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The Persistence, Forecasting, and Valuation Implications of the Tax Change Component of Earnings

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ABSTRACT: I examine whether earnings generated by changes in effective tax rates (the tax change component) persist and aid in forecasting future earnings. In addition, this study investigates to what extent investors incorporate the forecasting implications of the tax change component of earnings into stock prices. I find that there is a positive, significant association between the tax change component of earnings and future earnings. I use the interim reporting requirements of APB No. 28 (APB 1973) and FASB Interpretation No. 18 (FASB 1977) to further decompose the tax change component into an initial and a revised portion based on the first quarter estimate of the annual effective tax rates (ETR). I find that the initial tax change component is more persistent for future earnings than the revised tax change component. These results are consistent with my hypotheses that the initial and revised tax change components have differential persistence and forecasting implications, and dispute the broad notion advanced by prior literature that ETR-related earnings changes are transitory. Results from market tests indicate that the market underweights the forecasting implications of the tax change component and the mispricing appears to be driven by the transitory nature of the revised tax change component.

Keywords: *market efficiency; effective tax rates; earnings persistence; valuation.*

JEL Classification: *G14; H25; M41.*

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I. INTRODUCTION

This study investigates whether earnings generated by changes in the effective tax rate (hereafter, the tax change component of earnings) are persistent for future earnings.[1] In addition, this study investigates to what extent investors incorporate the forecasting implications of the tax change component of earnings into stock prices. The tax change component of earnings is likely to have implications for earnings persistence for a number of reasons. First, income taxes are of such magnitude that small changes in the effective tax rate (ETR) can lead to substantial changes in earnings. Second, corporate managers are placing greater emphasis on ETRs as in-house tax departments are increasingly viewed as profit centers (U.S. Department of the Treasury 1999; McGill and Outslay 2004).[2] Finally, recent academic literature, as well as the financial press, has identified ETR manipulation as an earnings management tool. Dhaliwal et al. (2004) and Comprix et al. (2006) find that firms lower ETRs when earnings absent tax management fall short of analyst forecasts. Myers et al. (2005) indicate that managers use ETRs to smooth reported EPS.

The tax change component of earnings captures the aggregate effect of ETR reconciliation items, including permanent book-tax differences. However, ETR reconciliation items increasingly reflect the effects of strategic tax-planning/tax-optimization activities, which are designed to provide sustainable long-term benefits to earnings. For example, management of Tyco urged shareholders to reject a proposal to move its parent company back to the U.S. from Bermuda, stating that the impact on the company's current and future earnings (from an estimated seven-percentage-point increase in its current and future ETR) could have caused a $4 to $5 billion decrease in market capitalization (McGill and Outslay 2004). Observers speculate that items like these are a major reason for the increase in book-tax differences in the 1990s (Reason 2002).

The collapse of Enron, the rise of global tax optimization (planning), and the renewed use of corporate tax shelters has resulted in increased scrutiny of book-tax differences and their implications for earnings quality and financial performance. My study contributes to the growing literature that examines the persistence and pricing implications of book-tax differences by directly examining how taxes contribute to earnings prediction, which is consistent with the view that one task of accounting research is to discover what information in the financial statements projects future earnings (Penman 1992).[3] Understanding the differential persistence of the tax change component and its forecasting implications should aid market participants in profitability analysis and in income forecasting.

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[1] A subtle difference between this study and studies that examine taxes as one of several fundamental signals used in financial statement analysis (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997, 1998; Amir et al.2000) is how the effective tax rate (ETR) and the tax change component is defined. I define the ETR as total tax expense divided by pretax income and the tax change component as pretax income multiplied by the change in the ETR. Lev and Thiagarajan (1993) use current tax expense only in the numerator of the ETR and Abarbanell and Bushee (1997, 1998) and Amir et al. (2000) use pretax income adjusted for amortization of intangibles in the denominator of the ETR. Additionally, Abarbanell and Bushee (1997, 1998) and Amir et al. (2000) interact the change in ETR with the change in after-tax EPS in order to determine the earnings effect of ETR changes, which differs from my definition of the tax change component.

[2] Beginning in 1995, Enron's tax division used a series of structured transactions to increase company profits. The deals were intended to create $1.9 billion in earnings over 30 years (Witt and Behr 2002).

[3] This approach differs from that of Guenther and Jones (2003), who study the relationship between contemporaneous stock returns and annual ETR-related earnings changes in order to determine whether annual ETR-related earnings changes are value-relevant. An important assumption in Guenther and Jones (2003) is that the value-relevance of ETR-related earnings is indicative of future earnings or growth opportunities of the firm. Guenther and Jones (2003) do not test whether ETR-related earnings changes are associated with realized future earnings, which is the primary focus of this paper.

Prior literature either ignores or aggregates taxes with other earnings components (Sloan 1996; Hribar 2001; Nissim and Penman 2001; Barth et al. 2004) or examines the implications of information contained in temporary book-tax differences (deferred tax expense) for the quality of pretax earnings (Hanlon 2005). An additional branch of research examines the informativeness of estimated taxable income to capital markets (Shevlin 2002; Hanlon et al. 2005; Lev and Nissim 2004).

In contrast to these studies, my decomposition of earnings treats taxes like any other earnings component (i.e., cash flows, changes in accounts receivable, changes in inventory, etc.), which allows me to directly test a maintained hypothesis that earnings generated by ETR changes are transitory or attempts at aggressive accounting by management.

I find that there is a positive, significant association between the tax change component of earnings and future earnings, which disputes the broad notion advanced by prior literature (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997, 1998; Amir et al. 2000) that ETR-related earnings changes are completely transitory. In contrast to these earlier studies, as well as concurrent research by Guenther and Jones (2003), I use the interim reporting requirements of APB No. 28 (APB 1973) and FASB Interpretation No. 18 (FASB 1977) to further decompose the tax change component into an initial and a revised portion based on the first quarter estimate of the annual ETR. I find that the initial tax change component is more persistent for future earnings than the revised tax change component.

This study also complements concurrent research that suggests tax-related earnings information is priced by the market (Hanlon 2005; Gleason and Mills 2004; Guenther and Jones 2003; Lev and Nissim 2004) by directly testing whether investors appropriately incorporate the implications of ETR-related earnings changes for future earnings into market prices.

Results from market tests indicate that investors underweight the persistence of the tax change component and the mispricing appears to be driven by the transitory nature of the revised tax change component. Supplemental tests confirm that the results obtained from the market tests are likely a result of mispricing rather than alternative explanations such as omitted risk factors or previously documented anomalies.

I organize the remainder of the paper as follows. Section II presents an overview of corporate income tax disclosures, emphasizing the issues surrounding the ETR reconciliation and how current reporting requirements affect my empirical proxies. Section III develops hypotheses. Section IV outlines the research design; Section V presents results and supplemental analyses. Section IV concludes.

II. CORPORATE INCOME TAX DISCLOSURES

Effective Tax Rates

Disclosure

Recent accounting standards provide guidance regarding ETR disclosures. Statement of Financial Accounting Standards (SFAS) No. 96 (FASB 1987, ¶28) and No. 109 (FASB 1992, ¶47), *Accounting for Income Taxes*, require companies to disclose a reconciliation of the amount of income tax expense that would result from applying the domestic federal statutory rate to pretax income from continuing operations to the reported amount of income tax expense attributable to continuing operations for the year. When a firm reconciles its

statutory rate to the ETR, it must report any item that results in a material difference between the statutory rate and the ETR.[4]

Reconciliation Adjustments

Permanent differences cause the ETR to deviate from the statutory rate. Permanent differences are caused by items that enter into pretax book income but never enter into taxable income and items that enter into taxable income but never into pretax book income.[5] Common examples of permanent differences include:

- *Items recognized in pretax book income but not in taxable income*: Interest on tax-exempt municipal bonds and life insurance proceeds on an officer of the corporation, qualified stock options accounted for using the fair value method, penalties and fines, key employee life insurance premiums, and most goodwill and in-process research and development (IPRD) in acquisitions.[6]
- *Items recognized in taxable income but not in pretax book income*: Percentage depletion in excess of cost depletion and the dividends-received deduction.

Additionally, certain items that are technically temporary differences have the same effect as a permanent difference because a deferred tax liability is not recognized for these items (SFAS No. 109 ¶31a–d). One example is the undistributed earnings of a foreign subsidiary consolidated for book purposes that management intends to reinvest indefinitely.[7]

Tax rate adjustments also cause the ETR to deviate from the statutory rate. Tax rate adjustments are special tax rates or tax credits that affect the statutory rate. Tax rate adjustments are not permanent or temporary differences as they do not affect pretax income or taxable income (Weber and Wheeler 1992) and include:

- Tax credits (e.g., the research and development credit or the foreign tax credit).
- Different tax rates on foreign income.
- Tax expense that includes both state and local income taxes, net of federal tax benefit.

Finally, the ETR reconciliation includes adjustments not only for the tax effects of pretax income from continuing operations, but also for the tax effects of other items attributable to continuing operations, including:

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[4] If no individual reconciling item amounts to more than 5 percent of the amount computed by multiplying the income before tax by the applicable statutory Federal income tax rate, and the total difference to be reconciled is less than 5 percent of such computed amount, then no reconciliation need be provided unless it would be significant in appraising the trend of earnings. Reconciling items that are individually less than 5 percent of income tax expense may be aggregated in the reconciliation (SEC Regulation S-X §210.4-08(h)(2)).

[5] Permanent differences are defined in ¶33 of APB No. 11. However, the term ''permanent difference'' is not used in SFAS No. 109. Instead, SFAS No. 109 (¶14) states that certain differences between the tax basis and accounting basis of assets and liabilities will not result in taxable or deductible amounts in future years, therefore no deferred tax liability or asset should be recognized.

[6] Until 1993, goodwill was always a permanent difference; it was amortized for book purposes for a period not to exceed 40 years and was not deductible on the tax return. After 1993, goodwill may be amortized over 15 years for tax purposes (IRC section 197) as long as the tax bases of the acquired firm's assets are stepped-up. A step-up occurs almost exclusively in subsidiary sales or acquisitions of conduits. In these cases, goodwill results in a temporary difference. Goodwill created through the acquisition of a freestanding C-corporation, where basis step-ups are rare, usually results in a permanent difference (Scholes et al. 2004). IPRD is written off immediately for financial reporting purposes. Similar to goodwill, IPRD is not tax deductible as long as no tax basis exists.

[7] Undistributed earnings of subsidiaries consolidated for financial reporting purposes are recognized in pretax book income currently whether such subsidiaries are foreign or domestic. These earnings would usually be recognized in taxable income when distributed, resulting in a temporary difference. However, if a foreign subsidiary intends to reinvest its undistributed earnings indefinitely, no deferred tax liability is recorded, which effectively treats the undistributed earnings as a permanent difference.

- deferred tax asset valuation allowance account adjustments;
- changes in tax laws or tax rates;
- changes in the tax status of an enterprise (e.g., from a partnership to a corporation); and
- tax loss carryforward benefits.

The tax change component of earnings reflects the aggregate effect of ETR reconciling items; therefore, the extent to which the tax change component of earnings persists and aids in forecasting future earnings provides an indication of how ETR reconciliation items can be used in financial statement analysis.

Interim Reporting Requirements

GAAP mandates that the quarterly reporting period be viewed as an integral part of the annual reporting period.[8] APB Opinion No. 28 (APB 1973), SFAS No. 3 (FASB 1974), and FASB Interpretation No. 18 (FASB 1977) require firms to estimate many annual operating expenses and then allocate these estimates to interim periods based on forecasted figures. As the fiscal year progresses, firms revise estimates and record estimation errors from earlier quarters (Rangan and Sloan 1998).

Income taxes are one type of expense that is subject to the interim reporting requirements. Firms compute quarterly tax expense by estimating the ETR that is expected to be applicable for the full fiscal year. The estimated annual ETR is then applied to the year-to-date ordinary income at the end of each interim period, defined as pretax income before extraordinary items, discontinued operations, and cumulative effects of changes in accounting principles (FASB Interpretation No. 18, 1977, ¶9), to compute the year-to-date tax expense. The year-to-date tax expense of the prior quarter is then subtracted from the year-to-date tax expense of the current quarter to arrive at the current quarter's tax expense. This procedure is illustrated in the following footnote from Hewlett-Packard's Q3 2000 10-Q:

> HP's effective tax rate was 23% for the first nine months of fiscal 2000, reflecting the tax rate expected for the full fiscal year. The tax rate was 21.3% in the third quarter of 2000 due to a reduction in the annual effective tax rate from 24% to 23%. In 1999, the full-year effective tax rate was 26%, and the rate was 26.5% in both the third quarter and first nine months of the year. The year-to-year decrease in HP's effective tax rate was primarily the result of changes in the mix of our pretax earnings in various tax jurisdictions throughout the world.

I use the interim reporting requirements to decompose the tax change component into an initial and revised portion based on the first quarter estimate of the annual ETR. This decomposition allows me to develop and test hypotheses regarding the differential persistence and forecasting implications of the tax change component of earnings.

III. RESEARCH QUESTIONS AND HYPOTHESES

The Persistence and Forecasting Implications of the Tax Change Component of Earnings

The first objective of my paper is to document whether the tax change component is persistent for future earnings. Variations of the tax change component have been studied

[8] The integral approach was selected over a discrete approach for interim reporting. Under the discrete approach, each interim quarter is viewed as a separate accounting period, therefore interim accruals and deferrals should reflect the same principles employed for annual reports. The discrete approach applies the same expense recognition principles to both interim and annual reports with no special interim accruals or deferrals allowed.

previously as part of a set of fundamental signals used by financial analysts to predict future performance (Lev and Thiagarajan 1993; Abarbanell and Bushee 1997, 1998). The underlying hypothesis in these papers is that analysts view earnings generated from ETR changes as transitory.[9] Abarbanell and Bushee (1997) find that ETR-related earnings changes are less persistent for future earnings changes and long-term earnings growth than aggregate earnings changes from 1983–1990, but do not directly test (or report) the extent to which ETR-related earnings changes are associated with future earnings changes. Despite this, Abarbanell and Bushee (1997) state that the ETR variable captures more than transitory effects, possibly unidentified risk factors or structural changes.

The view that earnings generated from ETR changes contain some transitory elements is reasonable because the ETR can be used for period-specific earnings management (i.e., beating analyst forecasts, avoiding a loss, or avoiding a decrease in earnings). Recent research examines earnings management through aggregate ETR changes (Comprix et al. 2006; Dhaliwal et al. 2004; Myers et al. 2005) and specific ETR reconciling items such as the DTVA (Miller and Skinner 1998; Visvanathan 1998; Bauman et al. 2001; Burgstahler et al. 2003; Frank and Rego 2003; Schrand and Wong 2003), permanently reinvested foreign earnings (Krull 2004), intangible assets (Nelson et al. 2003), and the tax cushion (Smith 2001; Gleason and Mills 2002; Nelson et al. 2003). The managed portion of earnings could be transitory (or less persistent), resulting in a lower coefficient on managed earnings in predicting future earnings, compared to the coefficient on unmanaged earnings (Xie 2001; Joos et al. 2003; Hanlon 2005).

However, some of the most prominent ETR reconciliation items, including foreign tax rate differentials and state taxes, likely reflect long-term (and therefore persistent) strategic tax-planning activities as well as contain forward-looking information that may shed light on the future prospects of the firm.[10] Mills et al. (1998) show that there is a positive relationship between investments in tax planning and long-term strategy indicators such as the presence of foreign assets, number of entities, and capital intensity. Bodnar and Weintrop (1997) find that foreign operations provide greater growth opportunities than domestic operations and Thomas (2000) finds that foreign earnings changes are more useful than domestic earnings changes in predicting future earnings changes. If greater growth opportunities lead to more persistent earnings (Collins and Kothari 1989), ETR-related earnings in foreign jurisdictions may be more permanent depending on the extent to which the company maintains or expands its operations in foreign jurisdictions.

Further, state tax-planning activities have grown tremendously in the 1990s, in part due to fewer (and more costly) federal tax-planning opportunities, economic-development-oriented tax incentive competition among states, and more aggressive state tax compliance due to state fiscal problems. Gupta and Mills (2002) show that state ETRs decrease (at a decreasing rate) and then increase (at an increasing rate) as a function of the number of state tax returns filed by the firm. This information would be reflected in the ETR and

[9] This hypothesis, which originated in Lev and Thiagarajan (1993), likely comes from the following sources: (1) various accounts in O'Glove (1987, 72) where a decrease in the ETR is characterized as a nonrecurring/nonoperating item, (2) a survey by Siegel (1982), which indicates that analysts, accountants, and financial managers think that an increase in earnings from the utilization of a net operating loss carryforward represents a deterioration of earnings quality, and (3) articles in publications such as the *Wall Street Journal* that discussed characteristics of company earnings releases.

[10] Strategic tax-planning activities also include ETR "optimization" strategies such as transferring intangibles offshore, transfer pricing, structuring low-tax contract manufacturing operations, using holding companies to minimize withholding taxes on dividends, and engaging in intercompany financing techniques like debt push-downs.

would increase the persistence of the tax change component of earnings through the extent to which the benefits of state tax planning result in permanent tax savings.

The persistence of the tax change component could also be affected by the renewed use of tax shelters starting in the mid-1990s.[11] While most tax shelters are thought to provide one-time benefits, evidence suggests that some tax shelters could have more persistent effects on earnings. For example, Graham and Tucker (2005) find that the average tax shelter used by firms in their sample was active for approximately five years. While most tax-sheltering activity is likely not as persistent as long-term strategic tax planning, there could be a positive effect on the persistence of the tax change component from tax sheltering to the extent that certain tax shelters provide benefits over multiple years.

Since the tax change component of earnings (as does any earnings component) has effects that are expected to be either persistent or transitory, whether the tax change component of earnings persists or aids in forecasting future earnings depends on the relative proportion of persistent and transitory effects. The previous discussion suggests that the tax change component of earnings primarily reflects a combination of long-term strategic tax planning (expected to be relatively persistent), tax-sheltering activities, and period-specific earnings management activities (both expected to be relatively transitory). This raises the following question:

RQ_1: Is the tax change component of earnings persistent for future earnings (i.e., useful in forecasting future earnings incremental to earnings excluding the tax change)?

The Persistence and Forecasting Implications of the Tax Change Component of Earnings in Interim Periods

I next consider the persistence of the tax change component of earnings in interim periods. The results of prior research on the time-series properties of quarterly earnings are consistent with the notion that interim earnings become less persistent (more transitory) as the fiscal year progresses.[12] Thus, even without considering aspects specific to tax expense, one might expect the tax change component early in the year to be more persistent than any revisions.

However, the interim reporting requirements for income tax expense suggest additional arguments for the tax change component to be more or less persistent. APB No. 28 requires managers to make their best estimate of the firm's ETR that is expected to be applicable for the full fiscal year when computing interim income tax expense. The estimated annual ETR should reflect anticipated tax credits, foreign tax rates, percentage depletion, capital

[11] Tax advisors and corporate directors regard a transaction with low visibility that results in a permanent difference as the perfect tax shelter (U.S. Department of Treasury 1999; Hanlon 2003; Boynton and Mills 2004; McGill and Outslay 2004). These shelters would affect the ETR and, thus, the tax change component of earnings.

[12] Collins et al. (1984) find that the forecast errors tend to increase as the fiscal year progresses, while Bathke and Lorek (1984) find that time-series forecast errors are larger in the fourth quarter. Salamon and Stober (1994) and Kross and Schroeder (1990) present evidence that earnings response coefficients are significantly smaller for fourth quarter earnings than for interim earnings, which is consistent in part with the existence of fiscal year-end discretionary accruals from earnings management. Lipe and Bernard (2000) find that the differential stock-price response to fourth quarter earnings is most likely due to increased recognition of transitory earnings in the fourth quarter, opposed to the traditional explanation of the annual audit correcting interim reporting errors. The Lipe and Bernard (2000) finding is consistent with Burgstahler et al. (2002), who find that special items, which proxy for transitory earnings, occur more frequently during quarters later in the fiscal year, with about 41 percent occurring in the fourth quarter, and Livnat (2003), who finds that fourth quarter earnings have lower persistence than earnings from the first through third quarters and the decline in persistence is attributed mostly to extremely negative earnings surprises.

gains rates, and other available tax-planning alternatives (FASB Interpretation No. 18, 1977, ¶8).

Interviews with current and former tax partners suggest that it is likely that the items that have the most material (and persistent) effect on management's estimate of the annual ETR are anticipated and incorporated into the initial (Q1) annual ETR estimate.[13] For example, it may be that early in the year, managers make assumptions regarding the relative long-term strategic mix of income from various sources (i.e., domestic versus foreign earnings, taxable versus tax-advantaged income) and use these estimates (in part) to arrive at the initial annual estimate of the ETR. As period-specific information becomes available in subsequent quarters (Q2, Q3, Q4), managers may revise the annual ETR estimate for period-specific deviation in the income weights.[14,15]

Anecdotal evidence suggests that analysts often view revisions in estimated annual ETRs as attempts at aggressive accounting, and prior research finds that firms change ETRs to beat analysts' forecasts or to smooth earnings, consistent with earnings management (Dhaliwal et al. 2004; Comprix et al. 2006; Myers et al. 2005). However, it is ultimately an empirical question as to whether the initial (Q1) tax change component of earnings behaves differently than subsequent revisions (Q2, Q3, Q4) in the tax change component of earnings.[16] If tax-planning (earnings management) activities are more persistent (transitory) and if the initial tax change component reflects more tax-planning activities than earnings management activities, then the initial tax change component will be more persistent (or less transitory). Likewise, if the revised tax change component reflects more earnings management activities, then the revised tax change component will be less persistent. Stated formally:

H_1: The initial (Q1) tax change component of earnings is more persistent for future earnings than subsequent revisions (Q2, Q3, Q4) in the tax change component of earnings.

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[13] The partners stressed that managers are aware of the major permanent differences and other ETR reconciliation items when firms predict end-of-year book income. Furthermore, managers do not like surprises from the tax department, which often leads to conservative initial ETR estimates. When an ETR is changed after the initial estimate is made at the end of the first quarter (Q1), it is usually due to one of the following reasons: (1) there is a surprise, such as an audit settlement that is better than what was previously anticipated; (2) new tax planning; (3) there is a return to reality (i.e., the initial conservative ETR estimates from Q1 are ''trued up'' as future earnings are realized); (4) earnings management; or (5) significant variations in pretax earnings (especially pretax earnings close to zero). Of these reasons, the partners agreed that new tax planning is least likely to occur.

[14] Additional insight into this phenomenon (albeit with different income sources) can be gained from the Q3 2000 MD&A of Viad (2000): ''The relatively low ETR compared to the statutory federal rate is primarily attributable to tax-exempt income from Viad's Payment Services businesses. APB Opinion No. 28 requires that income taxes be provided based on the estimated ETR expected to be applicable for the entire fiscal year, with an adjustment of the annual ETR made each quarter. During the third quarter, Viad determined that the estimated annual ETR for 2000 is expected to be lower than in prior periods due to higher than previously expected tax-exempt income in proportion to total pretax income, resulting from rapid growth in investments in tax-exempt securities in the Payment Services segment along with lower operating income in the Convention and Event Services Segment. Accordingly, the adjustment of the ETR was made in the third quarter of 2000.''

[15] This could also be an additional way the ETR is managed. In fact, when companies make interim ETR revisions, one of the most common explanations for the revision is a change in the estimated mix of income from foreign and domestic sources (for example, see the Q3 2000 10-Q of Hewlett-Packard, a part of which is presented in Section II).

[16] Unless a tax shelter provides benefits for multiple years, it is unlikely that management's estimate of the annual ETR will reflect the tax benefits from the shelter; therefore, it is not likely that this type of activity will affect the persistence of the initial and revised tax change component in a different manner.

Valuation Implications of the Tax Change Component of Earnings

My final objective is to determine if market participants recognize the forecasting implications of the tax change component. Until recently, the empirical evidence (Lipe 1986; Lev and Thiagarajan 1993; Abarbanell and Bushee 1997, 1998) on the value-relevance of ETR-related earnings changes has been inconclusive and inconsistent. Guenther and Jones (2003) reconcile these studies and determine that the conflicting results are due primarily to how the tax change component is measured in each study (see footnote 1).

Guenther and Jones (2003) document a significant, positive association between contemporaneous abnormal returns and the tax change component and show that this association varies cross-sectionally and over time. Guenther and Jones (2003) hypothesize that the variation in the magnitude of the association between contemporaneous returns and the tax change component is due to the persistence of the tax change component in different contexts.[17] However, this expectation assumes that the market is efficient with respect to the implications of the tax change component for future earnings.[18]

Despite the recently documented value-relevance of the tax change component, there is conflicting evidence about the efficient use of this information by market participants. For example, Abarbanell and Bushee (1997) find that analysts overreact to annual ETR-related earnings changes before the implementation of SFAS No. 109, while Chen and Schoderbek (2000) find that analysts failed to incorporate the deferred tax adjustment required by SFAS No. 109 into their earnings forecasts when corporate tax rates increased in 1993. Bauman and Shaw (2005) find that analysts' quarterly earnings forecasts incorporate (underreact to) the earnings effects of ETR increases and small ETR decreases (the earnings effects of large ETR decreases) in previous quarters after the implementation of SFAS No. 109.

Evidence of analyst forecast inefficiency raises the question of whether stock prices fully reflect the persistence of the tax change component of earnings. Further complicating matters, research indicates that investors inefficiently utilize information contained in analysts' earnings forecasts. Mendenhall (1991), Walther (1997), and Elgers et al. (2001, 2003) document that investors underweight information contained in analysts' forecasts, while LaPorta (1996) and Bradshaw et al. (2001) find that investors overweight information contained in analysts' forecasts. Therefore, it is not entirely clear that investors' expectations of the forecasting implications of the tax change component will be consistent with the implications of the tax change component for future earnings. This leads to the final hypotheses:

H_{2a}: The earnings expectations embedded in stock prices fail to fully reflect the persistence of the tax change component of earnings.

[17] The positive coefficient on the tax change component is significantly smaller after firms' adoption of SFAS No. 109 in 1993. Further, in the post-SFAS No. 109 period the coefficient on the tax change component is significantly smaller for firms reporting the utilization of a net operating loss and for firms recording restructuring charges or asset impairments, and is significantly larger for firms engaged in acquisitions and for firms that experience a change in the percentage of foreign earnings.

[18] The results of Lev and Nissim (2004) and Hanlon (2005) weaken this assumption. Lev and Nissim (2004) document that the market does not fully reflect the information contained in a tax fundamental that captures aggregate book-tax differences. Hanlon (2005) finds that investors underestimate the persistence of the cash flow component of earnings for firm-years with large positive temporary book-tax differences (i.e., book income greater than taxable income) and overestimate the persistence of accruals when firm-years contain large negative temporary book-tax differences (i.e., book income less than taxable income).

H_{2b}: The earnings expectations embedded in stock prices fail to fully reflect the persistence of the initial (Q1) and revised (Q2, Q3, Q4) tax change component of earnings.

IV. RESEARCH DESIGN

Model Development

To focus on the effect of an ETR change on earnings, I follow Lev and Thiagarajan (1993) and decompose the annual change in earnings, $\Delta E_t = E_t - E_{t-1}$, into two components:

(1) The change in pretax earnings (ΔPTE_t), using last year's effective tax rate (ETR_{t-1}): $\Delta PTE_t(1 - ETR_{t-1})$, and
(2) The effect of the annual ETR change on current pretax earnings: $PTE_t(ETR_{t-1} - ETR_t)$:

$$\Delta E_t = \Delta PTE_t(1 - ETR_{t-1}) + PTE_t(ETR_{t-1} - ETR_t). \quad (1)$$

In Equation (1), $PTE_t(ETR_{t-1} - ETR_t)$, which represents earnings generated by a change in the annual ETR, is my measure of the tax change component of earnings.[19] *ETR* is a firm's effective tax rate, measured as total income tax expense divided by *PTE*. Interim (annual) Compustat data items used for each variable are: Earnings = 8 (18), Income Tax Expense = 6 (16), and Pretax Earnings = 23 (170). Following Gupta and Newberry (1997), the *ETR* is set to 1 when the ETR is greater than 100 percent, and to 0 when the ETR is negative.

The Persistence and Forecasting Implications of the Tax Change Component of Earnings

I examine the persistence of the tax change component of earnings for future earnings using the following equation (firm subscripts are omitted):

$$E_{t+1} = \gamma_0 + \gamma_1 ATE_t + \gamma_2 TCC_t + \nu_{t+1} \quad (2)$$

where *E* represents income before extraordinary items, *ATE* represents aggregate earnings excluding the tax change component [$ATE = PTE_t(1 - ETR_{t-1})$], and *TCC* represents the tax change component of earnings [$TCC = PTE_t(ETR_{t-1} - ETR_t)$].[20] I scale all earnings component variables by contemporaneous average total assets (Compustat annual data item

[19] The following example, adapted from Lev and Thiagarajan (1993), should provide intuition for this measure. Assume:

	t	$t-1$
Pre-tax income	120	100
ETR	0.25	0.40
Net income	90	60

Following Equation (1), the net income change, 30, consists of the pretax earnings change net of the prior tax rate, $20 \times (1 - 0.40) = 12$, and the effect of the tax rate change, $120\ (0.40 - 0.25) = 18$. I refer to the latter component of the earnings change as the tax change component.

[20] My partitioning of earnings into a tax component (*TCC*) and a pretax component (*ATE*) generally assumes that the pretax component is unrelated to the tax component. I acknowledge that some tax-planning choices directly affect pretax earnings through implicit taxes. Although it is possible that some of the pretax persistence is related to implicit taxes, I assume that the magnitude of any implicit tax effects is too small to affect my inferences.

#6) to control for differences in size across firms and over time and to allow for cross-sectional comparability.

The Persistence and Forecasting Implications of the Tax Change Component of Earnings in Interim Periods

The interim reporting requirements of APB Opinion No. 28 and FASB Interpretation No. 18 allow me to further decompose the tax change component of earnings into an initial and a revised component based management's first quarter estimate of the ETR that is expected to be applicable for the full fiscal year. Hypothesis 1 predicts that Equation (2) is misspecified since it implicitly constrains the coefficients on the initial and revised tax change components of earnings to be equal. The specification implied by H_1 is:

$$E_{t+1} = \delta_0 + \delta_1 ATE_t + \delta_2 INTCC_t + \delta_3 REVTCC_t + \nu_{t+1} \tag{3}$$

where *INTCC* represents the initial tax change component of earnings [$PTE_t(ETR_{t-1} - ETRQ1_t)$] and *REVTCC* represents the revised tax change component of earnings [$PTE_t(ETRQ1_t - ETR_t)$]. $ETRQ1_t$ is the first quarter estimate of the annual ETR. Hypothesis 1 predicts $\delta_2 > \delta_3$. The larger coefficient predicted on the initial relative to the revised tax change component of earnings reflects the higher persistence expected from the initial tax change component of earnings. To mitigate concern that any differential persistence is driven by asset growth, I scale the dependent variables in Equations (2) and (3) by lagged average total assets so the scalar is the same as that used for the independent variables (Fairfield et al. 2003).

Finding a significant positive relation for any coefficient in Equations (2) or (3) indicates that the component is incrementally informative in predicting future earnings. For each earnings component, a slope coefficient of 0 indicates that the earnings component is purely transitory, while a coefficient of 1 indicates that the earnings component follows a random walk. A slope coefficient greater than 1 indicates growth in the component.

Valuation Implications of the Tax Change Component of Earnings

My final objective is to test whether the market fully incorporates the forecasting implications of the initial, revised, and annual tax change component of earnings. To test H_{2a} and H_{2b}, I estimate the following systems of equations in accordance with the Mishkin (1983) framework:

$$E_{t+1} = \gamma_0 + \gamma_1 ATE_t + \gamma_2 TCC_t + \nu_{t+1} \tag{2}$$

$$AR_{t+1} = \phi_0 + \phi_1(E_{t+1} - \gamma_0 - \gamma_1^* ATE_t - \gamma_2^* TCC_t) + \varepsilon_{t+1} \tag{4}$$

$$E_{t+1} = \delta_0 + \delta_1 ATE_t + \delta_2 INTCC_t + \delta_3 REVTCC_t + \nu_{t+1} \tag{3}$$

$$AR_{t+1} = \omega_0 + \omega_1(E_{t+1} - \delta_0 - \delta_1^* ATE_t - \delta_2^* INTCC_t - \delta_3^* REVTCC_t) + \varepsilon_{t+1} \tag{5}$$

where AR_{t+1} = the abnormal return in year $t+1$, measured as the 12-month buy-and-hold return beginning four months after the fiscal year-end minus the buy-and-hold value-weighted return of a benchmark portfolio over the same 12-month period (Daniel et al. 1997). I create 125 ($5 \times 5 \times 5$) size/book-to-market/prior year return portfolios each year

to control for a set of common risk factors: size, book-to-market, and momentum.[21] I measure each characteristic at the end of the most recent fiscal year prior to portfolio formation.

Equation (2) is a *forecasting* equation that estimates the forecasting coefficients (γ) of aggregate earnings excluding the tax change and the tax change component for predicting future earnings.[22] Each coefficient is a measure of the persistence of an earnings component for future earnings. Equation (4) is a *valuation* equation that estimates valuation coefficients (γ^*) that the market assigns to earnings components. Mishkin (1983) suggests that Equation (4) provides an estimate of the market's *perceived* persistence of earnings and the tax change component. Because earnings and the tax change component of earnings are public information, market efficiency requires $\gamma_1 = \gamma_1^*$, and $\gamma_2 = \gamma_2^*$. If any pair of coefficients is not equal, then the market's perception of earnings persistence differs from the actual earnings persistence implied by the specification of the forecasting equation.

I estimate the system of Equations (2) and (4) jointly in two stages using iterative generalized nonlinear least squares (Mishkin 1983). In the first stage, I jointly estimate an unconstrained system of Equations (2) and (4). In the second stage, I impose the rational pricing constraints $\gamma_q = \gamma_q^*$ (q = 1 or 2) and re-estimate Equations (2) and (4) jointly. I test market efficiency with the likelihood ratio statistic described in Mishkin (1983). The specific likelihood ratio test is $2n\log(SSR^c/SSR^u) \sim \chi^2(q)$ where n = the number of observations, q = the number of rational pricing constraints, SSR^c = the sum of squared residuals from the constrained weighted system, and SSR^u = the sum of squared residuals from the unconstrained weighted system.

Sample Selection Procedures and Sample Profile

My sample consists of all U.S. Compustat firm-years between 1994 and 2001 with nonmissing values of annual and quarterly assets, total income tax expense, and pretax income (36,442 observations). Due to the difficulty in interpreting ETRs when a firm has negative pretax income, I exclude 13,581 firm-years with negative pretax income. Then, I delete 1,591 mutual funds, trusts, REITs, limited partnerships, and other flow-through entities due to different reporting requirements and varying earnings management and tax-planning incentives. Next, I exclude 7,753 firm-years with missing CRSP return data. Finally, to remove the effects of outliers from the data, I drop 822 firm-years with the highest and lowest 1 percent of the values for each variable in year t (Kothari and Zimmerman 1995; Collins et al. 1997; Fama and French 1998; Barth et al. 1999).[23] My final sample consists of 12,695 firm-years, which are distributed uniformly throughout the sample period.

V. EMPIRICAL RESULTS

Descriptive Statistics

Table 1 reports descriptive statistics for the variables used in this study. Panel A describes the variables that I use in the calculation of the tax change component of earnings. The average annual ETR in the prior and current year is 35.68 percent and 35.47 percent, respectively, while the average ETR in Q1, which represents management's expectation of the annual ETR, is 35.93 percent. $ETRQ1_t$ is significantly higher than ETR_{t-1} and ETR_t

[21] Firms must have calendar year-end market capitalization values available on CRSP and positive fiscal year-end book value data (annual data item #60) available on Compustat.

[22] The discussion of the Mishkin (1983) procedure for Equations (2) and (4) generalizes to Equations (3) and (5).

[23] Extreme returns or earnings in year $t+1$ are not eliminated since this would introduce hindsight bias in the results (Thomas 2000). I also run all of my tests on data that has been winsorized rather than trimmed. The inferences from all of my tests are unchanged when I use the winsorized data.

TABLE 1
Descriptive Statistics

Variable	Mean	Standard Deviation	1st Quartile	Median	3rd Quartile
Panel A: Financial Variables[a]					
$Assets_t$	6306.79	34104.66	163.003	553.621	2161.740
PTE_t	275.72	1002.81	11.679	40.740	147.345
ETR_t	0.3568	0.0840	0.3304	0.3676	0.3939
ETR_{t-1}	0.3547	0.0788	0.3318	0.3690	0.3945
$ETRQ1_t$	0.3593	0.0756	0.3389	0.3716	0.3960
Panel B: Regression Variables[b]					
E_{t+1}	0.0659	0.0544	0.0243	0.0534	0.0932
AR_{t+1}	0.0409	0.6180	−0.2951	−0.0393	0.2639
TCC_{t+1}	−0.0004	0.0098	−0.0014	0.0000	0.0015
ATE_t	0.0700	0.0532	0.0247	0.0534	0.0938
TCC_t	−0.0002	0.0044	−0.0011	0.0000	0.0010
$INTCC_t$	−0.0005	0.0042	−0.0012	−0.0001	0.0002
$REVTCC_t$	0.0003	0.0029	−0.0003	0.0001	0.0015
Panel C: Risk and Anomaly Control Variables[c]					
MVE_t	3373.70	15896.93	104.35	397.86	1506.92
BMR_t	0.2701	1.8811	−0.1415	0.1567	0.6970
$PBHR_t$	0.1807	0.5498	−0.1228	0.1071	0.3701
$BETA_t$	0.8789	0.5997	0.4732	0.8089	1.1958
$SPEC_t$	−0.0024	0.0166	0.0000	0.0000	0.0000
$DTAX_t$	−0.0018	0.0115	−0.0065	−0.0009	0.0033
VOL_t	95.1764	113.4364	33.7918	61.2824	108.9021
EP_t	0.0698	0.0398	0.0457	0.0642	0.0858
$PTXACC_t$	−0.0244	0.0761	−0.0642	−0.0306	0.0057
$PTXCF_t$	0.1462	0.1025	0.0840	0.1377	0.2024

Panel D: Industry Composition[d]

Industry Membership	Mean *TCC*	Mean *INTCC*	Mean *REVTCC*
Mining and Construction	−3.1851	−6.5646	3.3795
Food	1.1964	−2.0408	3.2372
Textiles, Printing, Publishing	−0.0920	−3.4453	3.3534
Chemicals	0.0651	−7.4574	7.5225
Pharmaceuticals	−0.4225	−8.2941	7.8716
Extractive Industries	−15.0310	−14.3429	−0.6881
Durable Manufacturers	−2.0190	−8.1600	6.1410
Computers	−4.6170	−7.4794	2.8624
Transportation	−2.3980	−1.1700	−1.2280
Utilities	−3.4671	−5.9137	2.4466

(*continued on next page*)

TABLE 1 (Continued)

Industry Membership	Mean *TCC*	Mean *INTCC*	Mean *REVTCC*
Retail	−1.3513	−4.1479	2.7967
Financial Institutions	−1.6000	−1.9117	0.3117
Insurance and Real Estate	−4.6166	−7.9737	3.3571
Personal Services	−3.8471	−6.2612	2.4141
Professional Services	−3.7826	−5.6880	1.9054
Other	−2.1882	−7.6665	5.4783
Total	−2.9597	−6.1573	3.1976

[a] Panel A variables are defined as follows: *Assets* = total assets (Compustat annual item #6); *PTE* = Pretax income (Compustat annual item #170); *ETR* = Effective tax rate (Compustat annual item #16 ÷ *PTE*); and *ETRQ1* = Q1 Effective tax rate (Compustat quarterly item #16 ÷ Compustat quarterly item #23).

[b] Panel B variables are defined as follows: *E* = income before extraordinary items (Compustat annual item #18). *AR* = the 12-month buy-and-hold security return beginning four months after the fiscal year end minus the value-weighted return of the benchmark size/book-to-market/prior year return portfolio over the same 12-month period. The benchmark portfolios are created by first sorting stocks into quintiles based on their capitalization values (*MVE*) at the beginning of the year of portfolio formation. NYSE breakpoints are used so that there are an equal number of NYSE stocks in each quintile. Next, within each of the size quintiles, stocks are sorted into quintiles based on their industry-adjusted book-to-market ratios. The book-to-market (*BMR*) ratio is defined as the book value at the end of the fiscal year prior to the year of portfolio formation divided by capitalization value at the beginning of the calendar year of portfolio formation. Book-to-market ratios are industry adjusted by subtracting the mean industry book-to-market ratio over the sample period from the individual stock's book-to-market ratio, where industries are defined along two-digit SIC codes. Finally, within the 25 size/book-to-market portfolios, stocks are sorted based on their prior 12-month return (*PBHR*) ending one month prior to portfolio formation. *TCC* = the tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETR_t)$. *ATE* = aggregate earnings excluding the tax change component of earnings, measured as $PTE_t(1 - ETR_{t-1})$. *INTCC* = the initial tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETRQ1_t)$. *REVTCC* = the revised tax change component of earnings, measured as $PTE_t(ETRQ1_t - ETR_t)$. All regression variables (except *AR*), are scaled by contemporaneous average total assets.

[c] Panel C variables are defined as follows: *MVE* = market value of equity (Compustat annual item #25 * #199); *BMR* = book-to-market ratio (Compustat annual item #60 ÷ *MVE*); *PBHR* = 12-month buy-and-hold return, defined above; *BETA* = systematic risk estimated from regressions of monthly raw returns on a value-weighted portfolio over a 60-month period prior to the abnormal return accumulation period; $SPEC_t$ = special items (Compustat annual item #17); *DTAX* = deferred income tax expense (Compustat annual item #50); *VOL* = annual trading volume divided by common shares outstanding; *EP* = the earnings-to-price ratio, measured as income before extraordinary items divided by the fiscal year-end stock price; *PTXACC* = pretax accruals, defined as pretax income minus pretax operating cash flows; and *PTXCF* = pretax operating cash flow, measured as operating cash flow plus cash taxes paid minus cash flow due to extraordinary items (Compustat annual item #308 + #317 − #124). *SPEC*, *DTAX*, *PTXACC*, and *PTXCF* are scaled by contemporaneous average total assets.

[d] All means are multiplied by 10,000.

(t = 4.7462 and 2.4925, respectively). I obtain similar inferences using the nonparametric Wilcoxon signed-rank test ($ETRQ1_t$ is significantly higher than ETR_{t-1} and ETR_t [z = 19.102 and 14.530, respectively]). This seems to indicate that on average, management sets the estimate of the annual ETR too high in Q1, perhaps to create a reserve from which current earnings can be drawn, or because tax departments are conservative in their initial estimates (Comprix et al. 2006).[24]

Panel B of Table 1 reports the descriptive statistics for the variables used in the regression analyses. The mean of E_{t+1} is 0.0659, which indicates the average scaled earnings

[24] The unique feature of the integral view of quarterly reporting for taxes is that the estimation of the initial ETR creates opportunities for intra-year earnings management (annual ETR estimates are used to calculate quarterly income tax expense), which would affect current annual earnings, but not necessarily future annual earnings.

for the sample firms is approximately 6.6 percent. The average TCC_t accounts for approximately 2.1 percent of the average change in return on assets (ROA). $INTCC_t$ decreases ROA by approximately 5 percent on average, while $REVTCC_t$ increases ROA by approximately 3 percent on average. Therefore, for the average firm in the sample, approximately 60 percent of $INTCC_t$ reverses by year-end. These statistics are consistent with those from Panel A and quantifies the effect of tax changes on earnings. Panel C presents descriptive statistics for the risk and anomaly control variables.

Panel D of Table 1 presents industry descriptive statistics, where the industry breakdown is adapted from Barth et al. (1999) and Rajgopal et al. (2003). The majority of the sample is clustered in four industries: financial institutions (20.17 percent), durable manufacturers (19.08 percent), retail (12.24 percent), and computers (7.63 percent). I also examine the means of TCC_t, $INTCC_t$, and $REVTCC_t$ at the industry level in Panel D of Table 1. The degree of reversal in $INTCC_t$ by the end of the year is startling for some industries. For example, in the food industry, 159 percent of $INTCC_t$ reverses by year-end, while 101 percent of $INTCC_t$ reverses by year-end for firms in the chemicals industry. Other industries exhibiting this strong reversal in $INTCC_t$ include textiles, printing and publishing (97 percent), retail (67 percent), pharmaceuticals (95 percent), and durable manufacturers (75 percent).

Table 2 reports Pearson correlations. Consistent with Guenther and Jones (2003), TCC_t is positively correlated with contemporaneous returns ($\rho_P = 0.0218$, $p = 0.0140$). $INTCC_t$ is also positively correlated with contemporaneous returns, while the correlation between $REVTCC_t$ and returns is not significant. $INTCC_t$ ($REVTCC_t$) is negatively (positively) correlated with ATE_t ($\rho_P = -0.1029$, $p = 0.0000$ and $\rho_P = 0.0270$, $p = 0.0024$). Finally, the correlation between $INTCC_t$ and $REVTCC_t$ is significantly negative ($\rho_P = -0.2778$, $p = 0.0000$), as is the correlation between pretax accruals and pretax operating cash flow ($\rho_P = -0.6455$, $p = 0.0000$).

Multivariable Results

Tables 3 and 4 present the results from estimating Equations (2) and (3) using OLS.[25] Because the data are pooled, I estimate the regressions in the spirit of Fama and MacBeth (1973). I estimate yearly cross-sectional regressions and use the average slopes and their time-series standard errors to draw inferences.[26] In Tables 3 and 4, I list the mean coefficient estimate first, followed by the Fama-MacBeth t-statistic and the number of yearly positive (negative) coefficients.

I also partition the sample and estimate Equations (2) and (3) separately for firms with decreases (increases) in annual ETRs. Because decreases in annual ETRs increase earnings (or conversely, increases in annual ETRs decrease earnings), *ceteris paribus*, managers will

[25] Results from the Breusch and Pagan (1980) Lagrange Multiplier Test ($\chi^2 = 0.59$, $p = 0.4431$) indicate that a fixed or random effects specification is not appropriate for Equation (2). This result holds for all specifications of Equations (2) and (3).

[26] *Assuming independence through time*, the Fama-MacBeth regressions control for cross-sectional correlation in the residuals. In the presence of positive cross-correlation in the residuals, the standard errors can be biased downward and the t-statistics biased upward in pooled regressions. For example, Fama and French (2000) find that Fama-MacBeth standard errors are two to five times the OLS standard errors from pooled regressions using their sample.

However, the assumption of temporal independence in regressions without abnormal returns as the dependent variable is tenuous, as many firms appear in the regressions multiple years. Any autocorrelation in the coefficients would further bias the standard errors, but reliably estimating the serial correlation from eight observations is problematic. Fama and French (2000) suggest that if the first-order autocorrelation is 0.5, t-statistics of 2.8 (instead of 1.96) should be used to infer reliability. Accordingly, I require t-statistics of 2.8 to indicate significance of the coefficient estimates in Equations (2), (3), (6), and (7).

TABLE 2
Sample Correlations

	ATE_t	TCC_t	$INTCC_t$	$REVTCC_t$	MVE_t	BMR_t	$PBHR_t$	$BETA_t$	$SPEC_t$	$DTAX_t$	VOL_t	EP_t	$PTXACC_t$	$PTXCF_t$
ATE_t														
TCC_t	**−0.0799** **(0.0000)**													
$INTCC_t$	**−0.1029** **(0.0000)**	**0.7665** **(0.0000)**												
$REVTCC_t$	**0.0270** **(0.0024)**	**0.4040** **(0.0000)**	**−0.2778** **(0.0000)**											
MVE_t	**0.0623** **(0.0000)**	0.0126 (0.1548)	**0.0219** **(0.0136)**	−0.0123 (0.1654)										
BMR_t	−0.0083 (0.3508)	−0.0098 (0.2689)	−0.0156 (0.0785)	0.0076 (0.3939)	−0.0103 (0.2447)									
$PBHR_t$	**−0.0175** **(0.0492)**	**0.0218** **(0.0140)**	**0.0180** **(0.0421)**	0.0069 (0.4360)	**−0.0247** **(0.0055)**	**0.0371** **(0.0000)**								
$BETA_t$	**0.1688** **(0.0000)**	**−0.0224** **(0.0255)**	−0.0120 (0.2304)	−0.0165 (0.1000)	0.0109 (0.2789)	**−0.0620** **(0.0000)**	**0.0555** **(0.0000)**							
$SPEC_t$	**0.0805** **(0.0000)**	**0.0187** **(0.0445)**	**−0.0310** **(0.0008)**	**0.0724** **(0.0000)**	**−0.0279** **(0.0026)**	−0.0039 (0.6749)	−0.0110 (0.2382)	**−0.0507** **(0.0000)**						
$DTAX_t$	**0.0505** **(0.0000)**	0.0166 (0.1007)	0.0189 (0.0612)	−0.0021 (0.8388)	**0.0220** **(0.0289)**	**0.0356** **(0.0004)**	**0.0385** **(0.0000)**	**0.0726** **(0.0000)**	**−0.2229** **(0.0000)**					
VOL_t	**0.3029** **(0.0000)**	**−0.0197** **(0.0274)**	**−0.0197** **(0.0269)**	−0.0013 (0.8821)	−0.0110 (0.2161)	**−0.0239** **(0.0074)**	**0.0238** **(0.0075)**	**0.4449** **(0.0000)**	**−0.0832** **(0.0000)**	**0.0911** **(0.0000)**				
EP_t	**−0.0331** **(0.0003)**	0.0163 (0.0771)	−0.0160 (0.0830)	**0.0475** **(0.0000)**	**−0.1125** **(0.0000)**	**0.0273** **(0.0031)**	**0.0720** **(0.0000)**	−0.1656 (0.0000)	**0.2484** (0.0000)	**−0.0710** (0.0000)	**−0.1384** (0.0000)			
$PTXACC_t$	**0.1201** **(0.0000)**	−0.0111 (0.2666)	**−0.0245** **(0.0143)**	0.0184 (0.0663)	**−0.0271** **(0.0000)**	−0.0031 (0.7579)	**−0.0623** **(0.0000)**	**0.1075** **(0.0000)**	**0.1794** **(0.0000)**	**−0.0561** **(0.0000)**	**0.1163** **(0.0000)**	**0.0824** **(0.0000)**		
$PTXCF_t$	**0.6643** **(0.0000)**	0.0058 (0.5647)	0.0031 (0.7563)	0.0042 (0.6717)	**0.0605** **(0.0000)**	**−0.0419** **(0.0000)**	**0.0328** **(0.0011)**	**0.0450** **(0.0000)**	**−0.0481** **(0.0000)**	**0.0807** **(0.0000)**	**0.1118** **(0.0000)**	**−0.0689** **(0.0000)**	**−0.6455** **(0.0000)**	

This table reports Pearson correlations for the full sample (n = 12,695). The correlation coefficient, followed by a two-sided p-value is reported in each cell. Bold values are significant at $p \leq 0.05$. Variables are defined as follows (all variables except *MVE, BMR, PBHR, VOL,* and *EP* are scaled by contemporaneous average total assets): *ATE* = aggregate earnings excluding the tax change, measured as $PTE_t(1 - ETR_{t-1})$. *TCC* = the tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETR_t)$. *INTCC* = the initial tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETRQ1_t)$. *REVTCC* = the revised tax change component of earnings, measured as $PTE_t(ETRQ1_t - ETR_t)$. *MVE* = market value of equity. *BMR* = book to market ratio. *PBHR* = Prior 12-month buy-and-hold return. *BETA* = systematic risk estimated from regressions of monthly raw returns on a value-weighted portfolio over a 60-month period prior to the abnormal return accumulation period. $SPEC_t$ = special items. *DTAX* = deferred income tax expense. *VOL* = annual trading volume divided by common shares outstanding. *EP* = the earnings-to-price ratio, measured as income before extraordinary items divided by the fiscal year-end stock price. *PTXACC* = pretax accruals, defined as pretax income minus pretax operating cash flows. *PTXCF* = pretax operating cash flow, measured as operating cash flow plus cash taxes paid minus cash flow due to extraordinary items.

want to sustain ETR decreases and mitigate ETR increases. Therefore, the results also provide evidence on the persistence and forecasting implications of the tax change component of earnings under different conditions.

The Persistence and Forecasting Implications of the Tax Change Component of Earnings

Table 3 presents the results from estimating Equation (2), in which future earnings are regressed on current earnings and the tax change component. The estimate of the persistence of ATE_t in Panel A is 0.8106 (t = 34.53), while the persistence estimate of TCC_t is 0.7121 (t = 6.56). The coefficient on TCC_t is clearly different from zero, which is initial evidence that the tax change component of earnings is not transitory. When I estimate Equation (2) separately for firms with either annual ETR decreases (Panel B) or increases (Panel C), the results continue to indicate that the tax change component is not transitory. Specifically,

TABLE 3
Summary Regression Statistics of the Forecasting Implications of the Tax Change Component of Earnings[a]

$$E_{t+1} = \gamma_0 + \gamma_1 ATE_t + \gamma_2 TCC_t + \nu_{t+1} \quad (2)$$

Panel A: Full Sample (n = 8)

Parameters[b]	γ_0	γ_1	γ_2	$\overline{R}^2$
Estimate	0.0091	0.8106	0.7121	0.6041
t-statistic	9.49*	34.53*	6.56*[c]	37.80*
Pos/(Neg)	8/(0)	8/(0)	8/(0)	

Panel B: *ETR* Decreases (n = 8)

Parameters	γ_0	γ_1	γ_2	$\overline{R}^2$
Estimate	0.0073	0.8286	0.7373	0.6777
t-statistic	6.45*	35.02*	3.71*[c]	41.17*
Pos/(Neg)	8/(0)	8/(0)	7/(1)	

Panel C: *ETR* Increases (n = 8)

Parameters	γ_0	γ_1	γ_2	$\overline{R}^2$
Estimate	0.0108	0.7935	0.7198	0.5696
t-statistic	13.73*	39.36*	3.08*[c]	27.33*
Pos/(Neg)	8/(0)	8/(0)	6/(2)	

The symbols *, †, and ‡ denote conventional significance at the 0.01, 0.05, and 0.10 (two-tailed) levels, respectively. In order to account for potential serial correlation, I interpret t-statistics of 2.8 or higher on the regression coefficients as an indication of significance at the 0.05 level (Fama and French 2000).

[a] This table presents summary statistics of annual cross-sectional regressions estimated using the Fama and MacBeth (1973) approach. I use average slopes and their time-series standard errors to draw inferences (mean coefficients are reported first, followed by the t-statistic and the number of yearly positive (negative) coefficients). OLS is used rather than a fixed or random effects model. Results from Breusch and Pagan (1980) LM tests indicate that OLS is the appropriate estimation method.

[b] Variables are defined as follows (all variables are scaled by average total assets): E = income before extraordinary items; ATE = aggregate earnings excluding the tax change, measured as $PTE_t(1 - ETR_{t-1})$; and TCC = the tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETR_t)$.

[c] RQ_1: Is the tax change component of earnings useful in forecasting future earnings incremental to earnings excluding the tax change?

when annual ETRs decrease (increase), the coefficient on TCC_t is 0.7373 (0.7198) with a t-statistic of 3.71 (3.08). These results contradict the maintained hypothesis in prior literature that earnings generated by ETR changes are transitory.

If the earnings innovation to TCC_t were completely persistent, then γ_2 in Table 3 would be 1. However, the magnitude of the coefficient on TCC_t in each specification of Equation (2) indicates that TCC_t contains transitory elements. The results in the next section should help to identify the origins of the persistence of the tax change component of earnings.

The Persistence and Forecasting Implications of the Tax Change Component of Earnings in Interim Periods

Table 4 reports the estimation results for Equation (3), in which future earnings are regressed on current earnings, the initial tax change component, and the revised tax change component.[27] The coefficient on ATE_t in Panel A is 0.8137 (t = 34.02). The coefficient on $INTCC_t$ is 0.9398 (t = 7.50) and the coefficient on $REVTCC_t$ is 0.1116 (t = 0.72). The test of H_1 rejects the hypothesis that $\delta_2 = \delta_3$ (t = 4.89). Therefore, for the full sample, the initial tax change component of earnings is more persistent for future earnings than the revised tax change component of earnings.

Panel B of Table 4 reports the results of estimating Equation (3) for firms with annual ETR decreases. The coefficient on $INTCC_t$ is 0.9627 (t = 3.65) and the coefficient on $REVTCC_t$ is 0.2909 (t = 2.20). The test of H_1 rejects the hypothesis that $\delta_2 = \delta_3$ (t = 2.53). Results from estimating Equation (3) for firms with annual ETR increases (Panel C) show that $INTCC_t$ is also more persistent for future earnings than $REVTCC_t$ ($\delta_2 = 0.9144$, t = 4.29; $\delta_3 = -0.0505$, t = −0.15). The test of H_1 rejects the hypothesis that $\delta_2 = \delta_3$ (t = 6.09).

Prior literature has generally found that the coefficient on pretax earnings is greater than that on ETR-related earnings. Although this is not the focus of my study, unreported tests indicate that the difference in the persistence of the tax (*TCC* and *INTCC*) and earnings coefficients (*ATE*) is not statistically significant. The failure to reject the null hypothesis of no difference could be seen as further evidence against the hypothesis that ETR-related earnings are transitory.

When I decompose $REVTCC_t$ to examine the forecasting implications of the tax change component for each individual quarter (Q2, Q3, and Q4), the results indicate that the tax change component becomes more transitory (less persistent) as the year progresses (i.e., Q1 > Q2 > Q3 > Q4). The coefficient estimates for TCC_t in each quarter are: Q1 = 0.9546; Q2 = 0.4836; Q3 = 0.0937; Q4 = −0.1838. Both Q1 and Q2 are significant at $p < 0.05$.

I also find that δ_2 is greater than zero and δ_3 is not statistically different from zero in all reported specifications of Equation (3). These results suggest that, on average, management's initial ETR estimate reflects the persistent information contained in the annual tax change.[28] By decomposing TCC_t into an initial and revised portion, I identify a persistent

[27] Results of a series of F-tests indicate that the decomposition of earnings into these three components is more informative than a univariate regression of future earnings on current earnings (F = 81.61, p = 0.0000) or a regression of future earnings on current earnings and the aggregate tax change component (F = 56.08, p = 0.0000).

[28] The phrase ''on average'' should be emphasized. If I partition the sample into firms that have increases in *INTCC* and decreases in *REVTCC*, then the persistence estimates of *TCC* (in Equation (2)) and *INTCC* (in Equation (3)) are not significantly different from zero. However, *INTCC* is still significantly larger that *REVTCC* in this situation.

TABLE 4
Summary Regression Statistics of the Forecasting Implications of the Initial and Revised Tax Change Component of Earnings[a]

$$E_{t+1} = \delta_0 + \delta_1 ATE_t + \delta_2 INTCC_t + \delta_3 REVTCC_t + \nu_{t+1} \quad (3)$$

Panel A: Full Sample (n = 8)

Parameters[b]	δ_0	δ_1	δ_2	δ_3	$\overline{R}^2$	H_1: $\delta_2 > \delta_3$[c]
Estimate	0.0092	0.8137	0.9398	0.1116	0.6562	0.8281
t-statistic	9.33*	34.02*	7.50*	0.72	37.12*	4.89*
Pos/(Neg)	8/(0)	8/(0)	8/(0)	6/(2)		7(1)

Panel B: *ETR* Decreases (n = 8)

Parameters	δ_0	δ_1	δ_2	δ_3	$\overline{R}^2$	H_1: $\delta_2 > \delta_3$
Estimate	0.0076	0.8290	0.9627	0.2909	0.6997	0.6718
t-statistic	6.42*	34.15*	3.65*	2.20	41.50*	2.53†
Pos/(Neg)	8/(0)	8/(0)	7/(1)	5/(3)		7(1)

Panel C: *ETR* Increases (n = 8)

Parameters	δ_0	δ_1	δ_2	δ_3	$\overline{R}^2$	H_1: $\delta_2 > \delta_3$
Estimate	0.0106	0.7958	0.9144	−0.0505	0.6225	0.9649
t-statistic	13.20*	38.60*	4.29*	−0.15	26.74*	6.09*
Pos/(Neg)	8/(0)	8/(0)	8/(0)	5/(3)		8/(0)

The symbols *, †, and ‡ denote conventional significance at the 0.01, 0.05, and 0.10 (two-tailed) levels, respectively. In order to account for potential serial correlation, I interpret t-statistics of 2.8 or higher on the regression coefficients as an indication of significance at the 0.05 level (Fama and French 2000). The symbols for tests of H_1 represent significance levels for one-tailed tests.

[a] This table presents summary statistics of annual cross-sectional regressions estimated using the Fama and MacBeth (1973) approach. I use average slopes and their time-series standard errors to draw inferences (mean coefficients are reported first followed by the *t*-statistic and the number of yearly positive (negative) coefficients). OLS is used rather than a fixed or random effects model. Results from Breusch and Pagan (1980) LM tests indicate that OLS is the appropriate estimation method.

[b] Variables are defined as follows (all variables are scaled by average total assets): E = income before extraordinary items; ATE = aggregate earnings excluding the tax change, measured as $PTE_t(1 - ETR_{t-1})$; $INTCC$ = the initial tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETRQ1_t)$; and $REVTCC$ = the revised tax change component of earnings, measured as $PTE_t(ETRQ1_t - ETR_t)$.

[c] H_1: The initial (Q1) tax change component of earnings is more persistent for future earnings than subsequent revisions (Q2, Q3, Q4) in the tax change component of earnings.

element of the tax change component of earnings, which further dispels the notion that earnings generated by ETR changes are transitory.

Valuation Implications of the Tax Change Component of Earnings

Panel A of Table 5 reports results from estimating the system of Equations (2) and (4) on the full sample. For ATE_t, the valuation coefficient ($\gamma_1^* = 0.9131$) is larger than the forecasting coefficient ($\gamma_1 = 0.8149$), which suggests that the market overestimates the persistence of earnings excluding the tax change relative to its ability to forecast one-year-ahead earnings. The likelihood ratio statistic reported in Panel A is statistically significant ($\chi^2(1) = 6.3403$, $p = 0.009$). The market appears to underestimate the persistence of TCC_t;

TABLE 5
Nonlinear Generalized Least Squares Estimation of the Pricing of Earnings Components[a]

Panel A: Market Pricing of the Tax Change Component with Respect to its Implications for One-Year-Ahead Earnings

$$E_{t+1} = \gamma_0 + \gamma_1 ATE_t + \gamma_2 TCC_t + \nu_{t+1} \quad (2)$$

$$AR_{t+1} = \phi_0 + \phi_1(E_{t+1} - \gamma_0 - \gamma_1^* ATE_t - \gamma_2^* TCC_t) + \varepsilon_{t+1} \quad (4)$$

Parameters[b]	γ_1	γ_2	γ_1^*	γ_2^*	
Estimate	0.8149	0.6914	0.9131	−0.2276	
Asymptotic SE	0.0055	0.0669	0.0391	0.4707	
Test of Market Efficiency:[c]			$\gamma_1 = \gamma_1^*$	$\gamma_2 = \gamma_2^*$	$\gamma_k = \gamma_k^*$
Likelihood Ratio Statistic:			6.3403*	3.7913*	10.9818*

Panel B: Market Pricing of the Initial and Revised Tax Change Component with Respect to their Implications for One-Year-Ahead Earnings

$$E_{t+1} = \delta_0 + \delta_1 ATE_t + \delta_2 INTCC_t + \delta_3 REVTCC_t + \nu_{t+1} \quad (3)$$

$$AR_{t+1} = \omega_0 + \omega_1(E_{t+1} - \delta_0 - \delta_1^* ATE_t - \delta_2^* INTCC_t - \delta_3^* REVTCC_t) + \varepsilon_{t+1} \quad (5)$$

Parameters	δ_1	δ_2	δ_3	δ_1^*	δ_2^*	δ_3^*	
Estimate	0.8176	0.9147	0.0977	0.9179	0.2571	−1.4850	
Asymptotic SE	0.0055	0.0731	0.1036	0.0388	0.5080	0.7243	
Test of Market Efficiency:[d]				$\delta_1 = \delta_1^*$	$\delta_2 = \delta_2^*$	$\delta_3 = \delta_3^*$	$\delta_k = \delta_k^*$
Likelihood Ratio Statistic:				6.7291*	1.6526	4.8654*	12.4737*

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

[a] This table reports the estimation results of the Mishkin (1983) framework. The two systems of equations are jointly estimated using an iterative nonlinear generalized least squares estimation procedure based on 12,695 observations during 1994–2001.

[b] Variables are defined as follows (all variables are scaled by average total assets): E = income before extraordinary items; ATE = aggregate earnings excluding the tax change, measured as $PTE_t(1 - ETR_{t-1})$; TCC = the tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETR_t)$; $INTCC$ = the initial tax change component of earnings, measured as $PTE_t(ETR_{t-1} - ETRQ1_t)$; and $REVTCC$ = the revised tax change component of earnings, measured as $PTE_t(ETRQ1_t - ETR_t)$.

[c] H_{2a}: The earnings expectations embedded in stock prices fail to fully reflect the persistence of the tax change component of earnings.

[d] H_{2b}: The earnings expectations embedded in stock prices fail to fully reflect the persistence of the initial (Q1) and revised (Q2, Q3, Q4) tax change component of earnings.

the valuation coefficient ($\gamma_2^* = -0.2276$) is significantly smaller than the forecasting coefficient ($\gamma_2 = 0.6914$; $\chi^2(1) = 3.7913$, $p = 0.048$).

Panel B of Table 5 reports results from the estimation of the system of Equations (3) and (5) on the full sample. The results for ATE_t are similar to those reported in Panel A: the valuation coefficient ($\delta_1^* = 0.9179$) is significantly larger than the forecasting coefficient ($\delta_1 = 0.8176$), which suggests that the market overestimates the persistence of earnings relative to its ability to forecast one-year-ahead earnings. The market appears to underestimate both the persistence of $INTCC_t$ and the persistence of $REVTCC_t$. Specifically, the valuation coefficient ($\delta_2^* = 0.2571$) is smaller than the forecasting coefficient ($\delta_2 = 0.9147$)

for $INTCC_t$, and the valuation coefficient ($\delta_3^* = -1.4850$) is less than the forecasting coefficient ($\delta_3 = 0.0977$) for $REVTCC_t$. The likelihood ratio statistics reported in Panel B indicate that the mispricing of $INTCC_t$ is not statistically significant ($\chi^2(1) = 1.652$, $p = 0.199$), while the mispricing of $REVTCC_t$ is statistically significant ($\chi^2(1) = 4.865$ $p = 0.027$).[29] These results suggest that investors do not fully understand the implications of the transitory nature of the revised tax change component.

The lower valuation coefficients (relative to the forecasting coefficients) on *TCC* and *REVTCC* are consistent with a market that punishes firms for engaging in behavior it deems representative of earnings management. DeFond and Park (2001), Bartov et al. (2002), and Gleason and Mills (2004) find that the market discounts the reward to beating earnings expectations when earnings appear to be managed.

Robustness Checks and Sensitivity Analyses

Tax (or Benefit) Applicable to Significant Unusual or Infrequently Occurring Items, Discontinued Operations, or Extraordinary Items

A provision of APB No. 28 excludes taxes related to ''significant unusual or extraordinary items that will be separately reported or reported net of their related tax effect'' from the estimated annual ETR calculation (APB No. 28, ¶19). Instead, these items should be recognized in the interim period in which they occur (APB No. 28, ¶21). To the extent that these significant unusual or extraordinary items are not randomly distributed throughout the year, they could drive the results for H_1. A similar concern exists with respect to in-process research and development (IPRD), a large ETR reconciliation item that is transitory. Because IPRD is not persistent, the transitory nature of *REVTCC* could be due to IPRD (instead of earnings management) to the extent that IPRD is either not predicted well in Q1 or IPRD is booked disproportionately in Q2–Q4. To address this concern, I identify firms that reported a merger or acquisition, divestiture, special item, or extraordinary item (Compustat item numbers FN1, 66, 17, and 192, respectively), exclude them from the sample (leaving a sample of 10,375 firm-year observations), and rerun the tests for H_1. Untabulated results indicate that the null continues to be rejected for each hypothesis.

Abnormal Returns to a Hedge Strategy

The findings from the Mishkin (1983) test suggest that stock prices do not accurately reflect the persistence of the tax change component of earnings and this mispricing is driven by the revised tax change component of earnings. In order to control for additional risk and anomaly variables, I supplement the Mishkin (1983) tests by estimating return regressions using the Fama and MacBeth (1973) technique.

The Fama and MacBeth (1973) approach calls for the formation of zero-investment hedge portfolios. To create long and short positions of the hedge portfolios, I first rank firms on the magnitude of ATE_t and equally assign firms to one of ten portfolios each year. Next, within each of the ten *ATE* portfolios, I assign firms equally into deciles based on $INTCC_t$ and $REVTCC_t$. I divide each $INTCC_t$ and $REVTCC_t$ decile number by 9 so each observation related to $INTCC_t$ or $REVTCC_t$ takes on a value ranging from 0 (for the lowest decile) to 1 (for the highest decile). I form the portfolios in this manner in order to rank firms on $INTCC_t$ or $REVTCC_t$ while controlling for the level of ATE_t. Firms in the lowest decile are firms with highest values of $INTCC_t$ and $REVTCC_t$ for a given level of ATE_t,

[29] Because the data used in the Mishkin estimation are pooled, I also estimate the system of Equations using the Fama and MacBeth (1973) approach, the benefits of which are discussed in footnote 26. The coefficient estimates from each equation are qualitatively similar, and a two-tailed difference of means t-test of the hypothesis that the mean valuation and forecasting coefficients of *REVTCC* are equal is rejected ($t = 2.38$, $p = 0.046$).

while firms in the highest decile have the lowest values of $INTCC_t$ and $REVTCC_t$ for a given level of ATE_t. The hedge portfolio is formed by taking a long (short) position in firms in the highest (lowest) decile of $INTCC_t$ or $REVTCC_t$.

I implement the Fama and MacBeth (1973) approach by estimating the following cross-sectional regression for each of the eight years in the sample:

$$AR_{t+1} = \varphi_0 + \varphi_1 INTCC_t^{dec} + \varphi_2 REVTCC_t^{dec} + \xi_{t+1} \tag{6}$$

where $INTCC_t^{dec}$ represents the scaled portfolio decile rank of the initial tax change component of earnings and $REVTCC_t^{dec}$ represents the scaled portfolio decile rank of the revised tax change component of earnings. In order for the regression coefficients to be interpreted as zero-investment portfolio returns, the returns used in the regressions must be for the same time period and the accounting information used to create the hedge portfolios must coincide chronologically and be publicly available at the time of portfolio formation. Thus, I estimate Equation (6) using firms with December year-ends only, which reduces my sample size to 8,061 firm-year observations. To further insure that the information is available to the market during the return calculation period, I also require firms to have Compustat earnings announcement dates for all four quarters in the subsequent year and these dates must fall within the 12-month buy-and-hold return interval (Thomas 2000).

The results from the Fama and MacBeth (1973) regressions in Panel A of Table 6 generally confirm the results of the Mishkin (1983) test. There is an insignificant, positive association between $INTCC_t$ and future returns in Equation (6). There is also a positive association between $REVTCC_t$ and future returns in Equation (6), however the association is marginally significant ($\varphi_2 = 0.0487$, t = 2.09). The positive sign on $REVTCC_t$ is consistent with the difference in historical and security market weightings documented using the Mishkin (1983) framework. Because the market underestimates the persistence of $REVTCC_t$, there should be positive abnormal returns for portfolios ranked on $REVTCC_t$. Thus, the abnormal return to a trading strategy based on $REVTCC_t$ is 4.87 percent.

Controlling for Additional Risk Factors and Market Anomalies

Although my measure of abnormal returns controls for three of the four commonly identified risk factors (Fama and French 1993; Carhart 1997), I also estimate the following regression to ensure that any relation between the revised tax change component of earnings and future abnormal returns is incremental to other risk factors and market anomalies identified in prior research:

$$\begin{aligned} AR_{t+1} = {} & \varphi_0 + \varphi_1 INTCC_t^{dec} + \varphi_2 REVTCC_t^{dec} + \varphi_3 BETA_t^{dec} + \varphi_4 SPEC_t^{dec} \\ & + \varphi_5 DTAX_t^{dec} + \varphi_6 VOL_t^{dec} + \varphi_7 EP_t^{dec} + \varphi_8 PTXCF_t^{dec} \\ & + \varphi_9 PTXACC_t^{dec} + \xi_{t+1} \end{aligned} \tag{7}$$

where $BETA_t$ = the slope coefficient from a regression of raw monthly returns on the value-weighted portfolio return over a 60-month period prior to the abnormal return accumulation period (Fama and French 1992), $SPEC_t$ = special items (annual Compustat item #17), computed as special items divided by average total assets (Elliott and Hanna 1996; Easton et al. 2000; Burgstahler et al. 2002), $DTAX_t$ = deferred income tax expense (annual Compustat item #50) divided by average total assets (Chaney and Jeter 1994; Philips et al. 2003; Joos et al. 2003; Hanlon 2005), VOL_t = the firm-specific annual trading volume from CRSP divided by common shares outstanding (Barth and Hutton 2004), EP_t = the earnings to

TABLE 6
Summary Regression Statistics of the Relation between Future Abnormal Stock Returns and Scaled Initial and Revised Tax Change Component Decile Rankings (Fama and MacBeth [1973] Approach)[a]

$$AR_{t+1} = \varphi_0 + \varphi_1 INTCC_t^{dec} + \varphi_2 REVTCC_t^{dec} + \xi_{t+1} \quad (6)$$

$$AR_{t+1} = \varphi_0 + \varphi_1 INTCC_t^{dec} + \varphi_2 REVTCC_t^{dec} + \varphi_3 BETA_t^{dec} + \varphi_4 SPEC_t^{dec} + \varphi_5 DTAX_t^{dec} + \varphi_6 VOL_t^{dec} + \varphi_7 EP_t^{dec} + \varphi_8 PTXCF_t^{dec} + \varphi_9 PTXACC_t^{dec} + \xi_{t+1} \quad (7)$$

Panel A: Univariate Regression—Total Period Return (n = 8,061)

Parameters[b]	φ_0	φ_1	φ_2	$\overline{R}^2$
Estimate	0.0334	0.0024	0.0487	0.0032
t-statistic	0.40	0.15	2.09‡	2.40‡
Pos/(Neg)	3/(5)	4/(4)	6/(2)	

Panel B: Regression after Controlling for Additional Risk Factors and Market Anomalies (n = 5,828)

Parameters	φ_0	φ_1	φ_2	φ_3	φ_4	φ_5	φ_6	φ_7	φ_8	φ_9	$\overline{R}^2$
Estimate	−0.0114	−0.0028	0.0594	0.1351	−0.0320	0.0425	0.0071	0.0757	−0.0400	−0.1234	0.0693
t-statistic	−0.09	−0.22	2.55†	0.96	−1.56	1.59	0.14	1.18	0.92	−2.83*	3.56*
Pos/(Neg)	4/(4)	2/(6)	7/(1)	6/(2)	2/(6)	6/(2)	4/(4)	5/(3)	2/(6)	2/(6)	

The symbols *, †, and ‡ denote conventional significance at the 0.01, 0.05, and 0.10 (two-tailed) levels, respectively. In order to account for potential serial correlation, I interpret t-statistics of 2.8 or higher on the regression coefficients as an indication of significance at the 0.05 level (Fama and French 2000).

[a] This table presents summary statistics of eight annual cross-sectional regressions estimated using the Fama and MacBeth (1973) approach. I use average slopes and their time-series standard errors to draw inferences (mean coefficients are reported first, followed by the t-statistic and the number of yearly positive (negative) coefficients). The decile rankings of *INTCC* and *REVTCC* are formed as follows: Ten portfolios are formed by first ranking firms on the magnitude of after-tax earnings, excluding the tax change (*ATE*). Next, within each of the ten *ATE* portfolios, firms are sorted evenly into deciles based on the initial tax change component of earnings and the revised tax change component of earnings. The long position consists of firms within the highest decile of each portfolio (i.e., *INTCC* or *REVTCC*), and the short position consists of firms in the lowest decile of each portfolio (i.e., *INTCC* or *REVTCC*). I estimate Equation (6) and Equation (7) using firms with December year-ends only, which results in a sample size of 8,061 and 5,828 firm-year observations, respectively.

[b] Variables are defined as follows: *AR* = Abnormal returns are defined as the 12-month buy-and-hold security return beginning April 1 and ending March 31 minus the value-weighted return of a benchmark size/book-to-market/prior year return portfolio over the same period (See Table 1 for a description of the benchmark portfolio construction); $INTCC^{dec}$ = the initial tax change component of earnings, transformed into a scaled-decile variable with values ranging from 0 to 1; $REVTCC^{dec}$ = the revised tax change component of earnings, transformed into a scaled-decile variable with values ranging from 0 to 1; $BETA^{dec}$ = systematic risk estimated from regressions of monthly raw returns on a value-weighted portfolio over a 60-month period prior to the abnormal return accumulation period, transformed into a scaled-decile variable with values ranging from 0 to 1; $SPEC^{dec}$ = special items, computed as special items divided by average total assets, transformed into a scaled-decile variable with values ranging from 0 to 1; $DTAX^{dec}$ = deferred income tax expense divided by average total assets, transformed into a scaled-decile variable with values ranging from 0 to 1; VOL^{dec} = annual trading volume divided by common shares outstanding, transformed into a scaled-decile variable with values ranging from 0 to 1; EP^{dec} = the earnings-to-price ratio, measured as income before extraordinary items divided by the fiscal year-end stock price, transformed into a scaled-decile variable with values ranging from 0 to 1; $PTXCF^{dec}$ = total pretax operating cash flow, measured as operating cash flows minus cash flow due to extraordinary items plus taxes paid in cash divided by average total assets, transformed into a scaled-decile variable with values ranging from 0 to 1; and $PTXACC^{dec}$ = total pretax operating accruals, measured as pretax income minus pretax operating cash flows divided by average total assets, transformed into a scaled-decile variable with values ranging from 0 to 1.

price ratio (Basu 1977), $PTXCF_t$ = total pretax operating cash flow, measured as operating cash flow (annual Compustat item #308) minus cash flow due to extraordinary items (annual Compustat data item #124) plus taxes paid in cash (annual Compustat data item #317) divided by average total assets (Hanlon 2005), $PTXACC_t$ = total pretax operating accruals, measured as pretax income minus pretax operating cash flows divided by average total assets (Sloan 1996; Collins and Hribar 2002). All risk and market anomaly controls are transformed into scaled decile variable with values ranging from 0 to 1. The inclusion of the additional control variables reduces the sample size used to estimate Equation (7) to 5,828 observations. The results from the Fama and MacBeth (1973) regressions in Panel B of Table 6 indicate that the marginally significant, incremental abnormal returns related to $REVTCC_t$ persist after controlling for additional risk factors and market anomalies (φ_1 = 0.0594, t = 2.55).

VI. CONCLUSIONS

I examine whether earnings generated by changes in ETRs (the tax change component) persist and aid in forecasting future earnings incremental to aggregate earnings excluding the tax change. Additionally, this study extends prior literature by testing whether the market fully incorporates the pricing effects of the persistence of the tax change component of earnings.

I find that there is a positive, significant association between the tax change component of earnings and future earnings. When I decompose the tax change component into an initial and revised portion, I find that the initial tax change component is more persistent and, therefore, more useful in forecasting future earnings than the revised tax change component. These results are consistent with my hypotheses that the initial and revised tax change components have differential persistence and forecasting implications, and dispute the broad notion that ETR-related earnings are transitory. Results from market tests indicate that investors underweight the forecasting implications of the tax change component and the mispricing appears to be driven by the transitory nature of the revised tax change component. Supplemental tests confirm that the results obtained from the market tests are likely a result of mispricing rather than alternative explanations such as omitted risk factors.

The results also suggest that investors can gain from breaking the tax change component of earnings into an initial and revised portion. To the extent that investors focus on the initial tax change component, they can better understand the persistence of earnings generated by ETR changes and, consequently, make better forecasts of future earnings. Such an understanding should also decrease the mispricing of ETR-related earnings. Investors may also benefit by focusing on the relative lack of persistence for the revised tax change component. When viewed in the context of concurrent research that finds Q2, Q3, and Q4 ETR revisions are used to meet or beat period-specific benchmarks (e.g., analyst forecasts), the lower persistence of the revised tax change component is consistent with managers using the revised tax change component as an earnings management tool. Increased attention to this issue may mitigate such behavior by managers.

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