the prior literature on the value relevance of tax variables (e.g., Lipe, 1986). See the Appendix for more details.

[3] We confirm in untabulated sensitivity analyses that the incremental information contained in tax expense surprises (or pre-tax income surprises) is not simply due to revenue surprises; the positive relation between tax expense surprise and future returns remains strong when we include revenue surprises as an additional regressor.

We contribute to the literature on the value relevance of tax variables in two ways. First, we confirm that the tax expense surprise anomaly is separate from the two tax-based anomalies introduced recently. Second, we raise the possibility that tax expense is a fundamental in its own right. The results of prior research suggest an auxiliary role for tax variables, where tax variables are value relevant only because they contain information that will be released in future book income. Our results suggest that predicting future tax expense is itself valuable.

We also contribute to the general literature on stock price anomalies. We identify a tax expense-based "momentum" effect that is incremental to book income momentum. While prior research had held out hope that tax effects might explain away the book income momentum anomaly (e.g., Bernard and Thomas, 1989), our results suggest that tax variables may in fact create their own momentum effects. We confirm that the observed relation between tax expense surprises and future returns is separate from other previously documented anomalies, including price momentum and pricing anomalies related to accruals, size, and book-to-market.

The rest of the paper is organized as follows. Section 2 reviews related literature and develops our research questions. Section 3 describes the data and provides summary statistics. Section 4 presents empirical evidence. Section 5 provides a number of robustness checks, and Section 6 concludes.

2. Literature review and research questions

As mentioned in the Introduction, this paper is related generally to the literature on pricing anomalies and is also related more specifically to the recent literature on the value-relevance of tax variables. The link to the general pricing anomaly literature can be forged by considering the subset of pricing anomalies that are based on information available currently that has implications for future book income. This research, which can be traced back to the price

drifts after earnings announcements noted in Ball and Brown (1968), suggests that investors do not incorporate those implications and are surprised when predictable components of future book income are revealed. While the earnings momentum anomaly, which relies on implications of current quarterly earnings surprises for future earnings surprises, has received considerable attention, other pricing anomalies that are based on the same underlying principle include those relating to earnings quality (e.g., Lev and Thiagarajan, 1993), those related to accruals (e.g., Sloan, 1996), and more generally those relating to various glamour/value strategies such as book-to-market and cash flow-to-price (e.g., Lakonishok, Shleifer, and Vishny, 1994).[4]

The second literature linked to this paper is the research that has examined the value relevance of different tax variables, primarily tax expense and its components. To study the value relevance of tax variables, prior research has investigated the relation between tax variables and a) contemporaneous returns, b) future book income, and c) future returns. The literature investigating the third link differs from those investigating the first two links because it allows for the possibility that the stock market is inefficient. In fact, the third link is assumed to exist because stock prices do not fully appreciate the second link.

When reviewing this second literature, we consider first studies that are based on overall tax expense (and effective tax rates), and then consider studies based on the components of tax expense. Our review of the literature investigating the value relevance of tax expense suggests that tax expense surprises are positively related to both contemporaneous returns and future book

[4] A parallel literature has emerged in Finance on price momentum, first documented in Jegadeesh and Titman (1993), which is based on positively correlated returns over adjacent short-term holding periods, extending from three to 12 months. While both earnings and price momentum suggest that investors underreact to new information, some research suggests that earnings momentum and price momentum reflect underreaction to different information (e.g., Chan et al. 1996)

income, when controlling for book income surprises.[5] Since that review is fairly lengthy, we offer it in the Appendix and focus here on the third link between tax expense and future returns.

Whereas early research (e.g., Abarbanell and Bushee, 1998) was able to document a positive relation between effective tax rate changes and future book income (second value relevance link above), results suggest that stock prices reflect this positive relation as no significant relation is observed between effective tax rate changes and future returns (third link above). More recently, however, Schmidt (2006) finds evidence consistent with stock prices underestimating the persistence of an earnings component derived from changes in effective tax rates. The results of breaking up changes in annual effective tax rates into the change from last year to the first quarter of this year plus the change from the first quarter to the remaining quarters of this year suggest that investors underestimate the persistence of the latter component.

In addition to investigating the value relevance of overall tax expense and effective tax rates, prior research has also separately considered the current and deferred portions of tax expense, as well as subcomponents of these two primary components, such as the valuation allowance included in deferred taxes.[6] The current component of tax expense, which represents the tax liability associated with the tax return, reflects the computation of profit using a different set of rules, as described by the tax system. Even though the tax system is not designed to measure value, but to achieve governmental goals, tax return variables hold the potential to provide separate value-relevant information.[7] The value-relevance of the current component of

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[5] When discussing this second literature we blur distinctions in the specific way that tax variables are computed to allow us to focus on conceptual issues. For example, when we refer to changes in effective tax rates, we recognize that some research measures the change in earnings caused by changes in the effective tax rate from a prior year to this year; i.e., rather than use this year's effective tax rate minus last year's rate they use the product of (prior years' effective tax rate minus this year's rate) times (this year's pre-tax income).

[6] Tax expense can also be separated into its foreign and domestic components, and value-relevance assessed for those two components (e.g., Guenther and Jones, 2006).

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

tax expense is investigated in the literature via a derived tax variable referred to as tax income, which is the tax system equivalent of book income computed under GAAP rules (e.g., Manzon and Plesko 2002 and Mills, Newberry, and Trautman 2002).[8] The results suggest that information derived from the tax system is value-relevant; for example, Lev and Nissim (2004) show that the ratio of tax income to book income is positively related to both future growth in book income and future returns. The results in Weber (2007) suggest that the ability of this ratio to predict future returns may be due partly to analysts not appreciating fully the information in that ratio.

Prior research on the value relevance of the deferred component has typically considered the potential for deferred taxes to be managed to achieve certain book income objectives. Schrand and Wong (2003) provide evidence of how well-capitalized banks create valuation allowances and reduced deferred tax assets when adopting SFAS 109, to build reserves that could be used to boost book income in future periods. Despite efforts by firms to manage the deferred component of tax expense, the evidence from this research suggests that the stock market recognizes the information about future book income contained in reported deferred tax numbers. For example, Gleason and Mills (2007) show that the market appears to understand at least partially any tax expense manipulation that is designed to alter book income. Similarly, Hanlon (2005) finds that investors interpret large book-tax differences as a "red flag" so that accruals are not mispriced for firm-years with large book-tax differences.

Based on this review of prior literature, we generate two research questions. First, is the observed relation between tax expense surprises and future stock returns a new anomaly? We begin by documenting the correlation between tax expense surprise and a variety of signals

[8] Dyreng, Hanlon, and Maydew (2007) suggest that a better measure of the gap between tax and book income is obtained by using cash taxes paid (from the cash flow statement), rather than the current portion of tax expense, and by aggregating taxes paid over many years, rather than making computations each year.

underlying previously documented stock price anomalies. We consider book income surprise, prior stock returns, size, book-to-market, and cash flow from operations, as well as quarterly analogs of the annual tax variables proposed in Lev and Nissim (2004) and Schmidt (2006).

Our second research question explores why tax expense surprises are reflected in stock prices with a delay. The literature cited above on the information contained in tax variables provides one potential reason; i.e., stock prices react with a delay because tax expense surprise contains incremental information about future book income surprises, beyond that contained in contemporaneous book income surprise, and stock prices move only when those future book income amounts are revealed. Lev and Nissim (2004) suggest that the incremental ability of tax income to predict future book income is due to tax income being a proxy for "permanent" earnings. They argue that this permanence in tax income may be induced by convexity in the tax schedule, which causes firms to smooth taxable income to reduce the present value of income taxes paid.[9]

We also posit a second reason why stock prices reflect information in tax expense surprises with a delay. It is possible that tax expense could capture some fundamental information that is not reflected in current and future book income over the next two quarters but is value relevant and is reflected in stock returns when that information is released via some variable other than future book income. One possible reason why such fundamental information might not be reported in book income over the next two quarters is that it is reflected in book income in a subsequent quarter. To investigate a specific example of how current tax expense might reflect a fundamental not reflected in near term future book income, we investigate

[9] Another explanation for tax income being more persistent is that write-offs, which create one-time shocks in book income, are not allowed under tax rules.

whether the ability of tax expense surprise to predict future returns is related to its ability to predict tax expense surprises over the next two quarters.

To review, we investigate two research questions. First, is the link between tax expense surprises and future stock returns a new anomaly? Second, why do stock prices reflect this value-relevant information in tax expense surprise with a delay? For this second question, we propose two possible channels, one which links current period tax expense surprise to future book income and the other which bypasses that link.

3. Sample data and descriptive statistics

We obtain data for our primary sample from two sources: a) book income, 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 2005:IV (the Roman numerals after years refer to fiscal quarters I through IV). Total assets (data44) are widely available 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. And our sample period ends in 2005:IV because that is the last quarter on the Compustat files we use.

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. Our primary control variable is book income surprise (ΔBI), and is measured as book income per share in quarter q minus book income per share in q-4, scaled by assets per share in quarter q-4. To allow differencing across years, both book income per share and tax expense per share are adjusted for stock splits and dividends.

Our primary 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 for 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 with book income 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 that is required to be filed no later than 45 and 90 days after the quarter-end, respectively.[10] 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 5.3 our efforts to investigate any potential bias caused by the window we use to measure RET_{q+1}.

Table 1 provides descriptive statistics for RET_{q+1}, ΔT, and ΔBI, the three main variables of interest. We separate the other control variables we consider into two groups: a) a first set that we deemed more important and for which we were able to obtain sufficiently large sample sizes, and b) a second set representing the remaining control variables. We include the first set of control variables for our primary analyses (Section 4) and consider the second set in our robustness tests (Section 5).

The first set of control variables includes 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*). 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). We also include changes in quarterly effective tax rates in the

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

first set, given our expectation that it is correlated highly with tax expense surprise. The variable we use to measure changes in quarterly effective tax rates (*TCC*) is a quarterly analog of the annual measure in Schmidt (2006), which we define 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.

The second set of control variables includes the ratio of tax income to book income (*TI/BI*) and cash flow from operations scaled by total assets (*CFO/TA*).[11] *TI/BI* is the quarterly analog of the ratio of tax income to book income used in Lev and Nissim (2004). Tax income is measured as (tax expense less deferred portion of tax expense)*$(1-\tau)/\tau$, where τ is the top statutory tax rate. This variable is missing for a majority of the sample, because a) deferred portion of tax expense is often missing (especially for interim quarters) and b) the ratio is computed only for cases with positive book income. Given the potential importance of controlling for this tax variable, however, we create a second version of *TI/BI* that is based on setting missing values of the deferred portion of tax expense to zero. We use this synthetic *TI/BI* measure as a control variable in the first set, and the original *TI/BI* measure (*TI/BI(2)*) is used as a control variable in the second set. *CFO/TA* is quarterly cash flow from operations, scaled by total assets at the end of prior quarter. Since cash flow from operations was widely disclosed

[11] 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 book income 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 (about 248 thousand firm-quarters). Untabulated results based on substituting forecast errors for seasonal differences reveal that our conclusions regarding tax expense surprise remain unchanged.

only after 1987, this variable is generally missing for the first 10 years of our sample period. A cash flow control is included because tax expense surprise may be correlated with operating cash flows and operating accruals, and our anomaly may inadvertently capture the accruals and cash flow anomalies (e.g., Sloan, 1996, and Desai et al., 2004). We also consider a second cash flow variable, *CFO/P*, which is based on lagged price rather than total assets as the scaling variable.

Our second set of control variables includes two additional variables: the level of quarterly effective tax rates (*ETR*) and the proportion of pre-tax income that is derived from foreign operations (*Foreign*). *Foreign* is the ratio of the absolute value of foreign pre-tax income to the sum of that amount and the absolute value of domestic pre-tax income. We include the level of effective tax rates to control for the possibility that it is positively related to differences in tax expense. We include *Foreign*, because of the potential for effective tax rates to be affected by levels of income generated in domiciles with statutory tax rates that are different from those in the US (e.g., Guenther and Jones, 2006). Sample sizes are considerably lower for *Foreign* because the separate amounts of domestic and foreign pre-tax income are not reported for most firm-quarters.

Panel A of Table 1 provides descriptive statistics for our three primary variables and the various control variables. To mitigate the effect of outliers, we Winsorize all variables at 1 percent and 99 percent, except for RET_{q+1}, the dependent variable of interest. As reported in the first column of Panel A, the sample size is above 570 thousand for future returns (RET_{q+1}), tax expense surprise (ΔT), and book income surprise (ΔBI). The sample sizes remain around 550 thousand for 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 book income (*TI/BI*)—because these two variables are undefined for

negative values of pre-tax income and book income, respectively.[12] Nevertheless, sample sizes are large enough for these two tax variables to be included in the first set of control variables. Note that we increased sample size substantially for *TI/BI* by setting missing values of deferred tax expense to zero.

Panel B presents pair-wise correlations across our primary variables. Surprises in tax expense and book income are positively correlated, the Pearson (Spearman) correlation is 0.228 (0.514). Book income surprises are positively related to future three-month stock returns, consistent with the evidence documented in the earnings momentum literature. Tax expense surprise is also positively related to future stock returns. While the Pearson correlations suggest that book income surprise is correlated more highly with future returns than tax expense surprise is, the Spearman correlations suggest that tax expense surprise exhibits a slightly higher correlation. Given the strong correlation between surprises in book income 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-established positive correlation between book income surprises and future returns.

Panel C provides a measure of the persistence of surprises in book income and tax expense by reporting the first order autocorrelations (estimated over pooled data). Whereas the Pearson and Spearman autocorrelations are slightly higher for book income surprise, there is considerable evidence of persistence in tax expense surprises. This evidence of persistence in tax expense surprises could be partially responsible for the anomaly we document, if the stock

[12] The reduction in sample size because of the requirement that book income and pre-tax income be positive is substantial and becomes more severe over time. For example, firm-quarters dropped for the TI/BI variable because of negative earnings account for 29.30% of the sample for the overall 1977-2005 period, and the percentage is increasing over time (9.63%, 25.88%, 29.86%, and 32.85% for 1970s, 1980s, 1990s, and 2000s, respectively).

market underestimates the level of persistence and if tax expense surprises contain incremental information over book income surprises.

To investigate the effect of potential non-linearity on the correlations between tax expense surprise and the different control variables, we sorted our sample each quarter into deciles of tax expense surprise as well as into deciles for all the other variables (except future returns) and computed the mean value of the decile rank for those other variables for each tax expense surprise decile. Those results are reported in Panel D. The first column indicates that the positive 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 3.89 percent hedge return, over three months, from investing long (short) in the highest (lowest) tax expense surprise decile. The second column shows that the overall positive relation between tax expense and book income 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 the third and fourth columns, suggest a non-linear relation at the decile level that is masked by the overall positive and negative correlations reported in Panel B. The fifth column reveals a strong monotonic positive relation between tax expense surprise and *RET_6*, the third control variable in our first set.

The results in column 6 of Panel D confirm that the positive serial autocorrelation for tax expense surprise reported in Panel C arises from a monotonic relation, and the results in column 7 suggest that tax expense surprises are strongly positively related to book income surprises in the next quarter. The column 8 results indicate that while there is a weak positive relation between the two tax variables, there is a clear U-shape to that relation caused by effective tax rates being substantially lower for the middle ΔT deciles i.e., extreme tax expense surprises are more likely to be observed for firms with high effective tax rates. Not only is this finding

intuitive, it suggests that our hedge portfolio results are not due to large differences in effective rates between the top and bottom tax expense surprise decile.

The change in effective tax rates (*TCC*), reported in column 9, is monotonically negatively related to changes in tax expense. This negative relation is expected given that *TCC* is defined as prior effective tax rate less current effective tax rate, whereas changes in tax expense (ΔT) are defined as current tax expense less prior tax expense. The ratio of tax income to book income (*TI/BI*) reported in column 10 exhibits the same U-shaped relation as *ETR* in column 8. Again, this relation is expected as tax income, the numerator of *TI/BI*, is highly correlated with tax expense, the numerator of *ETR*, mainly because we set missing values of deferred tax expense to zero, which then causes the implied current tax expense (used to calculate *TI*) to equal tax expense. Regardless, it is reasonable to expect a general U-shaped relation between the *level* of tax income and *changes* in tax expense, which reduces the likelihood that any observed relation between tax expense surprise and future returns is merely reflecting an underlying relation between *TI/BI* and future returns.

The results in column 11 reveal that the fraction of pretax book income from foreign sources (*Foreign*) is generally unrelated to tax expense surprise. This result should alleviate any concerns that tax expense surprise is related in some systematic way to the level of foreign income, which may be related to measurement error in tax expense surprise and also to future returns over this sample period. Columns 12 and 13 in Panel D suggest a shallow U-shaped relation between tax expense surprise and the two measures of cash flows (*CFO/TA* and *CFO/P*). The absence of a monotonic relation between cash flows and tax expense surprise suggests that the anomaly we document here is unlikely to be related to the cash flow and accruals anomalies

documented in the literature. Given the similarity in results between the two measures, we consider only the first cash flow measure (*CFO/TA*) hereafter.[13]

4. Results

4.1 Main results

To examine the relation between tax expense surprise and future stock returns, we estimate the regression described by equation (1). In addition to controlling for contemporaneous book income surprise, we include the five control variables in the first set (for which we were able to obtain non-missing values for most observations in our primary sample).

$$RET_{q+1} = \beta_0 + \beta_1 \Delta T + \beta_2 \Delta BI + \beta_3 TCC + \beta_4 TI / BI + \beta_5 Log(MV) + \beta_6 Log(BM) + \beta_7 RET\_6 + \varepsilon \quad (1)$$

Table 2 presents our main results. The left half of the Table (Models 1 to 5) is based on unadjusted values of the regressors, whereas the right half (Models 6 to 10) uses decile rankings for all regressors. Decile rankings are obtained by sorting regressor values each quarter and rescaling each variable to lie between 0 and 1 with the lowest (highest) decile assigned a value of 0 (1).[14] In each half of the Table we first consider ΔT alone (Models 1 and 6), then include the controls for size, book-to-market and price momentum (Models 2 and 7), and then include book income surprise, ΔBI (Models 3 and 8). Finally we include the quarterly analogs of *TCC* and *TI/BI*, the tax variables in Schmidt (2006) and Lev and Nissim (2004) (Models 4 and 5, and 9, and 10, respectively).

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[13] 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.

[14] Since decile rankings cannot be known until all observations in a calendar quarter have been collected, we are in effect using information that may not yet be available at the time that the portfolios are formed. As a robustness check, we use the decile breakpoints from four quarters ago to determine the decile rankings in quarter q. The results are very similar.

In all specifications, tax expense surprise is significantly, positively related to future stock returns, with t-statistics that are over 5, regardless of the controls included. Unless stated otherwise, all t-statistics in this study are based on the time-series distribution of quarterly slope coefficients (or hedge portfolio returns) estimated for each of the 116 quarters in our sample, as in Fama and MacBeth (1973). The lowest values of coefficients on *ΔT* and related t-statistics are observed when we include *TI/BI*. We show later that this reduction in the magnitude and significance of the effect of tax expense surprise is due to the mechanical relation we induce between *ΔT* and *TI/BI* by setting all missing deferred tax expense values to zero. We confirm that the impact of including *TI/BI* on the effect of *ΔT* is much lower when we consider in Table 7 the smaller sample for which we do not set missing deferred tax expense to zero. Overall, the evidence in Table 2 suggests strongly that the tax expense anomaly is separate from other anomalies documented in the literature.[15]

While the significant positive correlation between book income 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 periods considered here (which begin three months after the quarter end) are 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 earning announcement.

The coefficients on other control variables in Table 2 are generally consistent with the prior literature. Future stock returns are positively related to the book-to-market ratio and past price momentum and negatively related to firm size. The coefficients on *TI/BI* are significant (t-

[15] We replaced book income surprise in Model 3 with changes in the two components of book income—accruals and cash flow from operations, and find little change in the coefficient on tax surprise.

statistics over 2) and positive, consistent with the conclusion in Lev and Nissim (2004) that higher levels of tax income predict higher stock returns in the future. The coefficient on *TCC* is positive and significant in Model 4, but insignificant in Model 9 when decile ranks are used. Recall that a positive coefficient on *TCC* implies that a *decrease* in effective tax rates, which should be related to a decrease in tax expense, predicts higher future stock returns.

To resolve this apparent discrepancy between the positive coefficient on *TCC* and our general conclusion that increases in effective tax rates should be good news, we regressed future book income surprises and future returns (two measures of future good news) on the regressors in Models 4 and 9, *after excluding changes in tax expense*. Our results (untabulated) reveal that *TCC* is significantly *negatively* related to future returns and future book income surprises; i.e., increases in effective tax rates are good news. Overall, we conclude that increases in tax expense, effective tax rates, and tax income should all be viewed as good news.

To provide further insights into the relative performance of ΔT and ΔBI, we adopt a portfolio approach. Each calendar quarter, we sort stocks into ten deciles based on ΔT, ΔBI, and residual ΔT, where residual ΔT is defined as the residual from the following regression:

$$\Delta T = \beta_0 + \beta_1 \Delta BI + \varepsilon \qquad (2)$$

Table 3 reports the time-series means of future stock returns across ten deciles for each of the three variables. The results in the first column are the same as those reported in column 1 of Table 1, Panel D, with an average hedge portfolio return of 3.89 percent (t=10.89). A similar sort based on ΔBI generates an average return of 4.51 percent (t=13.14) for the D10-D1 hedge portfolio in column 2. As ΔT and ΔBI are positively correlated, the most relevant sort is by residual ΔT. The third column in Table 3 shows that returns increase from 2.91 percent for D1 to 5.48 percent for D10. The hedge portfolio return differential between high and low residual ΔT

deciles of 2.58 percent is lower than that based on ΔT but is statistically significant (t-statistic of 7.94) and economically significant (equivalent to an annualized return of 10.73 percent).[16]

Roughly speaking, ΔBI-related information in ΔT only accounts for 33.7 percent (computed as (3.89 percent-2.58 percent)/3.89 percent) of the predictive power of ΔT for future stock returns. Therefore, although tax expense and book income surprises are positively related to each other, the bulk of the information contained in tax expense surprises regarding future stock returns is separate from that contained in book income surprises.[17]

Since the residual ΔT analysis is based on cross-sectional regressions of ΔT on ΔBI, it is possible that fitting the same model to all industries generates residuals that measure true residuals with error. To investigate the bias in hedge portfolio returns caused by this potential error, we estimate regression (2) separately for each industry-quarter, where firms are grouped into industries based on 2-digit SIC codes. The results of that analysis, reported in the fourth column of Table 3, are very similar to those reported in the third column, suggesting that our estimates of residual ΔT are not sensitive to whether equation (2) is estimated separately for each industry or estimated across all industries.[18]

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[16] We repeated the analysis separately for different fiscal quarters and find that the hedge portfolio returns for interim quarters are higher than those for the fourth fiscal quarter. Specifically, the returns of the D10-D1 hedge portfolio based on tax expense surprises are 4.91% (t=8.58), 4.63% (t=5.53), 3.35% (t=5.74), 3.34% (t=6.81) for the 1st, 2nd, 3rd, and 4th quarters, respectively. The corresponding hedge returns are 3.25% (t=6.21), 3.09% (t=4.27), 2.18% (t=4.34), and 2.33% (t=5.61) if using residual tax expense surprises.

[17] One way to estimate whether book income 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, we sort our sample into quintiles of book income and tax expense surprise and find that the mean return earned by the portfolio in the top quintile of book income and tax expense surprise is 6.67% percent versus 1.63% percent for the bottom quintile of book income and tax expense surprise. The resulting hedge return of 5.04% percent is greater than the corresponding hedge returns based on extreme quintiles of tax expense and book income surprise (inferred by combining the top two and bottom two rows in columns 1 and 2 of Table 3).

[18] 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 the hedge returns earned across different quarters appears to be unrelated to the magnitude of tax surprise in those quarters.

To confirm that our results from residual ΔT deciles are robust to controls for potential risk factors, we estimate the following four-factor model for monthly returns on each of the residual ΔT deciles:

$$R_{it} - R_{ft} = a + b_{iM}(R_{Mt} - R_{ft}) + s_i SMB_t + h_i HML_t + m_i MOM_t + \varepsilon_{it} \qquad (3)$$

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 residual ΔT decile, after controlling for these four factors.

Table 4 presents the parameter estimates for the four-factor model. The intercept increases fairly monotonically from -0.147 percent for D1 to 0.584 percent for D10. After controlling for the market return, size, book-to-market, and momentum factors, the D10-D1 hedge portfolio yields a monthly return of 0.732 percent (t=7.47), which is equivalent to an annualized return of 9.15 percent.[19]

In sum, the results are consistent across the regression approach (Table 2), the portfolio approach (Table 3), and the four-factor model approach (Table 4); they all suggest that tax expense surprise predicts future stock returns, even after controlling for contemporaneous book income surprises and other factors that predict future stock returns.[20]

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[19] Since using residual tax expense surprise to form portfolios in Table 4 effectively controls for book income 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 from 0.732 in Table 4 to 0.487, but they remain statistically significant (t=4.54). The hedge return is 0.491(t=4.58) 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.

[20] By using residual ΔT, which is based on linear regressions of tax expense surprise on book income surprise, we are effectively assuming that future returns can be described by a linear function of surprises in book income 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 book income surprise and then sort each book income surprise decile into ten portfolios (1 to 10) based on tax expense surprise. We then collect

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

In Section 2, we offered two possible channels by which tax expense surprises might be related to future stock returns: a) tax expense surprises contain incremental information about future book income, and b) tax expense surprises contain fundamental information not reflected in current and near-term future book income.

To investigate the first channel, we first confirm that tax expense surprises contain incremental information about future book income, and then estimate the extent to which that incremental information is not already reflected in contemporaneous stock prices. To measure incremental information content about future book income, we regress book income surprises over each of the next four quarters on contemporaneous tax and book income surprises. The four regressions we estimate can be described as follows:

$$\Delta BI_{q+i} = \beta_0 + \beta_1 \Delta T_q + \beta_2 \Delta BI_q + \varepsilon \qquad (4)$$

where *i* equals 1, 2, 3, or 4, when the dependent variable is the one-, two-, three-, or four-quarter-ahead book income surprise, respectively.

The results of that analysis are reported in Table 5, Panel A. The coefficients on ΔT are positive and significant in all four columns, suggesting that tax expense surprise predicts book income surprises up to four quarters ahead, after controlling for the level of current book income surprise. The pattern of coefficients on book income surprise in the second row is consistent with the autocorrelation pattern documented in the prior literature: seasonal differences in quarterly book income are positively (negatively) auto-correlated at the 1st, 2nd, and 3rd (4th) lags.

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all ten portfolio 1's from each book income 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. Book income 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 1.51 percent (t=7.23).

To investigate whether this incremental ability of tax expense surprises to explain subsequent quarters' book income surprises is related to its ability to explain future stock returns, we estimate the equation (1) regressions, considering in turn stock returns over four three-month holding periods (RET_{q+i}), with the first, second, third, and fourth holding periods beginning with the fourth, seventh, tenth, and thirteenth month after the quarter end, respectively.[21] Note that regressions based on the first period (RET_{q+1}) are identical to those reported in Model 3 of Table 2. The results, reported in Table 5, Panel B, indicate that the coefficient on ΔT is positive and significant only for the first and second subsequent holding periods. Apparently, the positive coefficients observed in Panel A on ΔT in columns 3 and 4 are fully anticipated by the market two quarters later, as the coefficients on ΔT in columns 3 and 4 of Panel B are insignificant.[22]

We conclude that the results in Table 5 support the hypothesis that the first channel plays a role: tax expense surprise is positively related to returns over the subsequent two three-month holding periods because it has the incremental ability to explain book income surprise over the next two quarters, even after controlling for the level of contemporaneous book income surprise.

To investigate the second channel by which tax expense surprises are related to future stock returns, we examine whether tax expense surprises explain future stock returns after controlling for the first channel. The primary regression model we employ is as follows:

$$RET_{q+1} = \beta_0 + \beta_1 \Delta T_q + \beta_2 \Delta BI_{q+1} + \beta_3 \Delta BI_{q+2} + \varepsilon \qquad (5)$$

We include book income surprise for the first and second subsequent quarter since we wish to control for book income surprises that will be released during the 3-month holding

[21] We also consider later the case where the dependent variable is the earnings announcement return, rather than the returns over the three-month window considered here (see Section 5.5 and Table 10).

[22] Note that the four three-month return holding periods (RET_{q+1} and RET_{q+2}) are not aligned with the corresponding periods when the market learns of the information contained in our proxies for book income surprises over the next four quarters (ΔBI_{q+1} to ΔBI_{q+4}). For example, it is reasonable to assume that some of the information contained in ΔBI_{q+2} is released during the window that corresponds to RET_{q+1}.

period over which future returns are computed. While it is possible that in some cases the second quarter's earnings will be released after the 3-month holding period we use to compute future returns, we do not believe that our estimate of the coefficient on contemporaneous tax expense surprise will be biased upward because of this misalignment between future returns and future book income surprises.

Table 6, Panel A, provides the results from estimating different variants of equation (5). Model 1 includes book income surprise for the next two quarters ΔBI_{q+1} and ΔBI_{q+2}, Model 2 adds controls for size, book-to-market, and price momentum, and Model 3 adds a control for contemporaneous book income surprise (ΔBI_q). The main finding is that the coefficient on tax expense surprise (ΔT) is positive and highly significant in all models, which is consistent with the second channel being relevant; i.e., tax expense surprise is related to next quarter's stock returns because it contains fundamental information that is captured only partially by book income reported in the subsequent two quarters.[23]

Note that the sign of the coefficient on current book income (ΔBI_q) switches from positive to negative when future book income surprise is included (Model 3 in Table 6, Panel A versus Model 1 in Table 5, Panel B). As described in Ball and Bartov (1996), this switch is expected because book income surprises are positively autocorrelated at the first and second lag.

Panel B of Table 6 documents the ability of current tax expense surprise to predict future tax expense surprise over the next four quarters, in the presence of controls for current book income surprise. The coefficient on tax expense surprise is positive but declines over the next three quarters, and then flips to a large negative value four quarters later. This is the same

[23] We repeated the analysis in Panel A after replacing future book income surprises with a) the level of operating cash flows and b) seasonal differences in operating cash flows for the next two quarters. The coefficient on current tax expense surprise increased substantially over the levels reported in Table 6, Panel A.

autocorrelation pattern noted for book income in the earnings momentum literature. To the extent that future tax expense is value-relevant, this ability of current tax expense surprise to predict future tax expense surprise provides support for the second channel we posit for the link between tax expense surprise and future returns.

The analysis in Panel C of Table 6 investigates the role played by future tax expense surprise, the variable we conjecture may be a fundamental that influences future stock returns. We include tax expense surprises in the next two quarters to the primary regression model described by equation (5). Observing that future tax expense surprises provide incremental explanation of future returns, beyond that provided by future book income surprises, confirms that it is valuable to predict those future tax expense surprises. Also, since tax expense surprises exhibit the same autocorrelation pattern exhibited by book income surprises, we should observe that the coefficient on tax expense surprise in quarter q should flip from being significantly positive to significantly negative (e.g., Ball and Bartov, 1996).

Models 1, 2, and 3 in Panel C of Table 6 are similar to the corresponding models in Panel A, except that the Panel C models include tax expense surprises for the next two quarters. The large positive coefficient on future tax expense surprises in all 3 models of Panel C indicates that future tax expense surprises contain considerable value-relevant information beyond that contained in future book income surprises. And the substantial increase in adjusted R^2 from Panel A to Panel C for all three models confirms that future tax expense surprises provide a substantial amount of new information not contained in the variables in Panel A. Finally, the fact that the coefficients on current period tax expense surprise switches from significant positive values in Panel A to significant negative values in Panel C suggests that the market anomaly associated with tax expense surprises represents a momentum anomaly caused by the market

underestimating the magnitude of serial autocorrelation in tax expense surprises, similar in character to the book income momentum anomaly documented in the literature.

Overall, the Panel C results support the joint hypotheses that a) current tax expense surprise contains incremental information about future tax expense surprise, beyond that contained in current book income surprise, and b) that incremental ability to predict future tax expense surprise is one route for the second channel we propose, since future tax expense surprise contains information that is relevant for future stock returns, beyond that contained in future book income surprises.[24]

In sum, we find support for two potential channels by which information contained in current period tax expense surprise predicts subsequent stock returns. The first channel is that tax expense surprise predicts future book income surprises that will be reported in the first and second subsequent quarter. As a result, that information is reflected in stock prices when future book income is revealed to the market. The second channel is that tax expense surprise contains fundamental information about future stock returns that is not reflected in book income reported in those two subsequent quarters. Some of that information appears to be related to future tax expense surprises. 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 and that the ability to predict future tax expense plays a role in this second channel.

[24] To investigate whether the information contained in tax expense surprises over the next two quarters is revealed in subsequent book income surprises, we replaced the two future tax expense surprise terms in Panel C with book income surprises for quarters q+3 to q+8. The magnitude of the coefficient on current tax expense surprise remained a large positive value, as high as those reported in Panel A of Table 6, suggesting that the information revealed in tax expense surprises over the next two quarters is not revealed in book income surprises over the next eight quarters.

5. Robustness checks

5.1 Additional control variables

We consider next the second set of control variables that are potentially correlated with both tax expense surprises and future returns. As mentioned in Section 3, we deferred consideration of these controls mainly because of the decline in sample size caused by a substantial proportion of missing values for these variables. The first variable examined is the ratio of quarterly taxable income to book income (*TI/BI(2)*). We focus now on the smaller sample with non-missing values for all variables needed to compute this ratio. The second control variable we include is cash flow from operations, scaled by total assets (*CFO/TA*), which has been shown to be positively related to future stock returns and is potentially positively related to our tax expense surprise measure.[25] The third and fourth control variables are *Foreign*, the proportion of pre-tax income earned from non-domestic sources, and the level of the effective rate in quarter *q* (*ETR*).

The results of incorporating the second set of control variables are reported in Table 7. The reduction in sample size caused by including the different control variables considered in Table 7 can be gauged by comparing the number of observations available for each regression (reported in the bottom row) with the over 550,000 observations available for the analyses based on the first set of control variables. The first four columns describe regressions of future 3-month returns on ΔT and ΔBI and each control variable, and the next four columns are based on decile rankings of all regressors. We also include the following three variables from the first set of control variables: size (Log *MV*), book-to-market ratio (Log(*B/M*)) and price momentum (*RET_6*).

[25] We considered the impact of including accruals (*ACC*) as well as *CFO* to our analyses and find that the coefficient on ΔT is little changed. We also considered a specification that separates ΔBI into ΔCFO and ΔACC and again find the coefficient on ΔT is not changed substantially.

Our main finding is that tax expense surprise (ΔT) remains strongly significant in all regressions.[26] In terms of the incremental ability of the four control variables to predict future returns, significant positive relations to future returns are observed for *TI/BI(2)*, *CFO/TA* and *ETR* in both sets of regressions. The fourth control variable, *Foreign*, is not significantly related to future returns in both Models 3 and 7.

5.2 Consistency with which the hedge returns are observed over time

One standard approach to investigate the robustness of a stock market anomaly observed at an aggregate level is to repeat the analysis over different subperiods and check if the result is observed consistently in each subperiod. We conduct this analysis at the level of each calendar quarter between 1977:I and 2005:IV, and calculate the mean hedge portfolio returns (decile 10 less decile 1) for the fiscal quarters ending in those calendar quarters for three measures of surprise: a) seasonally-differenced tax expense (ΔT), b) seasonally-differenced book income (ΔBI), and c) the residuals from quarterly regressions of seasonally-differenced tax expense on seasonally-differenced book income (residual ΔT). Those results are presented in Panels A, B, and C, respectively, of Figure 1.

Comparison of Panels A and B reveals that both investment strategies appear to generate consistently positive returns, since of the 116 quarters considered only 16 quarters in Panel A and 14 quarters in Panel B exhibit negative returns. However, the returns in Panel A (tax expense) are more volatile, especially in more recent years. In particular, two large negative returns of about 7.5 percent are observed for fiscal quarters ending during the calendar quarter 2000:II and 2001:I. Since the holding periods begin four months later and continue for three

[26] We recognize that sample differences prevent direct comparisons of the coefficients on tax expense surprise across the regressions in Table 7 and also to those in Table 2.

more months, the negative returns occurred during 2000:IV and 2001:III.[27] Unlike prior research which suggests a change in the stock market's ability to interpret tax-related disclosures around 1993, when SFAS No. 109 became effective and substantially altered GAAP for income tax reporting, no apparent discontinuity is observed in Figure 1, Panel A around that event.

Whereas the results in Panel A document the profits from a strategy based on tax expense surprises, the results in Panel C describe the profits from a strategy that is based on information in tax expense surprises that is orthogonal to information in book income surprises. While the number of loss periods in Panel C is slightly more than that in Panel A (24 quarters out of 116) and while the general level of profits appears lower than that in Panel A, the overall picture remains one of consistent profitability. 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).

5.3 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. One concern is that some firms may file their 10-Q and 10-K reports later than that date and these late filings could potentially create spurious results. To address this issue, 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 available prior to our portfolio formation date. We are able to identify 174,638 firm-

[27] The stock market declined sharply during these two quarters, registering returns of −10.68% and −16.09%, respectively. The significant events that appear to cause these market declines were the bursting of the Internet bubble and the September 11 terrorist attack, respectively.

quarter observations for this sample, compared to 255,071 observations for the full sample from 1996 to 2005.[28] 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 8 the results for the full sample, subsample A and non-subsample A over the 1996-2005 time period. When using the return measure in the main analysis (RET_{q+1}, 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 1996-2005 period, but the magnitude is considerably smaller than that for the overall 1977-2005 period (the D10-D1 hedge return is 1.88 percent for the 1996-2005 subperiod, relative to 3.89 percent for the overall period). This result is anticipated by the lower returns that are documented in Panel A of Figure 1 over more recent years. More relevant to our robustness check, we find that although the D10-D1 hedge returns for our subsample A are lower than those for the "non-subsample A" (1.78 percent versus 2.54 percent), the subsample A results are still statistically significant.[29]

Since the RET_{q+1} holding period returns begin well after tax expense is released to the stock market for subsample A, the hedge returns reported in the third column of Table 8 understate the ability of tax expense surprises to predict future returns. The average (median) number of days between the 10-Q/K filing date and the fiscal quarter-end is 53 (44) 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 8 report portfolio results using $FRET_{q+1}$ for Subsample A based on tax expense surprise and residual tax expense surprise, respectively. The

[28] Of the 179,846 observations for which we could obtain filing dates, 5,208 had filings that were made later than three months after the quarter end.

[29] We report in the bottom four rows of Table 7 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.

D10-D1 hedge return for extreme tax expense surprise deciles is 4.88 percent (t=8.04), which is higher than the three hedge returns based on RET_{q+1} reported in columns 1, 2, and 3. The hedge return of 3.87 percent reported in column 5 confirms that the ability of tax expense to predict future returns remains even after controlling for book income surprises. This hedge return of 3.87 percent for Subsample A is both economically and statistically significant (t=6.04).[30]

The two conclusions from Table 8 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) biases our results in the direction of finding a relation between tax expense surprises and future returns, we find results 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 we drop from our holding period (RET_{q+1}) the days between the date when tax expense was first disclosed and the beginning of the fourth month after the quarter end. The results reported in Panel D of Figure 1 illustrate the extent of understatement, on a quarter-by-quarter basis. The profits from hedge portfolios based on $FRET_{q+1}$ are generally more positive (or less negative) than those based on RET_{q+1}.

These two conclusions are based on the conservative assumption that tax expense is 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.

[30] 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 8 by delaying the three-month return window by one and two weeks after the filing date (instead of the three day delay in Table 7). We find that the results remain relatively unchanged. For example, the hedge returns in column 5 of Table 8 decline slightly from 3.87 percent (t=6.04) to 3.63 percent (t=5.36) and 3.62 percent (t=4.94) for delays of one and two weeks, respectively.

5.4 Does tax expense momentum vary by firm size?

One way to distinguish whether documented anomalies are indeed 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 9 recasts the overall hedge portfolio results reported in the bottom row of Table 3 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 book income surprise anomaly literature (e.g., Foster, Olsen, and Shevlin, 1984), the results reported in the middle column for ΔBI confirm that the hedge portfolio returns are the highest for small firms (5.81 percent) and lowest for large firms (1.29 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.

5.5 Analysis of earnings announcement returns for the next four quarters

Another typical approach used in studies of market anomalies is to examine whether the future returns predicted are concentrated at subsequent quarterly earnings announcements. If such a pattern of concentrated returns is observed, the documented anomaly is less likely to be due to mismeasured risk, as very large risk changes are required to explain abnormal returns over short announcement windows. Also, to the extent that the earnings "surprises" announced on those future dates are correlated with the observed returns, these studies conclude that the anomalies are likely due to market mispricing, which is corrected only when the predictable portion of subsequent period earnings are actually revealed.

To investigate the relation between tax expense surprises and returns at future quarters' earnings announcements, we regress 3-day earnings announcement window returns ($ARET_{q+i}$, measured over day -1, day 0, and day +1) for the next four quarters on the level of tax expense surprise. For control purposes, we include book income surprise, as well as size (Log *MV*), the book-to-market ratio (Log(*B/M*)) and price momentum (*RET_6*). The regression results are provided for unadjusted regressors in the first four columns of Table 10 for the first, second, third, and fourth subsequent quarter, respectively. The corresponding results based on decile rankings of the regressors are provided in columns 5 though 8.

Consistent with the pattern of correlations between tax expense surprise and future returns reported in Table 5, we find that tax expense surprise (ΔT) is significantly positively related to announcement returns for the first and second subsequent quarter. In addition to confirming that the abnormal returns for the first and second quarter following are unlikely to be an artifact caused by mismeasured risk, these results suggest that current tax expense surprises contain incremental information about book income that will be reported over the next two quarters. To the extent that other fundamental information, other than future book income, that is predicted by current tax expense surprises is not released at future earnings announcement dates, these results describe the first channel by which tax expense surprises are related to future returns.

6. Conclusion

The consistent profitability of a long (short) investment in stocks reporting positive (negative) surprises based on quarterly book income, 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 book income, 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 book income and the income effect of changes in effective tax rates).

We consider two potential sources for that incremental information. First, current tax expense provides information about subsequent quarters' book income, above and beyond that provided by current book income. Second, current tax expense provides value-relevant information about disclosures that will be made over the next two quarters (and will affect stock prices at that time), but that information is not captured by book income reported currently or in subsequent quarters. Our results suggest that both channels play a role in the stock market anomaly we document here. Relating to the second channel, we find that current tax expense surprises predict future tax expense surprises and those future tax expense surprises are incrementally value relevant, beyond future book income surprises.

Appendix
Review of the prior literature on why tax expense surprises are good news

To understand the implications of the results of prior literature for the value relevance of tax expense surprises, we review below the literature on the links between tax variables and a) contemporaneous returns, and b) future book income. Results of research investigating the first link suggest that higher tax expense implies higher contemporaneous returns, controlling for book income surprise. Guenther and Jones (2006) adapt the Lipe (1986) valuation model to focus on changes in pre-tax income and changes in tax expense, and their results might be viewed as suggesting that increases in tax expense are bad news (reduces contemporaneous returns). However, since the coefficient on changes in pre-tax income is greater than the coefficient on changes in tax expense, we show next that the coefficient on tax expense surprise flips sign from negative to positive when changes in book income replace changes in pre-tax income.

Consider the following regression of abnormal returns (*AR*) on changes in pre-tax income (*ΔPTI*) and changes in tax expense (*ΔT*).

$$AR_q = \beta_0 + \beta_1 \Delta PTI_q + \beta_2 \Delta T_q + \varepsilon \qquad (A1)$$

The results in Table 2, Panel D of Guenther and Jones (2006) indicate estimated values of β_1=2.73, and β_2=–1.29.[31] Since changes in pre-tax income can also be represented as the sum of changes in book income (*ΔBI*) plus changes in tax expense, equation (A1) can be recast as follows.

$$AR_q = \beta_0 + \beta_1 \left(\Delta BI_q + \Delta T_q\right) + \beta_2 \Delta T_q + \varepsilon \qquad (A2)$$

Rearranging terms, we get the following relation.

$$AR_q = \beta_0 + \beta_1 \Delta BI_q + \left(\beta_1 + \beta_2\right) \Delta T_q + \varepsilon \qquad (A3)$$

[31] Guenther and Jones (2006) define changes in tax expense as $T_{q-1} - T_q$, whereas we define $\Delta T_q = T_q - T_{q-1}$. To reflect our definition of changes in tax expense, we convert their estimated value of β_2=1.29 to β_2=–1.29.

That is, if Guenther and Jones (2006) had estimated a regression of abnormal returns on changes in book income and changes in tax expense, the coefficients they would have estimated would be 2.73 on changes in book income and 1.44 (=2.73-1.29) on changes in tax expense. Provided the magnitude of β_1 is greater than the magnitude of β_2 in equation (A1), the coefficient on changes in tax expense will flip sign between equations (A1) and (A3). That is, while a negative coefficient on changes in tax expense in equation (A1) might suggest that a higher tax expense is bad news, recasting that relation as shown in equation (A3) clarifies that changes in tax expense should be viewed as good news when controlling for changes in book income.

Results of research investigating the second link suggest that higher tax expense implies higher future book income. For example, Abarbanell and Bushee (1997) find that increases in effective tax rates are positively related to current returns and future income.[32] The results in Schmidt (2006) are also consistent with increases in effective tax rates being good news, when the level of book income is controlled for. Again, we describe below how the relations estimated in Schmidt (2006) need to be recast to support our interpretation of those results.

Consider the following regression of future book income (BI_{q+1}) on book income excluding the change in effective tax rates (ATE_q) and the tax change component of earnings (TCC_q), where *ATE* and *TCC* are as defined in Schmidt (2006).

$$BI_{q+1} = \gamma_0 + \gamma_1 ATE_q + \gamma_2 TCC_q + \varepsilon \qquad (A4)$$

The estimates in Table 3, Panel A of Schmidt (2006) are γ_1=0.81, and γ_2=0.71. Adding and subtracting *TCC* to the *ATE* term in equation (A4) generates the following.

$$BI_{q+1} = \gamma_0 + \gamma_1\left(ATE_q + TCC_q - TCC_q\right) + \gamma_2 TCC_q + \varepsilon \qquad (A5)$$

[32] As mentioned in Guenther and Jones (2006), this inference can only be made for cases when the change in book income is positive. The opposite relation is predicted for cases with negative changes in book income. Guenther and Jones (2006) also offer an explanation for why the results in Lev and Thiagarajan (1993), which suggest that changes in effective tax rates are negatively related to current returns and future book income, appear to be caused by the particular effective tax rate measure selected.

Since the *ATE* plus *TCC* equals book income, equation (A5) can be restated as follows.

$$BI_{q+1} = \gamma_0 + \gamma_1\left(BI_q - TCC_q\right) + \gamma_2 TCC_q + \varepsilon = \gamma_0 + \gamma_1 BI_q + \left(\gamma_2 - \gamma_1\right)TCC_q + \varepsilon \qquad (A6)$$

That is, the coefficient on *TCC* flips sign from equation (A4) to equation (A6), since the magnitude of γ_1 in equation (A4) is greater than the magnitude of γ_2. As a result, the coefficient on *TCC* is negative in equation (A6) which includes a control for the level of book income. This implies that an increase in effective tax rates (represented by a negative value of *TCC*) is good news, since it has a positive impact on future book income.

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Table 1
Descriptive statistics

Panel A: Univariate statistics

Variable[a]	N[b]	Mean	Stdev	Min	Q1	Median	Q3	Max
RET_{q+1}	572379	0.039	0.333	-0.993	-0.114	0.011	0.147	17.737
ΔT	572379	0.001	0.012	-0.078	-0.001	0.000	0.003	0.083
ΔBI	570843	0.003	0.062	-1.197	-0.006	0.001	0.010	0.552
MV	553029	1115.57	4429.47	0.34	23.89	97.37	477.35	70702.4
BM	541047	0.771	0.668	0.000	0.344	0.605	0.983	8.267
RET_6	569250	0.069	0.421	-0.901	-0.155	0.025	0.222	8.182
ETR	403839	0.305	0.227	-2.906	0.250	0.360	0.408	1.765
TCC	354439	-0.000	0.006	-0.076	-0.001	0.000	0.001	0.056
TI/BI	404664	0.777	1.216	-15.371	0.305	0.915	1.166	20.986
Foreign	115186	0.301	0.277	0.000	0.066	0.213	0.484	0.989
CFO/TA	350883	0.005	0.069	-0.352	-0.016	0.014	0.038	0.266
CFO/P	345215	0.016	0.121	-1.083	-0.014	0.014	0.042	1.896

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	ΔBI	MV	BM	RET_6	TCC
RET_{q+1}	1	0.024**	0.032**	-0.009**	0.059**	-0.000	-0.003
ΔT	0.047**	1	0.228**	0.014**	-0.061**	0.136**	-0.515**
ΔBI	0.044**	0.514**	1	-0.001	-0.038**	0.118**	0.117**
MV	0.056**	0.080**	0.042**	1	-0.128**	0.017**	0.013**
BM	0.071**	-0.123**	-0.147**	-0.312**	1	-0.125**	0.023**
RET_6	0.040**	0.203**	0.219**	0.158**	-0.108**	1	-0.018**
TCC	-0.005	-0.404**	0.100**	0.021**	-0.004	-0.014**	1

** Significant at the 1% level.

Panel C: First-order autocorrelation in Book Income surprise (Δ*BI*) and Tax Expense surprise (Δ*T*).

	Pearson	Spearman
ΔT	0.294	0.378
ΔBI	0.303	0.407

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

ΔT deciles	RET_{q+1}	Mean decile ranking for											
		ΔBI_q	*MV*	*BM*	*RET_6*	ΔT_{q+1}	ΔBI_{q+1}	*ETR*	*TCC*	*TI/BI*	*Foreign*	*CFO/TA*	*CFO/P*
	1	2	3	4	5	6	7	8	9	10	11	12	13
D1	2.31%	2.67	4.81	5.71	4.25	3.85	3.93	5.02	7.41	4.99	5.53	5.52	5.42
D2	2.86%	3.56	5.56	6.08	4.81	4.32	4.49	5.43	6.97	5.47	5.74	5.72	5.80
D3	3.61%	4.39	5.93	6.14	5.19	4.71	4.88	5.22	6.70	5.27	5.77	5.58	5.79
D4	3.56%	4.98	5.71	6.03	5.37	4.94	5.15	4.38	6.20	4.57	5.46	5.07	5.41
D5	4.10%	5.48	4.57	5.30	5.17	5.09	5.54	2.35	5.50	2.84	4.23	3.95	4.47
D6	4.60%	5.40	6.10	6.03	5.75	5.49	5.39	4.83	5.31	5.06	5.49	5.33	5.68
D7	4.95%	5.99	6.32	5.70	5.97	5.94	5.72	5.80	5.03	5.80	5.66	5.82	5.93
D8	5.20%	6.68	6.28	5.27	6.18	6.46	6.13	6.33	4.69	6.23	5.62	6.23	6.01
D9	5.69%	7.41	5.87	4.99	6.39	6.97	6.54	6.61	4.28	6.46	5.48	6.46	5.97
D10	6.20%	8.09	5.21	4.63	6.40	7.38	6.87	6.89	3.63	6.60	5.17	6.54	5.83
D10 – D1	3.89% (10.89)												

Notes

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

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.

ΔBI book income surprise, measured as book income per share (#8/(#17*#15)) in quarter q minus book income 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.

Foreign The ratio of the absolute value of "pretax income-foreign" (#273) to the sum of that amount and the absolute value of "pretax income-domestic" (#272). Data are from Compustat annual files.

ETR Effective tax rate defined as total tax expense (#6) divided by pre-tax income (#23) (requiring pre-tax income to be positive).

TCC Tax change component of earnings as defined in Schmidt (2006), using quarterly data. It equals $(ETR_{q-4} - ETR_q)$*$PTEPS_q/TAPS_{q-4}$, where *ETR* is effective tax rate, *PTEPS* is pretax income per share (#23/(#17*#15)), and *TAPS* is total assets per share.

TI/BI The ratio of tax income to book income (#8) as defined in Lev and Nissim (2004) using quarterly data (requiring book income greater than zero), where tax income equals total tax expense (data6) minus deferred tax expense (data35), if any, multiplied by $(1-\tau)/\tau$. 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.

CFO/TA Cash flow from operations (#108) scaled by total assets at the end of prior quarter.

CFO/P Cash flow from operations scaled by the market value of equity (*MV*) from prior quarter-end.

b. The sample includes all firm-quarter observations with no missing future returns and changes in tax expense. There are 572,379 firm-quarter observations from 1977:I to 2005:IV. Each calendar quarter, all variables except RET_{q+1} are Winsorized at 1% and 99%.

Table 2
Regressions of future returns on tax expense surprise and control variables

	Based on actual values of regressors					Based on decile rankings of regressors				
	1	2	3	4	5	6	7	8	9	10
Intercept	0.042 (4.45)	0.065 (4.64)	0.064 (4.60)	0.068 (6.15)	0.070 (6.24)	0.024 (2.44)	0.010 (0.59)	0.001 (0.08)	0.017 (1.33)	0.017 (1.33)
ΔT	0.882 (10.79)	0.890 (11.77)	0.661 (8.56)	0.918 (9.28)	0.564 (6.77)	0.037 (12.04)	0.038 (14.77)	0.019 (7.70)	0.016 (6.02)	0.014 (5.23)
ΔBI			0.206 (5.97)	0.146 (2.66)	0.148 (2.99)			0.036 (12.05)	0.032 (7.72)	0.031 (5.99)
TCC				0.573 (4.35)					-0.001 (-0.35)	
TI/BI					0.002 (2.51)					0.005 (2.01)
Log(MV)		-0.004 (-2.11)	-0.003 (-2.01)	-0.004 (-3.09)	-0.004 (-3.35)		-0.022 (-1.99)	-0.020 (-1.84)	-0.024 (-2.98)	-0.027 (3.25)
Log(BM)		0.012 (3.92)	0.013 (4.06)	0.009 (2.91)	0.009 (3.18)		0.032 (3.60)	0.035 (3.95)	0.025 (3.30)	0.025 (3.39)
RET_6		0.018 (2.76)	0.016 (2.43)	0.019 (3.39)	0.020 (3.80)		0.016 (2.15)	0.012 (1.57)	0.012 (2.05)	0.014 (2.33)
Adj. R^2	0.003	0.033	0.034	0.035	0.035	0.004	0.035	0.036	0.036	0.037

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. ΔBI is book income surprise. *TCC* is the quarterly version of Schmidt's (2006) measure, and it equals ($ETR_{q-4} - ETR_q$)*$PTEPS_q/TAPS_{q-4}$, where *ETR* is effect tax rate, *PTEPS* is pretax income per share, and *TAPS* is total assets per share. *TI/BI* is the quarterly version of Lev and Nissim's (2004) measure and defined as the ratio of tax income to book income (we set deferred tax expense to be zero if missing). *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. In regressions using decile rankings (Models 6—10), actual values of explanatory variables are substituted by decile rankings, converted to a [0,1] scale, where decile rankings are obtained by ranking observations each calendar quarter and assigning them to 10 equal groups for each variable. The sample period includes 116 quarters from 1977:I to 2005:IV. The coefficient estimates are the average of quarterly estimates over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 3
Future returns for different surprise deciles based on tax expense and book income

	Ten portfolios sorted by ΔT	Ten portfolios sorted by ΔBI	Ten portfolios sorted by residual ΔT	Ten portfolios sorted by residual ΔT, estimated separately by 2-digit SIC industry
	1	2	3	4
D1	2.31%	1.35%	2.91%	2.92%
D2	2.86%	2.17%	3.23%	3.49%
D3	3.61%	3.17%	3.92%	4.14%
D4	3.56%	3.72%	4.20%	4.10%
D5	4.10%	4.63%	4.14%	4.22%
D6	4.60%	4.84%	4.23%	4.47%
D7	4.95%	4.87%	4.48%	4.28%
D8	5.20%	5.47%	4.64%	4.53%
D9	5.69%	6.11%	4.93%	4.78%
D10	6.20%	5.85%	5.48%	5.25%
D10 – D1	3.89% (10.89)	4.51% (13.14)	2.58% (7.94)	2.33% (7.76)

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), book income surprise (ΔBI) , and residual tax expense surprise after controlling for book income surprise (residual ΔT). Residual tax expense surprise is calculated as the residual from regressing ΔT on ΔBI in each quarter (see equation (2)). For the third (fourth) column, we estimate these regressions across all firms (separately for each 2-digit SIC industry group) when calculating residual ΔT. See Table 1 for detailed definitions. Each calendar quarter, we sort firms into ten deciles based on ΔT, ΔBI, or residual ΔT, and portfolio returns are average stock returns of firms in each decile. The sample period includes 116 quarters from 1977:I to 2005:IV. The portfolio returns are the average of quarterly mean returns over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 4
Residual tax expense surprise and future stock returns, with risk controls based on a four-factor model

	Intercept	$R_{Mt} - R_{ft}$	*SMB*	*HML*	*MOM*	Adj. R^2
D1	-0.147 (-1.05)	0.986 (28.69)	1.054 (23.80)	0.080 (1.52)	-0.299 (-9.57)	0.859
D2	-0.020 (-0.17)	0.973 (34.54)	0.910 (25.06)	0.170 (3.96)	-0.261 (-10.18)	0.884
D3	0.193 (1.73)	0.953 (34.62)	0.901 (25.41)	0.175 (4.16)	-0.259 (-10.35)	0.885
D4	0.278 (2.98)	0.929 (40.49)	0.782 (26.44)	0.255 (7.29)	-0.219 (-10.50)	0.902
D5	0.156 (1.80)	0.896 (41.97)	0.618 (22.49)	0.454 (13.93)	-0.155 (-7.96)	0.887
D6	0.219 (2.50)	0.895 (41.52)	0.652 (23.46)	0.305 (9.27)	-0.130 (-6.64)	0.894
D7	0.280 (3.43)	0.954 (47.47)	0.712 (27.51)	0.189 (6.16)	-0.143 (-7.81)	0.924
D8	0.324 (3.73)	0.978 (45.77)	0.786 (28.55)	0.149 (4.57)	-0.151 (-7.74)	0.923
D9	0.398 (3.95)	1.029 (41.54)	0.859 (26.92)	0.126 (3.34)	-0.126 (-5.59)	0.912
D10	0.584 (4.60)	1.066 (34.12)	0.978 (24.28)	0.003 (0.07)	-0.179 (-6.30)	0.888
D10 – D1	0.732 (7.47)	0.080 (3.33)	-0.076 (-2.45)	-0.076 (-2.08)	0.120 (5.47)	0.138

The table reports the coefficient estimates of the four-factor model for monthly returns for each of the ten residual tax expense surprise (residual ΔT) deciles. Residual ΔT is calculated as the residual from regressing tax expense surprise (ΔT) on book income surprise (ΔBI) in each quarter. The four factor model estimated is:

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

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. Tax expense and book income surprises 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. See Table 1 for detailed definitions. Each month, we sort firms into ten deciles based on residual ΔT, and portfolio returns are average stock returns of firms in each decile. Portfolios with fewer than ten stocks are eliminated. The sample period includes 116 quarters from 1977:I to 2005:IV; White heteroskedasticity-adjusted t-statistics are in parentheses.

Table 5
The implications of tax expense surprise for future book income and future stock returns

Panel A: Regressions of future book income surprises

	Dependent variable =			
	ΔBI_{q+1}	ΔBI_{q+2}	ΔBI_{q+3}	ΔBI_{q+4}
	1	2	3	4
Intercept	0.002 (6.40)	0.002 (6.44)	0.003 (7.51)	0.004 (9.47)
ΔT	0.226 (21.33)	0.184 (18.60)	0.088 (8.04)	0.154 (11.04)
ΔBI	0.290 (37.19)	0.159 (25.87)	0.053 (10.11)	-0.285 (-32.00)
Adj. R^2	0.115	0.041	0.008	0.077

Panel B: Regression of future three-month stock returns

	Dependent variable =			
	RET_{q+1}	RET_{q+2}	RET_{q+3}	RET_{q+4}
	1	2	3	4
Intercept	0.064 (4.60)	0.066 (4.77)	0.066 (4.80)	0.063 (4.52)
ΔT	0.661 (8.56)	0.268 (3.80)	-0.025 (-0.37)	0.079 (1.30)
ΔBI	0.206 (5.97)	0.108 (4.16)	0.105 (3.33)	-0.011 (-0.29)
Log(MV)	-0.003 (-2.01)	-0.003 (-1.99)	-0.003 (-1.92)	-0.003 (-1.49)
Log(BM)	0.013 (4.06)	0.013 (4.32)	0.012 (4.29)	0.011 (3.83)
RET_6	0.016 (2.43)	0.029 (4.57)	0.008 (1.24)	-0.010 (-1.72)
Adj. R^2	0.034	0.032	0.030	0.028

Panels A and B contain regressions of future book income surprises (ΔBI_{q+i}) and future three-month stock returns (RET_{q+i}), respectively. RET_{q+1} (RET_{q+2}, RET_{q+3}, RET_{q+4}) is three-month future stock returns measured from the 4th (7th, 10th, 13th, respectively) month after a firm's fiscal quarter end; ΔT is tax expense surprise; ΔBI is book income surprise; 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 116 quarters from 1977:I to 2005:IV. The coefficient estimates are the average of quarterly estimates over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 6
Implications of tax expense surprise for future stock returns, controlling for future book income and income before tax surprises

Panel A: Identifying the role of the second channel (tax expense surprise predicts a future fundamental other than future book income surprise) by controlling for future book income surprise (the first channel). Dependent variable is future stock returns (RET_{q+1}).

	1	2	3
Intercept	0.039 (4.24)	0.061 (4.35)	0.060 (4.33)
ΔT_q	0.221 (3.09)	0.330 (4.74)	0.408 (5.47)
ΔBI_q			-0.089 (-2.73)
ΔBI_{q+1}	0.730 (9.88)	0.770 (10.59)	0.786 (10.84)
ΔBI_{q+2}	0.0.732 (13.09)	0.776 (14.28)	0.783 (14.34)
Log(MV)		-0.003 (-1.58)	-0.003 (-1.54)
Log(BM)		0.016 (5.22)	0.016 (5.21)
RET_6		-0.002 (-0.24)	-0.001 (-0.13)
Adj. R^2	0.026	0.058	0.059

Panel B: Documenting the ability of tax expense surprise to predict future tax expense surprise.

	Dependent variable =			
	ΔT_{q+1}	ΔT_{q+2}	ΔT_{q+3}	ΔT_{q+4}
	1	2	3	4
Intercept	0.000 (6.78)	0.001 (6.56)	0.001 (7.21)	0.001 (9.74)
ΔT	0.302 (37.78)	0.174 (30.31)	0.062 (13.03)	-0.272 (-46.27)
ΔBI	0.013 (7.02)	0.005 (3.49)	-0.002 (-1.74)	0.002 (1.78)
Adj. R^2	0.111	0.036	0.006	0.087

Panel C: Identifying a specific route for the second channel, by including future tax expense surprise. Dependent variable is future stock returns (RET_{q+1}).

	1	2	3
Intercept	0.038 (4.13)	0.060 (4.30)	0.059 (4.27)
ΔT_q	-0.308 (-4.57)	-0.171 (-2.67)	-0.153 (-2.15)
ΔBI_q			-0.029 (-0.84)
ΔBI_{q+1}	0.573 (9.57)	0.612 (10.20)	0.614 (10.41)
ΔBI_{q+2}	0.520 (12.37)	0.567 (13.32)	0.573 (13.26)
ΔT_{q+1}	1.220 (17.21)	1.257 (17.77)	1.261 (17.90)
ΔT_{q+2}	1.806 (20.66)	1.820 (19.022)	1.814 (18.88)
Log(MV)		-0.003 (-1.54)	-0.003 (-1.50)
Log(BM)		0.016 (5.23)	0.016 (5.22)
RET_6		-0.009 (-1.33)	-0.008 (-1.28)
Adj. R^2	0.035	0.067	0.068

This table reports regressions of future three-month stock returns (in Panels A and C), controlling for current and future book income surprises as well as changes in future tax expense. RET_{q+1} is three-month future stock returns measured from the 4th month after a firm's fiscal quarter end; ΔBI_{q+i} and ΔT_{q+i} are the book income and tax expense surprise in quarter $q+i$, where i equals 0, 1, or 2. *MV* is the market value of equity at the end of fiscal quarter; and *BM* is the book-to-Market ratio; *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 116 quarters from 1977:I to 2005:IV. The coefficient estimates are the average of quarterly estimates over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 7
Robustness check: relation between tax expense surprise and future returns with additional control variables

	Based on actual values of regressors				Based on decile rankings of regressors			
	1	2	3	4	5	6	7	8
Intercept	0.077 (6.89)	0.068 (3.62)	0.052 (3.10)	0.069 (6.08)	0.025 (1.95)	-0.007 (-0.26)	0.012 (0.58)	0.016 (1.27)
ΔT	0.534 (5.21)	0.544 (5.79)	0.358 (3.21)	0.559 (6.64)	0.013 (3.70)	0.013 (4.23)	0.008 (2.05)	0.013 (4.84)
ΔBI	0.154 (2.22)	0.129 (5.00)	0.111 (2.92)	0.154 (3.15)	0.026 (4.95)	0.035 (8.59)	0.021 (6.26)	0.033 (6.44)
TI/BI(2)	0.002 (2.22)				0.014 (4.18)			
CFO/TA		0.174 (4.68)				0.041 (5.21)		
Foreign			0.003 (0.82)				0.005 (1.60)	
ETR				0.008 (2.11)				0.006 (2.22)
Log(MV)	-0.005 (-3.96)	-0.005 (-2.28)	-0.002 (-1.14)	-0.004 (-3.33)	-0.034 (-3.99)	-0.034 (-2.23)	-0.018 (-1.41)	-0.027 (-3.22)
Log(BM)	0.005 (1.90)	0.010 (2.61)	0.010 (2.59)	0.010 (3.39)	0.015 (1.94)	0.032 (2.58)	0.026 (2.37)	0.026 (3.50)
RET_6	0.026 (3.91)	0.007 (0.86)	0.012 (1.40)	0.020 (3.75)	0.019 (2.93)	0.007 (0.68)	0.006 (0.68)	0.013 (2.27)
Adj. R^2	0.040	0.033	0.032	0.035	0.042	0.035	0.033	0.037
# of observations	115,751	332,958	108,896	386,833	115,751	332,958	108,896	386,833

This table reports regressions of three-month future stock returns (RET_{q+1}) on changes in tax expense (ΔT) and control variables. *ΔBI* is book income surprise; *TI/BI(2)* is the ratio of tax income to book income as defined in Lev and Nissim (2004) using quarterly data when we treat missing deferred tax expense as missing. *CFO/TA* is cash flow from operations scaled by total assets at the end of prior quarter. *Foreign* is the ratio of the absolute value of "pretax income-foreign" (#273) to the sum of that amount and the absolute value of "pretax income-domestic" (#272). *ETR* is the effective tax rate defined as total tax expense (#6) divided by pre-tax income (#23) (requiring pre-tax income to be positive). *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. In regressions using decile rankings, actual values of explanatory variables are substituted by decile rankings, converted to a [0,1] scale, where decile rankings are obtained by quarterly ranking observations and assigning them in equal numbers to 10 portfolios for each variable. The sample period includes 116 quarters from 1977:I to 2005:IV. The coefficient estimates are the average of quarterly estimates over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 8
Robustness check: the effect of late 10-Q/K filing dates

Deciles based on tax expense surprise	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	3.25%	2.94%	3.28%	1.95%	2.53%
D2	3.01%	3.05%	3.10%	2.04%	2.77%
D3	3.76%	4.32%	3.45%	3.36%	4.11%
D4	3.73%	3.11%	2.80%	2.78%	4.79%
D5	4.55%	3.71%	6.03%	6.78%	4.85%
D6	4.50%	5.08%	3.96%	3.97%	4.74%
D7	4.80%	5.74%	4.58%	4.85%	4.15%
D8	5.10%	4.82%	5.24%	5.35%	5.16%
D9	5.02%	5.35%	4.89%	6.08%	5.42%
D10	5.13%	5.49%	5.07%	6.83%	6.41%
D10 – D1	1.88% (3.01)	2.54% (3.50)	1.78% (2.54)	4.88% (8.04)	3.87% (6.04)
Analysis based on splitting samples into 3 groups, based on tax expense surprise					
Bottom 30%	3.34%	3.43%	3.28%	2.44%	3.14%
Middle 40%	4.33%	4.09%	4.52%	4.94%	4.74%
Top 30%	5.08%	5.42%	4.98%	6.45%	5.92%
Top - Bottom	1.74% (3.75)	1.99% (3.80)	1.70% (3.28)	4.01% (9.10)	2.78% (5.62)

Out of 255,071 firm-quarter observations from 1996 to 2005 (referred to as "Full sample"), we identify a subset of 174,638 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, 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. Portfolios with fewer than ten stocks are eliminated. The sample period includes 40 quarters from 1996:I to 2005:IV. The portfolio returns are the average of quarterly mean returns over 40 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 three groups based on tax expense surprise (as opposed to deciles).

Table 9
Robustness check: Portfolio analysis by firm size

	Ten portfolios sorted by ΔT	Ten portfolios sorted by ΔBI	Ten portfolios sorted by residual ΔT
	Small firms		
D1	2.33%	2.00%	3.37%
D10	8.14%	6.96%	7.23%
D10 – D1	5.81% (12.16)	4.96% (9.09)	3.86% (8.05)
	Medium firms		
D1	1.82%	0.43%	2.43%
D10	6.01%	4.80%	5.05%
D10 – D1	4.18% (9.51)	4.37% (9.23)	2.62% (6.22)
	Large firms		
D1	3.07%	2.17%	2.99%
D10	4.36%	3.80%	4.15%
D10 – D1	1.29% (2.79)	1.64% (3.53)	1.16% (2.84)

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*), book income surprise (*ΔBI*) , and residual changes in tax expense (residual *ΔT*), where residual *ΔT* is the residual from regressing *ΔT* on *ΔBI* in each quarter. See Table 1 for detailed definitions. 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*, *ΔBI*, and residual *ΔT*, and portfolio returns are average stock returns of firms in each decile. Portfolios with fewer than ten stocks are eliminated. The sample period includes 116 quarters from 1977:I to 2005:IV. The portfolio returns are the average of quarterly mean returns over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Table 10
Robustness check: relation between tax expense surprise and returns around future earnings announcements

	Based on actual values of regressors Dependent variable =				Based on decile rankings of regressors Dependent variable =			
	1	2	3	4	5	6	7	8
	$ARET_{q+1}$	$ARET_{q+2}$	$ARET_{q+3}$	$ARET_{q+4}$	$ARET_{q+1}$	$ARET_{q+2}$	$ARET_{q+3}$	$ARET_{q+4}$
Intercept	0.008 (8.06)	0.008 (9.07)	0.008 (8.77)	0.008 (8.92)	-0.007 (-5.76)	-0.003 (-3.10)	0.001 (1.28)	0.006 (5.24)
ΔT	0.141 (7.13)	0.057 (2.95)	-0.027 (-1.59)	-0.037 (-1.79)	0.005 (8.28)	0.003 (5.18)	0.000 (0.75)	0.001 (2.18)
ΔBI	0.011 (1.24)	0.020 (2.31)	0.006 (0.64)	-0.062 (-5.52)	0.006 (7.91)	0.003 (3.37)	-0.001 (-1.27)	-0.008 (-10.41)
Log(MV)	-0.001 (-6.29)	-0.001 (-6.66)	-0.001 (-6.12)	-0.001 (-6.08)	-0.006 (-6.42)	-0.006 (-6.70)	-0.006 (-5.83)	-0.005 (-5.73)
Log(BM)	0.003 (8.82)	0.003 (9.40)	0.003 (9.69)	0.002 (7.79)	0.007 (9.00)	0.007 (9.09)	0.007 (8.61)	0.005 (6.84)
RET_6	0.007 (8.32)	0.006 (6.98)	0.001 (0.96)	-0.002 (-2.05)	0.006 (6.74)	0.005 (6.36)	0.001 (1.72)	-0.001 (-1.27)
Adj. R^2	0.006	0.005	0.004	0.004	0.007	0.005	0.003	0.004

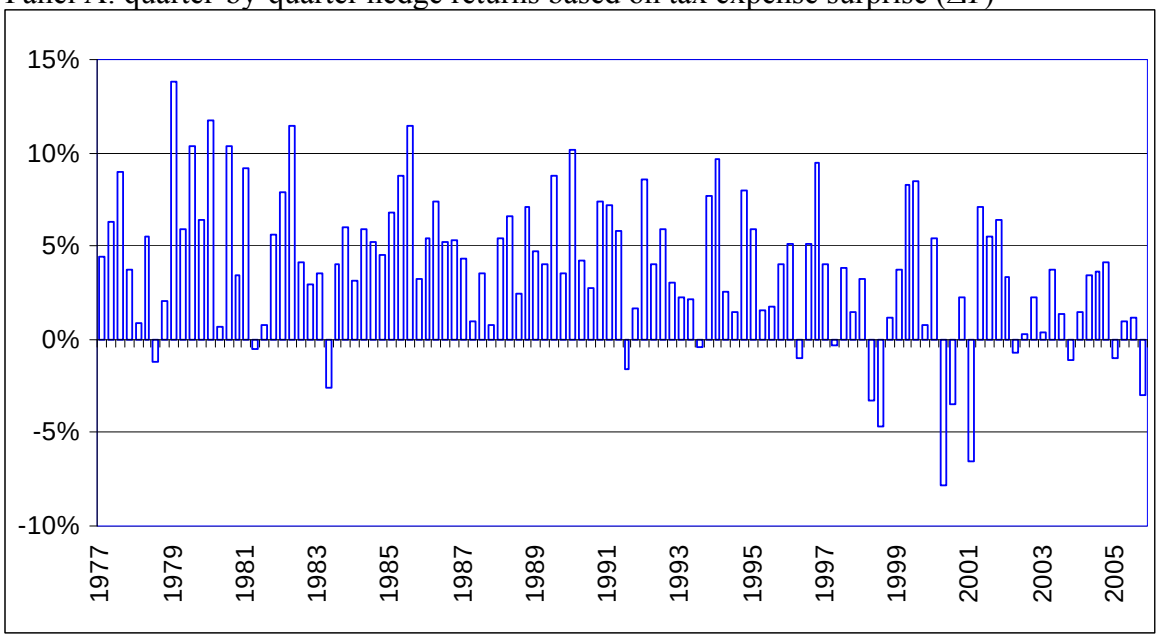
Earnings announcement returns (*ARET*), measured as raw returns minus market value-weighted returns over the three-day [-1, 1] period, where day 0 is the earnings announcement date. $ARET_{q+1}$, $ARET_{q+2}$, $ARET_{q+3}$, $ARET_{q+4}$ are earnings announcement returns for quarter q+1, q+2, q+3, and q+4, respectively; *ΔT* is tax expense surprise; *ΔBI* is book income surprise; *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. In regressions using decile rankings, actual values of explanatory variables are replaced by decile rankings, converted to a [0,1] scale, where decile rankings are obtained by ranking observations each quarter and assigning them to 10 equal portfolios for each variable. The sample period includes 116 quarters from 1977:I to 2005:IV. The coefficient estimates are the average of quarterly estimates over 116 quarters; t-statistics in parentheses are Fama-MacBeth t-statistics.

Figure 1

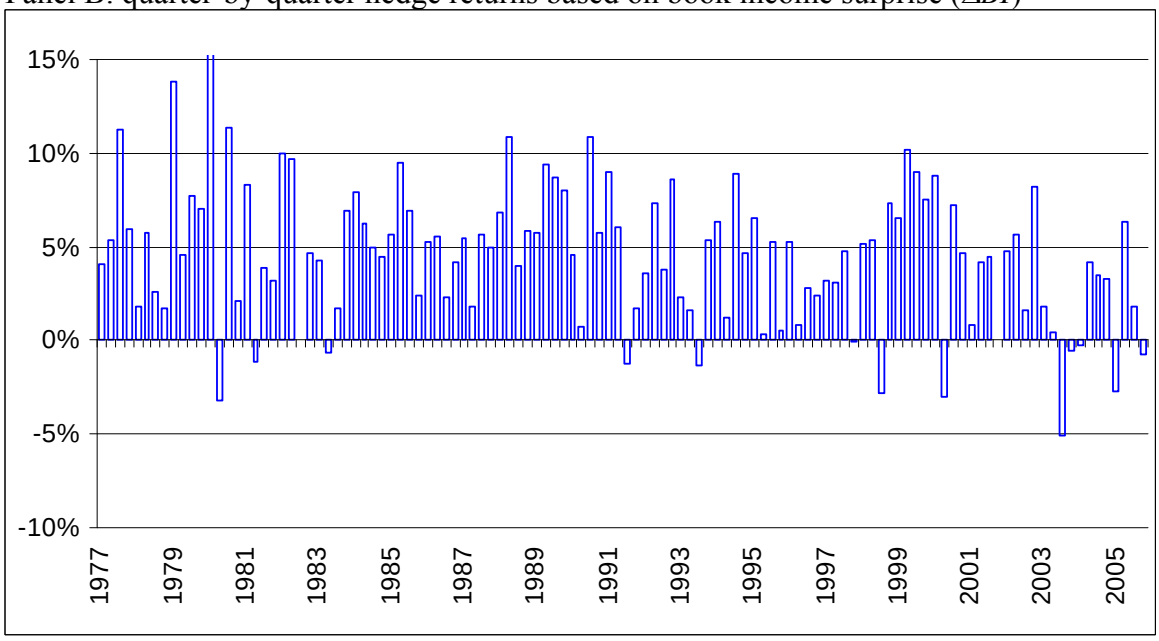
Time-series of hedge portfolio returns (based on extreme surprise deciles, D10 less D1)

Each calendar quarter, we sort firms into ten deciles based on ΔT, ΔBI, and residual ΔT, and report the time-series of returns to hedge portfolios that have a long position in D10 stocks and a short position in D1 stocks. Returns (RET_{q+1}) are three-month future stock returns measured from the 4th month after a firm's fiscal quarter end. $FRET_{q+1}$ in Panel D is the three-month stock returns starting from the fourth day after the 10-Q/K filing date. Portfolio returns are average stock returns of firms in each decile. Portfolios with fewer than ten stocks are eliminated. The sample period includes 116 quarters from 1977:I to 2005:IV. For Panel D, the sample period begins in 1996:I, when 10-Q/K filing dates became available on EDGAR.

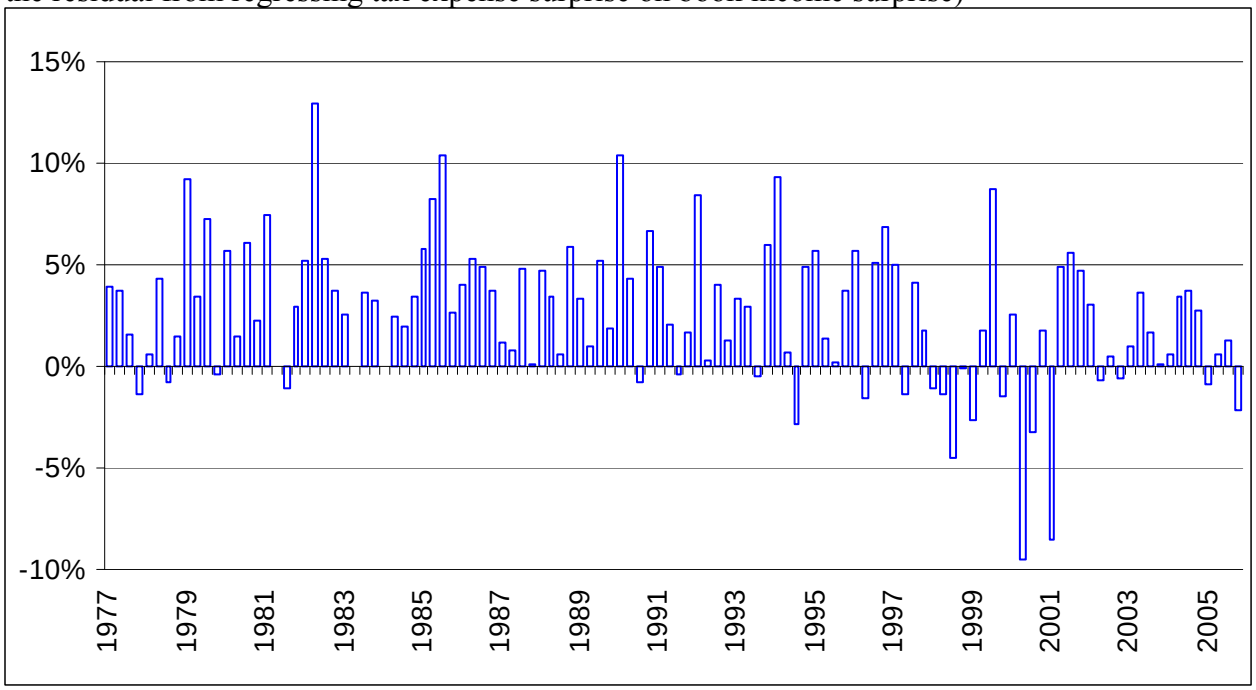
Panel A: quarter-by-quarter hedge returns based on tax expense surprise (ΔT)



Panel B: quarter-by-quarter hedge returns based on book income surprise (ΔBI)



Panel C: quarter-by-quarter hedge returns based on residual tax expense surprise (residual ΔT = the residual from regressing tax expense surprise on book income surprise)



Panel D: quarter-by-quarter hedge returns based on $FRET_{q+1}$, compared to those based on RET_{q+1}, for residual tax expense surprise (residual ΔT) for the 1996-2005 subperiod with EDGAR filing dates.