Taxable Income as a Performance Measure:  
The Effects of Tax Planning and Earnings Quality*

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1. Introduction
Hanlon (2005) and Lev and Nissim (2004) provide rather compelling evidence that book-tax differences, on average, are systematically related to earnings growth, future stock returns, and earnings persistence. Among other implications, these studies suggest that book-tax differences are useful measures in evaluating firm performance. Consistent with these studies, Shevlin (2002) and Hanlon, Laplante, and Shevlin (2005) find that while book income explains a firm’s annual stock returns better than estimated taxable income (i.e., calculated using financial statement disclosures), estimated taxable income, on average, has incremental explanatory power for book income (i.e., estimated taxable income summarizes information reflected in stock returns that is not captured by book income). Beyond these studies, there is little evidence regarding taxable income as an alternative performance measure and, in particular, cross-sectional differences in firms that mitigate or enhance the ability of taxable income to inform investors regarding firm performance.

We look to the recent debates on book-tax conformity and extant literature to identify two settings (high tax planning and low earnings quality) that may impair or enhance the information content of taxable income relative to book income. First, recent calls for mandatory book-tax conformity argue that the dual system of reporting both book and taxable income is “the province of much creative decision-making” (Desai 2006, 8) that manifests in taxable income that does not reflect the firm’s actual performance.1 This argument identifies aggressive tax planning as a primary source of book-tax differences and suggests that the end result is taxable income devoid of a firm’s economic performance.

* Accepted by Suzanne Paquette. An earlier version of this paper was presented at the 2007 Contemporary Accounting Research Conference, generously supported by the Canadian Institute of Chartered Accountants. Ayers and Laplante gratefully acknowledge the support of the Terry College of Business and the J. M. Tull School of Accounting. Jiang gratefully acknowledges the support of the Eli Broad College of Business. We thank Michelle Hanlon, Ken Klassen, Mark Laplante, Kelly McKillop, Lil Mills, Craig Nichols, Suzanne Paquette (associate editor), Jana Smith Raedy (discussant), John Robinson, Terry Shevlin, Isabel Wang, workshop participants at Michigan State University, and participants at the 2006 Annual Conference on Financial Economics and Accounting, the 2007 American Accounting Association Annual Conference, and the 2007 Contemporary Accounting Research Conference, as well as two anonymous referees for helpful comments.

Contemporary Accounting Research Vol. 26 No. 1 (Spring 2009) pp. 15—54 © CAAA

doi:10.1506/car.26.1.1
Second, financial accounting texts, extant literature, and anecdotal evidence suggest that taxable income may be especially important in assessing firm performance for firms with lower earnings quality. Revsine, Collins, and Johnson (2002, 654) state that “an increase in a deferred tax liability might be an indication of deteriorating earnings quality”. They also state (2002, 630) that “analysts can use tax footnotes to glean information not provided elsewhere in the financial statements to better understand a firm’s performance and future prospects”. Consistent with this view, Lev and Nissim (2004) and Hanlon (2005) find that large book-tax differences, on average, are systematically associated with the quality (persistence, growth) of firm earnings. However, neither study investigates the information content of taxable income for firms with low earnings quality. Thus, as posed in Seida’s 2003 congressional testimony regarding Enron’s tax disclosures and rather sizable differences in Enron’s book and taxable income, the question remains whether taxable income may be a useful alternative measure of income in settings in which book income is considered of lower quality.

On the basis of the expectation that tax planning obscures the firm’s actual performance by minimizing the firm’s tax liability (e.g., avoiding or deferring taxable income), we hypothesize that the relative and incremental information content of taxable income is lower for high tax-planning firms. Likewise, we anticipate that the relative and incremental information content of taxable income will be higher for firms with lower-quality earnings. This expectation is based on the assumption that the “shocks” to book and taxable income and the managed components of each measure are not identical (Lev and Nissim 2004).

Similar to Hanlon et al. 2005, we define information content as the ability of book income and estimated taxable income to summarize information that affects stock returns, and we assess information content using long-window association tests. Specifically, we estimate the relative information content of estimated taxable income and book income using separate annual regressions of stock returns on first differences in estimated taxable income and book income. We estimate worldwide taxable income (federal tax expense plus foreign tax expense divided by the statutory tax rate less changes in net operating losses [NOLs]) to ensure that it is comparable to our measure of pre-tax book income, which is also a worldwide number. For each analysis, we compare the ratio of the adjusted $R^2$ for the separate tax and book regressions for the comparison group (i.e., high tax planning, low earnings quality) to the ratio of the adjusted $R^2$ for these regressions for all other firms. We also assess the incremental information content of taxable income by comparing the difference in adjusted $R^2$s from a regression of returns on both the change in book and estimated taxable income and a regression of returns on just the change in book income for the comparison group (high tax planning, low earnings quality) versus all other firms.

We identify firms as high tax planners using current effective tax rates calculated as the ratio of the sum of current tax expense over the five years from year $t - 4$ to year $t$ to the sum of pre-tax book income calculated over the same period. For this analysis, we limit our sample to firms with positive values for both the numerator (sum of current tax expense over five years) and the denominator (sum
of pre-tax book income over five years). We designate firms ranked in the lowest 20 percent of current effective tax rates for each two-digit Standard Industrial Classification (SIC) industry and year as high tax-planning firms. We define low earnings quality as earnings composed of relatively large “abnormal accruals”. We designate firms ranked in the highest 20 percent of modified Jones model abnormal accruals (absolute value) for each two-digit SIC industry and year as firms with low earnings quality.

Consistent with expectations, we find that the relative information content of estimated taxable income for high tax-planning firms is much lower than that of other firms. Specifically, although we find that estimated taxable income for high tax-planning firms continues to be significantly associated with annual stock returns, estimated taxable income for these firms explains only 40.3 percent of the annual return variation explained by book income. In contrast, estimated taxable income for all other sample firms explains 74.2 percent of annual return variation explained by book income. Additional analyses suggest that the relative information content of taxable income for high tax-planning firms versus other firms decreased significantly after 1992, a period commonly perceived to be characterized by high tax shelter activity (e.g., Treasury 1999; Government Accountability Office [GAO] 2003). From a tax policy perspective, this evidence suggests that tax planning results in a taxable income number that does not map well into the market’s perception of firm performance, especially during periods of high tax shelter activity. The results from incremental information content tests are also consistent with the information in taxable income being impaired for high tax-planning firm-years. However, the incremental information content of taxable income, on average, is moderate. Thus, we conclude that from a financial statement analysis perspective, the incremental information loss to investors from tax planning is quite modest.

Consistent with expectations, we also find that the relative and incremental information content of estimated taxable income to book income for firms with large abnormal accruals is significantly larger than that for other firms. For example, for firms with large abnormal accruals, estimated taxable income explains 66.2 percent of the annual return variation explained by book income versus 49.8 percent for all other firms. Additional analyses suggest that the relative information content of taxable income for low earnings-quality firms versus other firms increased significantly after 1992, a period marked by increased concerns of opportunistic earnings management (e.g., Levitt 1998; Katz 2002; Bergstresser and Philippon 2006). Conclusions from our incremental information content tests are similar but, again, the incremental information content of taxable income is quite modest.

In sensitivity analyses, we assess the robustness of the study’s analyses to alternative classifications of low earnings-quality firms and high tax-planning firms by running various tests to address the measurement error in taxable income, using hedge portfolio tests of our hypotheses, and segregating book and estimated taxable income into cash flow and accrual components. Conclusions are the same in each of these analyses. Of particular interest, we compare the relative and incremental information content of estimated taxable income and book income, for firms subject to Securities and Exchange Commission (SEC) enforcement action

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for overstating earnings. As expected, we find that the relative and incremental information content of estimated taxable income is particularly high for these firms (e.g., estimated taxable income explains 90.1 percent of the annual return variation explained by book income, and adding the change in estimated taxable income to the regression of the change in pre-tax income on returns increases the adjusted $R^2$ by 0.019, a 37.2 percent increase in explanatory power). Among other implications, these results suggest that the relative explanatory power of taxable income increases substantially in those settings where managers may have used opportunistic discretion in reporting book income.

This study makes several contributions. First, consistent with speculation in Desai 2006, results suggest that tax planning obscures the relation between taxable income and firm performance (as proxied by annual stock returns). Second, this study contributes to the recent literature investigating taxable income as an alternative performance measure. Consistent with speculation in Seida 2003, results suggest that taxable income becomes a more useful performance measure in settings where management may have used discretion in reporting book income. Nonetheless, we find that book income better explains annual stock returns, on average, for firms with large abnormal accruals. In sum, our evidence suggests that investors view taxable income as a supplemental, not a superior, performance measure. Third, results suggest that tax planning and low earnings quality have contrasting effects on the information content of taxable income. Given that both tax planning and events that result in low earnings quality may generate book-tax differences, this study’s findings may be particularly useful for researchers investigating book-tax differences. In particular, our analyses suggest that existing tax-planning and low earnings-quality proxies are sufficiently powerful to detect settings where book-tax differences are more likely attributable to discretion in reporting either book or taxable income. Finally, evidence that taxable income becomes less informative for high tax-planning firms and more informative for low earnings-quality firms suggests that investors, at least in part, are able to distinguish sources of book-tax differences. In the low earnings-quality setting, this evidence is consistent with the market using taxable income to assess firm performance when earnings may be questionable.

Our paper proceeds as follows. Section 2 develops hypotheses, while section 3 describes the sample data and research methods. Section 4 presents results, section 5 presents sensitivity analyses, and section 6 concludes.

2. Prior research and hypotheses
Because book and tax reporting serve different purposes and stakeholders, managers have different incentives in calculating both book and taxable income. Managers have incentives to report higher income for financial reporting purposes because of bond covenants, compensation contracts, regulatory capital requirements, etc. For tax purposes, managers have incentives to report lower taxable income. Given that managers face different incentives in reporting book and taxable income, and each measure is a summary measure of a firm’s performance based on a unique set of rules, both book and taxable income may be informative performance measures for tax authorities and financial statement users. Specifically, each measure should be
informative if the “shocks” to taxable income and book income and the managed components of each measure are not identical (Lev and Nissim 2004). Anecdotal and empirical evidence confirms this expectation. For example, Internal Revenue Service (IRS) audit manuals instruct internal revenue agents to reconcile book and tax amounts and question any differences when auditing corporate tax returns. Likewise, Mills (1998) finds that IRS audit adjustments increase as the book-tax gap widens (i.e., as book income exceeds taxable income), providing further evidence that tax authorities view book income as an informative measure of a firm’s tax base.

Recent literature also suggests that taxable income is an informative measure of firm performance for financial statement users. Hanlon (2005) and Lev and Nissim (2004) find that book-tax differences are systematically related to earnings growth, future stock returns, and earnings persistence, suggesting that book-tax differences are useful measures in evaluating firm performance. Consistent with these studies, Shevlin (2002) and Hanlon et al. (2005) find that although book income better explains a firm’s annual stock returns than taxable income (calculated using financial statement disclosures), estimated taxable income has significant incremental explanatory power to book income. Beyond these studies, there is little evidence regarding taxable income as an alternative performance measure. Despite the paucity of evidence, there is ample speculation regarding taxable income as a performance measure, especially in settings where the firm engages in tax planning or has lower earnings quality.

Tax-planning hypothesis development

Concerned by large differences between income reported for financial statement and tax purposes, recent calls for mandatory book-tax conformity argue that the dual system of reporting book and taxable income manifests in taxable income that does not reflect the firm’s actual performance. Our analyses speak to this debate by analyzing the information content of estimated taxable income for high tax-planning firms. On the basis of the expectation that tax planning obscures the firm’s actual performance by minimizing the firm’s tax liability (e.g., by avoiding or deferring taxable income), we hypothesize that, ceteris paribus, the information content of taxable income will be lower for high tax-planning firms.

Despite the rather clear preceding prediction, there is debate whether tax planning enhances or adversely affects the information content of taxable income. Lev and Nissim (2004) argue that, under the assumption that firms “smooth” taxable income to minimize the present value of income taxes, tax planning actually enhances the ability of taxable income to inform investors regarding future earnings growth. Specifically, under the assumption that smoothing is the optimal tax-planning strategy, taxable income (after tax planning) provides a better indicator of the firm’s expected income in the future (i.e., higher taxable income suggests a higher expected future income). However, Graham and Smith (1999) conclude that 75 percent of firms have little tax-based incentive to smooth earnings. Consistent with Graham and Smith 1999, we contend that most firms have incentives to avoid or defer tax, and thus, we expect that tax planning decreases the information content of taxable income. Our first hypothesis stated in the alternative is:
HYPOTHESIS 1. High tax-planning firms have relatively less informative taxable income than other firms.

Earnings-quality hypothesis development

Revsine et al. (2002, 654) state that “an increase in a deferred tax liability might be an indication of deteriorating earnings quality”. They also state (2002, 630) that “analysts can use tax footnotes to glean information not provided elsewhere in the financial statements to better understand a firm’s performance and future prospects”. Likewise, Seida (2003), in his congressional testimony regarding Enron’s tax disclosures and rather sizable differences in Enron’s book and taxable incomes, poses the question whether taxable income may be a useful alternative measure of income. Consistent with this view, Lev and Nissim (2004) and Hanlon (2005) find that large book-tax differences are systematically associated with the quality (persistence, growth) of firm earnings. Among other implications, these studies suggest that taxable income may have enhanced information content as a summary performance measure when book income is of lower quality. Nonetheless, this is not a foregone conclusion (e.g., Joos, Pratt, and Young 2000; Frank, Lynch, and Rego 2006). Instead, the enhanced information content of taxable income in this setting depends on the source of the lower earnings quality and the extent to which taxable income is likewise affected. For example, if lower earnings quality results from opportunistic management discretion (e.g., discretion used to mislead investors), we anticipate that taxable income will have enhanced information content to the extent that taxable income does not reflect management discretion. Erickson, Hanlon, and Maydew (2004) show that of 27 firms accused of fraudulently overstating book income, 15 firms willingly paid taxes on fraudulent earnings. Their evidence is consistent with some, but not all, firms trading off higher taxes in exchange for higher book income. In contrast, if the low earnings quality results from transitory events (i.e., value-relevant events with low persistence) reflected in book income but not yet in taxable income (the write-down of purchased goodwill, restructuring charges, mark-to-market adjustments, etc.), then the relative information content of taxable income (i.e., the relative ability of current year taxable income to explain returns) could actually decrease. Thus, it is an empirical question whether taxable income has enhanced information content when earnings are of lower quality. Our second hypothesis stated in alternative form is:

HYPOTHESIS 2. Firms with lower earnings quality have relatively more informative taxable income.

3. Research methods

We conduct long-window tests of the information content of estimated taxable and book income for high tax-planning firms in Hypothesis 1 and low earnings-quality firms in Hypothesis 2 relative to all other firms. Information content is defined as the ability of either estimated taxable income or book income to capture or summarize information that affects returns. This definition does not mean that the information in book or taxable income causes returns to vary, rather a number has information
content if it reflects, or is associated with, information that equity investors find useful in assessing firm performance. Because we are interested in examining the ability of taxable or book income to summarize all information that affects returns and are not concerned with causality, we use long-window association tests.

We conduct two association tests to assess the information content of estimated taxable income and book income. We use 16-month windows ending 4 months after the fiscal year-end to test for a statistical association between the two measures of income and security returns to ensure that market participants have received the annual income numbers. This is especially pertinent to our setting because tax returns are confidential, and we derive an estimate of taxable income from details in the financial statements. We follow Hanlon et al. 2005 in calculating taxable and book income. Our primary measure of estimated taxable income \( TI \) for firm \( j \) at time \( t \) is estimated as follows:

\[
TI_{jt} = \left[ \frac{FTE_{jt} + FOTE_{jt}}{str} \right] - \Delta NOL_{jt} \quad (1),
\]

where \( FTE \) is current federal income tax expense (data 63), \( FOTE \) is current foreign tax expense (data 64), \( str \) is the top U.S. statutory tax rate for year \( t \), and \( \Delta NOL \) is the change in net operating loss carryforwards (data 52).\(^{11}\) We subtract \( \Delta NOL \) because we require an estimate of the firm’s taxable income (or loss) prior to the effects of any carrybacks or carryforwards.\(^{12}\)

Plesko (2000, 2006) provides evidence that taxable income calculated from financial statements is highly and significantly correlated with firms’ actual taxable income, thus providing some assurance that taxable income estimated from financial statements is a reasonable proxy for a firm’s actual taxable income.\(^{13}\) Nonetheless, Hanlon (2003) identifies seven major problems in estimating a firm’s tax liability and hence taxable income from financial statement disclosures. Briefly, the issues include accounting for employee stock options exercises, intraperiod tax allocation, consolidation, reserves for uncertain tax positions, tax credits, foreign operations, and negative taxable income. Although each of these issues contributes to potential measurement error in our estimate of taxable income, as in Hanlon et al. 2005, the first three issues should not affect our inferences (see Appendix A of Hanlon et al. 2005 for a detailed discussion related to the current setting), and lack of firm disclosure prevents us from evaluating the effects of the tax cushion on our analyses.\(^{14}\) Because we compare the relative information content of estimated taxable income across groups of firms, measurement error in taxable income resulting from the last three issues is less of a concern to the extent that the error is not systematically related to how we classify high tax-planning and low earnings-quality firms. We address these last three issues in sensitivity analysis in section 5 to provide assurance that these issues do not significantly influence our results.\(^{15}\)

Because our estimate of taxable income represents the worldwide income of the firm, we also estimate worldwide book income. Our measure of book income \( PTBI \) for firm \( j \) at time \( t \) is calculated as follows:

\[
PTBI_{jt} = PTB_{jt} - MI_{jt} \quad (2),
\]
where $PTB$ is pre-tax book income (data 170) and $MI$ is minority interest (data 49). We use a pre-tax measure of book income to be consistent with estimated taxable income, which is a pre-tax measure.

**Test 1: Information content**

In our first test, we examine the ratio of the information content of estimated taxable income to book income for high tax-planning firms versus all other firms to test Hypothesis 1. We conduct a similar test for low earnings-quality firms to test Hypothesis 2. We measure the information content of estimated taxable income and book income separately as the adjusted $R^2$ in regressions of security returns on each measure. To implement this test, we estimate the following two equations annually for each group of firms (high tax planners versus all others for Hypothesis 1; low earnings-quality firms versus all others for Hypothesis 2):

\[ R_{jt} = \alpha_0 + \alpha_1 \Delta TI_{jt} + \varepsilon_{jt} \quad (3), \]

\[ R_{jt} = \alpha_0 + \alpha_1 \Delta PTBI_{jt} + \varepsilon_{jt} \quad (4), \]

where $R_{jt}$ is the buy-and-hold market-adjusted return to security $j$ over the 16-month return window starting at the beginning of fiscal year $t$ and ending 4 months after the end of fiscal year $t$. The changes in estimated taxable income and book income, $\Delta TI_{jt}$ and $\Delta PTBI_{jt}$, are equal to the difference in each measure for firm $j$ from year $t - 1$ to year $t$ [(TI$_{jt}$ - TI$_{jt-1}$) and (PTBI$_{jt}$ - PTBI$_{jt-1}$)], each scaled by the market value of equity measured at the start of fiscal year $t$, respectively. TI$_{jt}$ and PTBI$_{jt}$ are as previously defined. We use a changes specification (i.e., returns and changes in estimated taxable income and book income) to mitigate concerns associated with levels regressions such as correlated omitted variables and heteroscedasticity (Kothari 2001).

Our test statistic is the average ratio of the adjusted $R^2$ from (3) to the adjusted $R^2$ from (4) for each group of firms over our sample period, as follows:

\[ \text{Adjusted } R^2_{\text{taxable income}} / \text{Adjusted } R^2_{\text{book income}} \quad (5). \]

An advantage of this statistic is that it allows us to compare the information content of two performance measures (estimated taxable income and book income), holding returns for the firm constant. This measure does not simply compare the adjusted $R^2$ of estimated taxable income across samples, which would be susceptible to a variety of alternative explanations. Instead, this measure compares the relative information content of estimated taxable income to book income for groups of firms segregated on tax (tax-planning) and accounting (earnings-quality) characteristics. For an unidentified variable to influence our inferences, not only would it have to affect the information content of estimated taxable income relative to book income but also do so in the manner predicted for high tax-planning and low earnings-quality firms.

For Hypothesis 1, we predict that the ratio represented by (5) will be lower for high tax-planning firms than for all other firms because the relative information...
content of taxable income is reduced for high tax-planning firms. For Hypothesis 2, we predict that the ratio represented by (5) will be higher for firms with lower earnings quality than for all other firms because the relative information content of taxable income is enhanced for the low earnings-quality firms. We test significance using both $t$-tests and Wilcoxon rank sum tests of the yearly values of (5).

**Test 2: Incremental explanatory power of taxable income**

In our second test, we assess the additional explanatory power (i.e., the incremental or unique explanatory power) of including estimated taxable income in a regression of book income on returns for high tax-planning firms versus all other firms (Hypothesis 1). We conduct a similar test for low earnings-quality firms versus all other firms (Hypothesis 2). We measure the additional explanatory power of estimated taxable income as the difference in the adjusted $R^2$ from a regression of returns on both the change in estimated taxable income and book income and the adjusted $R^2$ from (4). To implement this test, we estimate (4) and the following equation annually for each group of firms (high tax planners versus all other firms to test Hypothesis 1 and low earnings-quality firms versus all other firms to test Hypothesis 2):

$$R_{jt} = \beta_0 + \beta_1 \Delta PTBI_{jt} + \beta_2 \Delta TI_{jt} + \varepsilon_{jt}$$  \hspace{1cm} (6),

where all of the variables are as previously defined.

Our test statistic for this test is the difference in the adjusted $R^2$ from (6) and the adjusted $R^2$ from (4) for each group of firms over our sample period, as follows:

Adjusted $R^2_{(6)} - \text{Adjusted } R^2_{(4)}$  \hspace{1cm} (7).

Our expectations for these tests are the same as discussed in Hypothesis 1 and Hypothesis 2. For Hypothesis 1, the difference represented by (7) will be lower for high tax-planning firms than for all other firms if tax planning reduces the information content of estimated taxable income. For Hypothesis 2, the difference represented by (7) will be higher for firms identified as low earnings-quality firms than for all other firms if the relative information content of estimated taxable income is enhanced for firms with lower earnings quality.

**Identification of high tax-planning firms**

Dyreng, Hanlon, and Maydew (2008) argue that tax-avoidance firms are those that are able to sustain a low tax rate over multiple years. Following their logic regarding sustainability, we identify high tax-planning firms as firms in the lowest quintile of accumulated effective tax rates ($ETR$) for each year and two-digit SIC industry calculated as follows:

$$ETR_{jt} = \frac{\sum_{m = t - 4}^{t} CTE_{jm}}{\sum_{m = t - 4}^{t} PTB_{jm}}$$  \hspace{1cm} (8),
where $CTE$ is current tax expense equal to total tax expense (data 16) less deferred tax expense (data 50) for firm $j$ over the five-year period from $t - 4$ through $t$, and $PTB$ is as previously defined, also accumulated for firm $j$ over the five-year period from $t - 4$ through $t$. We exclude deferred tax expense from $ETR$ because it represents future tax effects from current transactions and not taxes due in the current period (Dyreng et al. 2008). Measuring $ETR$ this way captures both timing and avoidance tax-planning strategies (i.e., both deferring and permanently avoiding taxable income result in lower $ETR$s).

Despite its advantages (e.g., current tax expense is readily available), the traditional measure of $ETR$ has its limitations. First, $ETR$ is an accrual-based measure of tax avoidance and measures the actual taxes paid with error, because the accrued expense often differs from the actual payment to the government due to challenges by the IRS or mistakes made in estimating current tax expense (Dyreng et al. 2008). If, for example, a firm accrues an expense for an uncertain tax position that later is resolved in its favor, the current tax expense overstates the actual liability. Similarly, if the IRS disallows a questionable position, the current tax expense may understate the actual liability. The second limitation of $ETR$ is that it excludes the benefit of the deduction for stock options — that is, current tax expense is overstated for firms with stock option deductions. We address these limitations in two ways. First, we accumulate $ETR$ over a five-year period, which allows for some offsetting of over- and understatements of tax liability (i.e., mitigating the first limitation). Second, as an alternative measure of tax avoidance, we calculate our accumulated $ETR$ using actual cash taxes paid (i.e., instead of current tax expense), which addresses both limitations.

**Identification of low earnings-quality firms**

We use abnormal accruals to define earnings quality. Although abnormal accrual models are subject to criticism in their ability to isolate discretion (McNichols and Wilson 1988; Dechow, Sloan, and Sweeney 1995; Kasznik 1999; McNichols 2000; Dechow, Richardson, and Tuna 2003; Kothari, Leone, and Wasley 2005; Hribar and Nichols 2006; etc.), this study’s setting is less susceptible to these criticisms because we are interested in the ability of taxable income to inform investors where managers use discretion in reporting income and/or where book income may be more difficult to interpret (as one may expect when firms have large abnormal accruals). We identify firms as low earnings-quality firms by designating firms ranked in the highest 20 percent of absolute abnormal accruals for each year and two-digit SIC industry as having low earnings quality. We estimate abnormal accruals as the difference between total accruals and modified Jones model normal accruals (Dechow et al. 1995; DeFond and Subramanyam 1998; Dechow et al. 2003; Kothari et al. 2005). Modified Jones model normal accruals are estimated using the following equation cross-sectionally by year for each two-digit SIC industry with at least 10 observations:

$$
\frac{TACC_{jt}}{TA_{jt-1}} = \alpha_0 + \left[ \alpha_1 \left( \frac{1}{TA_{jt-1}} \right) \right] + \alpha_2 \left( \frac{\Delta Sales_{jt} + \Delta REC_{jt}}{TA_{jt-1}} \right) + \alpha_3 \left( \frac{PPE_{jt}}{TA_{jt-1}} \right) + \varepsilon_{jt} \tag{9},
$$

where $CTE$ is current tax expense equal to total tax expense (data 16) less deferred tax expense (data 50) for firm $j$ over the five-year period from $t - 4$ through $t$, and $PTB$ is as previously defined, also accumulated for firm $j$ over the five-year period from $t - 4$ through $t$. We exclude deferred tax expense from $ETR$ because it represents future tax effects from current transactions and not taxes due in the current period (Dyreng et al. 2008). Measuring $ETR$ this way captures both timing and avoidance tax-planning strategies (i.e., both deferring and permanently avoiding taxable income result in lower $ETR$s).

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where $TACC$ is total accruals measured as the change in current assets (data 4), plus the change in short-term debt (data 34), less the change in current liabilities (data 5), the change in cash (data 1), and depreciation and amortization expense (data 14) for firm $j$ in year $t$. $\Delta Sales$ is the change in sales (data 12) from year $t - 1$ to year $t$, and $\Delta REC$ is the change in accounts receivable (data 2) from year $t - 1$ to year $t$. $PPE_{jt}$ is firm $j$’s gross property, plant, and equipment (data 7) for year $t$. We deflate all variables except the constant term by beginning of the year total assets for firm $j$, $TA_{jt-1}$ (data 6). We include an intercept term in (9) because Kothari et al. (2005, 173) advocate that this term helps alleviate heteroscedasticity, mitigate concerns regarding an omitted size variable, and generate a more symmetric measure of abnormal accruals.

4. Results

Sample discussion

Our primary sample consists of firms with available data in the intersection of the 2005 COMPUSTAT industrial annual files and the Center for Research in Security Prices (CRSP) stock return files covering the period from 1983 through 2002. We exclude financial institutions (SIC codes 6000–6999), utilities (SIC codes 4900–4999), and firms incorporated outside the United States because they operate in regulated industries or under different regulations and face a different set of tax and/or book rules from other firms. We eliminate any firm-year observation in which the fiscal year-end changes to ensure that observations are comparable across years. We also exclude any firm-year observations with the absolute value of the change in pre-tax book income or estimated taxable income greater than one to avoid the influence of extreme values. For the tax-planning analyses, we limit our sample to firms with positive values for both the numerator (sum of current tax expense over five years) and the denominator (sum of pre-tax income over five years) from (8). Finally, firm-year observations must have sufficient data to allow us to estimate taxable income, pre-tax book income, and return variables as discussed in section 3. These criteria result in a sample of 50,760 firm-years for the tax-planning analyses using the accrual-based $ETR$, 24,558 firm-years using the cash-based $ETR$, and 74,403 firm-years for the low earnings-quality analyses. The samples for the tax-planning analyses are smaller due to the calculation of the tax-planning variable, $ETR$, described in (8). The sample based on cash-based $ETR$ is considerably smaller because cash taxes paid is available in the statement of cash flows beginning in 1988.

Descriptive statistics

Table 1 reports descriptive statistics for our sample and empirical proxies. Panel A reports descriptive statistics for the overall sample, the high tax-planning (HTP) sample, and all other (AO) firms where we identify high tax planners using $ETR$. Panel B reports descriptive statistics for the tax-planning sample using Cash $ETR$ to identify high tax planners. In panels A and B, descriptive data suggest that high tax-planning firms have lower tax rates (by construction) and higher changes in
pre-tax book income, $\Delta PTBI$. There is no consistent pattern in returns and changes in estimated taxable income, $\Delta TI$, between high tax planners identified by $ETR$ and all other firms. High tax planners identified by $Cash ETR$ have both higher returns and higher changes in estimated taxable income than all other firms.

Panel C of Table 1 provides descriptive statistics for our low earnings-quality sample. The low earnings-quality sample has higher abnormal accruals (by construction) and a significantly lower change in pre-tax book income than all other firms. This latter evidence suggests our sample of low earnings-quality firm-years is skewed toward firms with negative changes in book income. We find no difference in changes in estimated taxable income for the low earnings-quality firms relative to all other firms.27

Main results

Tables 2 and 3 present results for Hypothesis 1 with results based on our primary measure of tax planning, $ETR$, in Table 2 and our alternative measure, $Cash ETR$, in Table 3. Table 4 presents the results for the low earnings-quality analysis. We identify significant differences across samples using both $t$-tests and Wilcoxon rank sum tests, which test whether the average value of adjusted $R^2_{taxable income}/adjusted R^2_{book income}$ (or adjusted $R^2_{book income + taxable income} - adjusted R^2_{book income}$) for

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
</table>

Descriptive statistics

**Panel A:** Sample descriptive statistics and tests for differences in means across high tax-planning firms (defined using $Book ETR$s) and all other firms*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Significant difference†</th>
<th>Mean</th>
<th>s.d.</th>
<th>25% quartile</th>
<th>Median</th>
<th>75% quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td>0.058</td>
<td>0.714</td>
<td>−0.372</td>
<td>−0.066</td>
<td>0.303</td>
<td></td>
</tr>
<tr>
<td>High tax-planning firms $HTP \approx AO$</td>
<td>0.054</td>
<td>0.756</td>
<td>−0.411</td>
<td>−0.095</td>
<td>0.316</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td>0.059</td>
<td>0.704</td>
<td>−0.363</td>
<td>−0.06</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td><strong>$\Delta PTBI$</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td>0.009</td>
<td>0.128</td>
<td>−0.032</td>
<td>0.012</td>
<td>0.049</td>
<td></td>
</tr>
<tr>
<td>High tax-planning firms $HTP &gt; AO$</td>
<td>0.013</td>
<td>0.128</td>
<td>−0.034</td>
<td>0.013</td>
<td>0.055</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td>0.008</td>
<td>0.128</td>
<td>−0.032</td>
<td>0.012</td>
<td>0.047</td>
<td></td>
</tr>
<tr>
<td><strong>$\Delta TI$</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td>0.008</td>
<td>0.119</td>
<td>−0.029</td>
<td>0.007</td>
<td>0.044</td>
<td></td>
</tr>
<tr>
<td>High tax-planning firms $HTP \approx AO$</td>
<td>0.009</td>
<td>0.118</td>
<td>−0.025</td>
<td>0.004</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td>0.008</td>
<td>0.119</td>
<td>−0.03</td>
<td>0.008</td>
<td>0.045</td>
<td></td>
</tr>
<tr>
<td><strong>Book ETR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td>0.384</td>
<td>0.2</td>
<td>0.278</td>
<td>0.37</td>
<td>0.442</td>
<td></td>
</tr>
<tr>
<td>High tax-planning firms $HTP &lt; AO$</td>
<td>0.163</td>
<td>0.088</td>
<td>0.088</td>
<td>0.17</td>
<td>0.236</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td>0.435</td>
<td>0.183</td>
<td>0.338</td>
<td>0.395</td>
<td>0.464</td>
<td></td>
</tr>
</tbody>
</table>

(The table is continued on the next page.)
TABLE 1 (Continued)

### Panel B: Sample descriptive statistics and tests for differences in means across high tax-planning firms (defined using Cash ETRs) and all other firms§

<table>
<thead>
<tr>
<th>Variables</th>
<th>Significant difference†</th>
<th>Mean</th>
<th>s.d.</th>
<th>25% quartile</th>
<th>Median</th>
<th>75% quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.086</td>
<td>0.752</td>
<td>−0.364</td>
<td>−0.049</td>
<td>0.338</td>
</tr>
<tr>
<td>High tax-planning firms HTP &gt; AO</td>
<td>0.144</td>
<td>0.866</td>
<td>−0.376</td>
<td>−0.03</td>
<td>0.408</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>0.072</td>
<td>0.722</td>
<td>−0.361</td>
<td>−0.052</td>
<td>0.324</td>
</tr>
<tr>
<td><strong>ΔPTBI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.009</td>
<td>0.125</td>
<td>−0.03</td>
<td>0.012</td>
<td>0.046</td>
</tr>
<tr>
<td>High tax-planning firms HTP &gt; AO</td>
<td>0.022</td>
<td>0.12</td>
<td>−0.018</td>
<td>0.017</td>
<td>0.056</td>
<td></td>
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<tr>
<td>All other firms</td>
<td></td>
<td>0.006</td>
<td>0.127</td>
<td>−0.033</td>
<td>0.01</td>
<td>0.044</td>
</tr>
<tr>
<td><strong>ΔTI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.005</td>
<td>0.11</td>
<td>−0.027</td>
<td>0.006</td>
<td>0.039</td>
</tr>
<tr>
<td>High tax-planning firms HTP &gt; AO</td>
<td>0.015</td>
<td>0.111</td>
<td>−0.017</td>
<td>0.007</td>
<td>0.042</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>0.003</td>
<td>0.109</td>
<td>−0.031</td>
<td>0.005</td>
<td>0.038</td>
</tr>
<tr>
<td><strong>Cash ETR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.368</td>
<td>0.216</td>
<td>0.245</td>
<td>0.34</td>
<td>0.426</td>
</tr>
<tr>
<td>High tax-planning firms HTP &lt; AO</td>
<td>0.136</td>
<td>0.079</td>
<td>0.07</td>
<td>0.139</td>
<td>0.193</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>0.422</td>
<td>0.202</td>
<td>0.305</td>
<td>0.369</td>
<td>0.456</td>
</tr>
</tbody>
</table>

### Panel C: Sample descriptive statistics and tests for differences in means across high abnormal accruals firms and all other firms§

<table>
<thead>
<tr>
<th>Variables</th>
<th>Significant difference§</th>
<th>Mean</th>
<th>s.d.</th>
<th>25% quartile</th>
<th>Median</th>
<th>75% quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>−0.014</td>
<td>0.819</td>
<td>−0.507</td>
<td>−0.157</td>
<td>0.246</td>
</tr>
<tr>
<td>High accrual firms HA ≈ AO</td>
<td>−0.019</td>
<td>0.964</td>
<td>−0.626</td>
<td>−0.235</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>−0.013</td>
<td>0.779</td>
<td>−0.476</td>
<td>−0.142</td>
<td>0.243</td>
</tr>
<tr>
<td><strong>ΔPTBI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.002</td>
<td>0.184</td>
<td>−0.053</td>
<td>0.008</td>
<td>0.055</td>
</tr>
<tr>
<td>High accrual firms HA &lt; AO</td>
<td>−0.007</td>
<td>0.223</td>
<td>−0.084</td>
<td>0.006</td>
<td>0.071</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>0.005</td>
<td>0.173</td>
<td>−0.047</td>
<td>0.008</td>
<td>0.052</td>
</tr>
<tr>
<td><strong>ΔTI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall sample</td>
<td></td>
<td>0.004</td>
<td>0.157</td>
<td>−0.034</td>
<td>0</td>
<td>0.042</td>
</tr>
<tr>
<td>High accrual firms HA ≈ AO</td>
<td>0.001</td>
<td>0.187</td>
<td>−0.046</td>
<td>0</td>
<td>0.053</td>
<td></td>
</tr>
<tr>
<td>All other firms</td>
<td></td>
<td>0.005</td>
<td>0.148</td>
<td>−0.032</td>
<td>0.001</td>
<td>0.04</td>
</tr>
</tbody>
</table>

(The table is continued on the next page.)
TABLE 1 (Continued)

Notes:
* The overall sample consists of 50,760 firm-years from 1983 to 2002. The “high tax-planning firms” subsample consists of the 9,677 firm-years whose Book ETRs over five years are in the bottom quintile, ranked by two-digit SIC industry and year. The “all other firms” subsample consists of the remaining 41,083 firm-years whose Book ETRs over five years are in the top four quintiles, ranked by two-digit SIC industry and year.

† Significant differences between the high-tax planning (HTP) firm-years and all other (AO) firm-years are based on t-tests of means and Wilcoxon rank sum tests of medians (p-value < 0.05).

‡ The overall sample consists of 24,558 firm-years from 1992 to 2002. The “high tax-planning firms” subsample consists of the 4,659 firm-years whose Cash ETRs over five years are in the bottom quintile, ranked by two-digit SIC industry and year. The “all other firms” subsample consists of the remaining 19,899 firm-years whose Cash ETRs over five years are in the top four quintiles, ranked by two-digit SIC industry and year.

§ The overall sample consists of 74,403 firm-years from 1983 to 2002. The “high accrual firms” subsample consists of the 14,662 firm-years whose absolute values of abnormal accruals are in the top quintile, ranked by two-digit SIC industry and year. The “all other firms” subsample consists of 59,741 firm-years whose absolute value of abnormal accruals are not in the top quintile, ranked by two-digit SIC industry and year.

# Significant differences between the high accrual (HA) firm-years and all other (AO) firm-years are based on t-tests of means and Wilcoxon rank sum tests of medians (p-value < 0.05).

\[ \text{Return} = \text{the buy-and-hold market-adjusted return to firm } j \text{ over the 16-month return window starting at the beginning of fiscal year } t \text{ and ending 4 months after the end of fiscal year } t. \]

\[ \Delta PTBI = \text{the change of pre-tax book income deflated by the market value of equity at the start of fiscal year } t \text{ where pre-tax book income is (data 170) minus minority interest (data 49).} \]

\[ \Delta TI = \text{the change in estimated taxable income deflated by the market value of equity at the start of fiscal year } t. \text{ Taxable income is the sum of federal tax expense (data 63) and foreign tax expense (data 64) grossed up by the top U.S. statutory tax rate minus the change in net operating loss carryforwards (data 52). If both data 63 and data 64 are missing, we measure tax expense as the difference between total income tax expense (data 16) and the deferred portion of income tax expense (data 50).} \]

\[ \text{Book ETR} = \text{current tax expense (data 16) – data 50) divided by pre-tax income (data 170), each summed over five years from } t - 4 \text{ through } t. \]

(The table is continued on the next page.)
high tax-planning firms or high accrual firms is significantly different from that of all other firms.\textsuperscript{28}

In panel A of Table 2, we find that the relative information content of estimated taxable income for high tax-planning firms is much lower ($p < 0.001$, one-tailed $t$-test) compared with all other firms. Specifically, estimated taxable income for high tax-planning firm-years only explains 40.3 percent of the annual return variation explained by book income (i.e., the adjusted $R^2_{\text{taxable income}}/\text{adjusted } R^2_{\text{book income}} = 40.3$ percent) versus 74.2 percent for all other firms (i.e., the adjusted $R^2_{\text{taxable income}}/\text{adjusted } R^2_{\text{book income}} = 74.2$ percent). Results for the tax-planning firm-years identified by Cash ETR in panel A of Table 3 are similar in that the high tax-planning firm-years only explain 40.9 percent of the annual return variation explained by book income compared with 80.3 percent for all other firms.

Table 2 reports the average adjusted $R^2$ ratio pre-1993, post-1992, and across all sample years. U.S. Treasury (1999) and the Government Accountability Office (GAO) (2003) suggest that tax shelter activity increased dramatically beginning in the early 1990s. Consistent with increased aggressive tax planning during this period, results suggest that the relative information content of estimated taxable income for high tax-planning firms versus other firms decreased post-1992. Specifically, the difference in the adjusted $R^2$ ratio for high tax-planning firms versus all other firms decreased from $-0.247$ (i.e., $0.402 - 0.649$) pre-1993 to $-0.430$ (i.e., $0.405 - 0.835$) post-1992 ($p$-value $= 0.03$, one-tailed $t$-test). We note that the difference in the adjusted $R^2$ ratio for high tax-planning firms versus all other firms pre-1993 to post-1992 is attributable to an increase in the adjusted $R^2$ ratio for “all other firms” post-1992. This result is consistent with the estimated taxable income of high tax-planning firms becoming relatively less informative post-1992. However, it is possible that other events explain the larger differences in the relative information content of estimated taxable income post-1992 for high tax-planning firms versus all other firms. For example, Statement of Financial Accounting Standards No. 109 (SFAS No. 109) (Financial Accounting Standards Board [FASB] 1992) was effective for years beginning after December 15, 1992. SFAS No. 109 has little effect on the calculation of current tax expense. Ceteris paribus, we know of no reason why SFAS No. 109 would systematically influence the information content of estimated taxable income or pre-tax book income for high tax-planning or low earnings-quality firms in a manner that would significantly bias results in annual return variation.
TABLE 2
Hypothesis 1 results: High tax-planning firms (defined using Book ETRs) versus all other firms

**Panel A**: Relative information content of estimated taxable income to book income for high tax-planning firms (defined using Book ETRs) and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>ΔPTBI</th>
<th>R²ptbi</th>
<th>ΔTI</th>
<th>R²TI</th>
<th>R²TI / R²ptbi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Prior93</td>
<td>452</td>
<td>1.990†</td>
<td>0.176</td>
<td>1.364†</td>
<td>0.071</td>
<td>0.402†</td>
</tr>
<tr>
<td>Ave_Post92</td>
<td>516</td>
<td>2.427†</td>
<td>0.142</td>
<td>1.738†</td>
<td>0.059</td>
<td>0.405§</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>484</td>
<td>2.208†</td>
<td>0.159</td>
<td>1.551†</td>
<td>0.065</td>
<td>0.403#</td>
</tr>
</tbody>
</table>

**Panel B**: Incremental information content of estimated taxable income for high tax-planning firms (defined using Book ETRs) and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>ΔPTBI</th>
<th>R²ptbi</th>
<th>ΔTI</th>
<th>R²TI</th>
<th>R²TI / R²ptbi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Prior93</td>
<td>452</td>
<td>1.990†</td>
<td>0.176</td>
<td>1.364†</td>
<td>0.071</td>
<td>0.402†</td>
</tr>
<tr>
<td>Ave_Post92</td>
<td>516</td>
<td>2.427†</td>
<td>0.142</td>
<td>1.738†</td>
<td>0.059</td>
<td>0.405§</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>484</td>
<td>2.208†</td>
<td>0.159</td>
<td>1.551†</td>
<td>0.065</td>
<td>0.403#</td>
</tr>
</tbody>
</table>

(The table is continued on the next page.)
TABLE 2 (Continued)

Notes:

* The overall sample consists of 50,760 firm-years from 1983 to 2002. The “high tax-planning firms” subsample consists of the 9,677 firm-years whose book ETRs over five years are in the bottom quintile, ranked by two-digit SIC industry and year. The “all other firms” subsample consists of the remaining 41,083 firm-years whose book ETRs over five years are in the top four quintiles, ranked by two-digit SIC industry and year.

† p-value of ≤ 0.01 (one-tailed t-test) based on the distribution of coefficients across years (i.e., Fama-McBeth).

‡ 0.402 < 0.649, p-value = 0.001 (t-test), or p-value = 0.002 (Wilcoxon rank sum test), one-tailed test computed using the pre-1993 yearly values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

§ 0.405 < 0.742, p-value < 0.001 (t-test), or p-value < 0.001 (Wilcoxon rank sum test), one-tailed test computed using the values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

# 0.405 < 0.742, p-value < 0.001 (t-test), or p-value < 0.001 (Wilcoxon rank sum test), one-tailed test computed using the post-1992 yearly values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

** p-value of ≤ 0.05 (one-tailed t-test) based on the distribution of coefficients across years (i.e., Fama-McBeth).

†† 0.002 < 0.006, p-value = 0.013 (t-test), or p-value = 0.009 (Wilcoxon rank sum test), one-tailed test computed using the post-1992 yearly values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

‡‡ 0.004 < 0.011, p-value < 0.003 (t-test), or p-value < 0.001 (Wilcoxon rank sum test), one-tailed test computed using the yearly values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

§§ 0.001 < 0.001, p-value < 0.001 (t-test), or p-value < 0.001 (Wilcoxon rank sum test), one-tailed test computed using the yearly values of $R^2_{PTBI}/R^2_{PTBI}$ for high tax-planning firms versus all other firms.

Relative information content $= R^2_{PTBI}/R^2_{PTBI} = \text{ratio of the adjusted } R^2 \text{ from a regression of } Return \text{ on the change in estimated taxable income } (\Delta TI) \text{ to the adjusted } R^2 \text{ from a regression of } Return \text{ on the change in pre-tax book income } (\Delta PTBI)$.

$R^2_{PTBI} = \text{adjusted } R^2 \text{ from a regression of } Return \text{ on the change in pre-tax book income } (\Delta PTBI)$.  

$R^2_{TI} = \text{adjusted } R^2 \text{ from a regression of } Return \text{ on the change in estimated taxable income } (\Delta TI)$.  

Incremental information content $= R^2_{PTBI} + TI - R^2_{PTBI} = \text{difference in the adjusted } R^2 \text{ from a regression of } Return \text{ on the change in pre-tax book income } (\Delta PTBI) \text{ and a regression of } Return \text{ on the change in pre-tax book income } (\Delta PTBI) \text{ and the change in estimated taxable income } (\Delta TI)$.  

$R^2_{PTBI} + TI = \text{adjusted } R^2 \text{ from a regression of } Return \text{ on the change in pre-tax book income } (\Delta PTBI) \text{ and the change in estimated taxable income } (\Delta TI)$.  

Other variables are as defined in Table 1.
### Table 3
Hypothesis 1 results: High tax-planning firms (defined using Cash ETRs) versus all other firms

#### Panel A: Relative information content of estimated taxable income to book income for high tax-planning firms (defined using Cash ETRs) and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.*</th>
<th>ΔPTBI</th>
<th>$R^2_{PTBI}$</th>
<th>ΔTI</th>
<th>$R^2_{TI}$</th>
<th>$R^2_{TI}/R^2_{PTBI}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Post92</td>
<td>436</td>
<td>2.451†</td>
<td>0.134</td>
<td>1.758†</td>
<td>0.054</td>
<td>0.393‡</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>424</td>
<td>2.524†</td>
<td>0.142</td>
<td>1.828†</td>
<td>0.061</td>
<td>0.409§</td>
</tr>
</tbody>
</table>

#### Panel B: Incremental information content of estimated taxable income for high tax-planning firms (defined using Cash ETRs) and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.*</th>
<th>ΔPTBI</th>
<th>$R^2_{PTBI}$</th>
<th>ΔTI</th>
<th>$R^2_{PTBI}$ + ΔTI</th>
<th>$R^2_{PTBI}$ + ΔTI / $R^2_{PTBI}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Post92</td>
<td>436</td>
<td>2.451†</td>
<td>0.134</td>
<td>2.192†</td>
<td>0.062†</td>
<td>0.005#</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>424</td>
<td>2.524†</td>
<td>0.142</td>
<td>2.243†</td>
<td>0.063‡</td>
<td>0.005**</td>
</tr>
</tbody>
</table>

(The table is continued on the next page.)
favor of finding an increased difference in the relative information content of estimated taxable income post-1992. Nonetheless, we cannot eliminate this possibility.

The results from our second association test reported in panel B of Table 2 are also consistent with the incremental information in estimated taxable income being impaired for high tax-planning firm-years. Adding the change in estimated taxable income to the regression of the change in pre-tax income on returns increases the adjusted $R^2$ by 0.004 (a 2.5 percent increase in explanatory power) for high tax-planning firms compared with an increase in the adjusted $R^2$ by 0.011 (a 7.3 percent increase in explanatory power) for all other firms. Results for the tax-planning firm-years based on Cash ETR in panel B of Table 3 generate the same inference. Adding the change in estimated taxable income to the regression of returns on the change in book income increases the adjusted $R^2$ by 0.016 (a 3.5 percent increase in explanatory power) and by 1.6 percent for all other firms (an 11.3 percent increase in explanatory power) ($p$-value = 0.001, one-tailed $t$-test). Although these results suggest that the incremental information content of taxable income for high tax-planning firms is approximately 36 percent ($0.004/0.011 \times 100 = 36$ percent) and 31 percent ($0.005/0.016$) of the incremental information content of taxable income for all other firms in Tables 2 and 3, respectively, the incremental information content for taxable income, in general, is quite modest.
We draw two conclusions from the analysis of the effects of tax planning on the information content of estimated taxable income. First, consistent with Hypothesis 1, we find that relative and incremental information content of taxable income is impaired for high tax-planning firm-years. From a tax policy perspective, the significant decline in the relative information content of taxable income (e.g., from 74.2 percent for all other firms to 40.3 percent for high tax-planning firms) suggests that tax planning results in a taxable income number that does not map well into the market’s perception of firm performance. Second, although we find a statistically significant decline in the incremental information content for high tax-planning firms, the incremental information content of estimated taxable income, on average, is moderate. Thus, the incremental information loss to investors associated with tax planning is quite modest.

Hypothesis 2 predicts that the relative information content of taxable income to book income is higher for firm-years with low earnings quality. Results in panel A of Table 4 confirm this expectation. Specifically, for firm-years with large abnormal accruals, estimated taxable income explains 66.2 percent of the annual return variation explained by book income (i.e., the adjusted $R^2_{\text{taxable income}}$/adjusted $R^2_{\text{book income}} = 66.2$ percent) versus 49.8 percent for all other firms. As well, the additional explanatory power of adding the change in estimated taxable income to a regression of returns on a change in pre-tax income is larger for the firm-years with low earnings quality as reported in panel B of Table 4. As before, the difference in explanatory power is modest (0.009 versus 0.005) but significant in the predicted direction ($p$-value $= 0.062$, one-tailed test). Overall, the results from Table 4 are consistent with Hypothesis 2, which predicts that the information content of taxable income relative to book income is higher for firms with low-quality earnings.

The pre-1993 and post-1992 analyses in Table 4 provide an opportunity to evaluate changes in the information content of estimated taxable income for low earnings-quality firms over time. Bergstresser and Philippon (2006) suggest increased concern of opportunistic earnings management/poor earnings quality during the latter period. Consistent with decreased earnings quality during this period, results suggest that the relative information content of estimated taxable income for low earnings-quality firms versus other firms increased significantly post-1992. Specifically, the difference in adjusted $R^2$ ratio for low earnings-quality firms versus all other firms increased from 0.008 (i.e., $0.536 - 0.528$) pre-1993 to 0.319 (i.e., $0.788 - 0.469$) post-1992 ($p$-value $= 0.033$, one-tailed $t$-test).

We note that the explanatory power of pre-tax book income for returns decreased across all groups from the pre-1993 to post-1992 period (i.e., the adjusted $R^2_{\text{book income}}$ reported in Tables 2 and 4 is lower in the post-1992 period than in the pre-1993 period), yet changes in the explanatory power of taxable income (adjusted $R^2_{\text{taxable income}}$) vary. Although this pattern is consistent with decreased earnings quality in the post-1992 period, the adjusted $R^2$s from different samples are not directly comparable. Accordingly, we do not base our conclusions on the changes in adjusted $R^2_{\text{book income}}$. As discussed earlier, it is possible that an event such as the implementation of SFAS No. 109 affected the information content of pre-tax book income post-1992, but we know of no reason why this or any other
TABLE 4
Hypothesis 2 results: High abnormal accruals firms versus all other firms

Panel A: Relative information content of estimated taxable income to book income for high abnormal accruals firms and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>ΔPTBI</th>
<th>R²PTBI</th>
<th>ΔTI</th>
<th>R²TI</th>
<th>R²TI/R²PTBI</th>
<th>High accruals firms</th>
<th>All other firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Prior93</td>
<td>656</td>
<td>1.097†</td>
<td>0.101</td>
<td>0.872†</td>
<td>0.053</td>
<td>0.536‡</td>
<td>2,679</td>
<td>1.155†</td>
</tr>
<tr>
<td>Ave_Post92</td>
<td>810</td>
<td>1.131†</td>
<td>0.069</td>
<td>1.358†</td>
<td>0.05</td>
<td>0.788§</td>
<td>3,295</td>
<td>1.233†</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>733</td>
<td>1.114†</td>
<td>0.085</td>
<td>1.115†</td>
<td>0.052</td>
<td>0.662#</td>
<td>2,987</td>
<td>1.194†</td>
</tr>
</tbody>
</table>

Panel B: Incremental information content of estimated taxable income for high abnormal accrual firms and for all other firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>ΔPTBI</th>
<th>R²PTBI</th>
<th>ΔTI</th>
<th>R²TI + TI - R²PTBI</th>
<th>High accruals firms</th>
<th>All other firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave_Prior93</td>
<td>656</td>
<td>1.097†</td>
<td>0.101</td>
<td>0.276†</td>
<td>0.0105</td>
<td>0.004**</td>
<td>2,679</td>
</tr>
<tr>
<td>Ave_Post92</td>
<td>810</td>
<td>1.131†</td>
<td>0.069</td>
<td>0.866†</td>
<td>0.084</td>
<td>0.015††</td>
<td>3,295</td>
</tr>
<tr>
<td>Ave_tot</td>
<td>733</td>
<td>1.114†</td>
<td>0.085</td>
<td>0.571†</td>
<td>0.094</td>
<td>0.009††</td>
<td>2,987</td>
</tr>
</tbody>
</table>

(The table is continued on the next page.)
5. Sensitivity analyses

We perform sensitivity analyses to address three critical research design issues: (a) the classification of low earnings-quality firms; (b) the classification of high tax-planning firms; and (c) measurement error in taxable income. We also examine whether results are robust to segregating book and estimated taxable income into cash flow and accrual components, and the hedge portfolio tests. Finally, we provide evidence regarding the relative information content of estimated taxable income.

Notes:

* The overall sample consists of 74,403 firm-years from 1983 to 2002. The “high abnormal accrual firms” subsample consists of the 14,662 firm-years whose absolute values of abnormal accruals are in the top quintile, ranked by two-digit SIC industry and year. The “all other firms” subsample consists of 59,741 firm-years whose absolute value of abnormal accruals are not in the top quintile, ranked by two-digit SIC industry and year.

† p-value of ≤ 0.01 (one-tailed t-test) based on the distribution of coefficients across years (i.e., Fama-McBeth).

‡ 0.536 > 0.528, p-value = 0.460 (t-test), or p-value = 0.396 (Wilcoxon rank sum test), one-tailed test computed using the pre-1993 yearly values of $R^2_{TI}/R^2_{PTBI}$ for high abnormal accruals firms versus all other firms.

§ 0.788 > 0.469, p-value = 0.025 (t-test), or p-value = 0.013 (Wilcoxon rank sum test), one-tailed test computed using the post-1992 yearly values of $R^2_{TI}/R^2_{PTBI}$ for high abnormal accruals firms versus all other firms.

# 0.662 > 0.498, p-value = 0.034 (t-test), or p-value = 0.070 (Wilcoxon rank sum test), one-tailed test computed using the yearly values of $R^2_{TI}/R^2_{PTBI}$ for high abnormal accruals firms versus all other firms.

** 0.004 > 0.004, p-value = 0.427 (t-test), or p-value = 0.081 (Wilcoxon rank sum test), one-tailed test computed using the pre-1993 yearly values of $R^2_{PTBI} + TI - R^2_{PTBI}$ for high abnormal accruals firms vs. all other firms.

†† 0.015 > 0.007, p-value = 0.025 (t-test), or p-value = 0.038 (Wilcoxon rank sum test), one-tailed test computed using the post-1992 yearly values of $R^2_{PTBI} + TI - R^2_{PTBI}$ for high abnormal accruals firms versus all other firms.

‡‡ 0.009 > 0.005, p-value = 0.062 (t-test), or p-value = 0.328 (Wilcoxon rank sum test), one-tailed test computed using the yearly values of $R^2_{PTBI} + TI - R^2_{PTBI}$ for high abnormal accruals firms versus all other firms.

Variables are as defined in Tables 1 and 2.
income to book income for groups of firms segregated into quintiles using our measures of tax planning and earnings quality.

Classification of low earnings-quality firms: An analysis of firms subject to SEC enforcement actions

To further test the relative information content of taxable income when book income is of lower quality, we collect a sample of firms subject to SEC enforcement action for allegedly overstating earnings. This sample does not rely on estimated accruals to identify firms with lower accounting quality and, thus, provides a strong test of Hypothesis 2. Erickson, Hanlon, and Maydew (2004) find that firms are willing to pay additional tax for overstated earnings, which suggests that taxable income for these firms may also be of lower quality. Thus, it is an empirical question whether taxable income is more informative in this setting.

Following the method in Dechow et al. 1995, 1996, we conducted a keyword search for “section 13(a)” in the Accounting and Auditing Enforcement Releases (AAER) Database through Lexis-Nexis. We searched for AAERs issued between 1994 and 2004 with an identified manipulation between 1989 and 2002. We eliminated releases involving violation of auditing standards, multiple releases involving the same firms, and firms not having stock returns, pre-tax book income, or taxable income. The final sample consists of 246 firm-years subject to enforcement actions by the SEC between 1989 and 2002 for overstating earnings. Results presented in Table 5 show that the sample has an adjusted $R^2$ ratio of 0.901 and that adding the change in estimated taxable income to the regression of returns on the change in pre-tax income increases the adjusted $R^2$ by 0.019 (a 37.2 percent increase in explanatory power) for these firms. By comparison, the adjusted $R^2$ ratio for “all other firms” reported in the last column of panel A of Table 4 is significantly lower (0.498 < 0.901, $p$-value < 0.001, one-tailed $t$-test). Likewise, the incremental information content of estimated taxable income for “all other firms” reported in the last column of panel B of Table 4 is significantly lower (0.005 < 0.019, $p$-value < 0.001, one-tailed $t$-test). In sum, results suggest that taxable income has significant relative and incremental information content for firms overstating earnings.

Classification of high tax-planning firms

A potential issue with our classification of tax-planning firms is that we may identify firms that are managing earnings upward instead of tax planning (i.e., managing taxable income downward). If firms manage earnings upward but do not simultaneously increase their current tax expense, then our measure of taxable income is low relative to book income, and the resulting book-tax difference results not from tax planning per se but from managing earnings. To the extent that the “high tax-planning” sample includes these firms, tests should be biased against the tax-planning hypothesis (Hypothesis 1). Specifically, Hypothesis 1 predicts that the taxable income of high tax-planning firms should be less informative than that of other firms. If the tax-planning sample merely represents firms that manage earnings upward, we expect that the taxable income of these firms is more informative than that of other firms (as predicted for low earnings-quality firms in Hypothesis 2).
This table presents results from tests of the relative information content and incremental explanatory power of taxable income for firms subject to SEC enforcement action for overstating earnings. Sample firms include firms with an Accounting and Auditing Enforcement Release (AAER) issued between 1994 and 2004 with an identified manipulation between fiscal years 1989 and 2002.

* p-value of ≤0.01 (one-tailed t-test).
† The relative information content of taxable income to book income (i.e., $R^2_{TI}/R^2_{PTBI}$) for the AAER firms (0.901) is significantly greater than that for “all other firms” (i.e., high earnings-quality firms) from Table 4, panel A (0.498) — i.e., 0.901 > 0.498, p-value < 0.001, one-tailed t-test.
‡ p-value of ≤0.05 (one-tailed t-test).
§ The incremental information content of taxable income (i.e., $R^2_{PTBI + TI} - R^2_{PTBI}$) for the AAER firms (0.019) is significantly greater than the incremental information content of taxable income for “all other firms” (i.e., high earnings-quality firms) from Table 4, panel A (0.005) — i.e., 0.019 > 0.005, p-value < 0.001, one-tailed t-test.

Variables are as defined in Tables 1 and 2.
mitigate the concern that the tax-planning sample is characterized by firms managing earnings, we examine the intersection of the high tax-planning and low earnings-quality samples. We note that only 17 percent of the high tax-planning firms (i.e., 3.4 percent of the total sample) are classified as low earnings-quality firms. All inferences remain the same after excluding these firms from our analyses.

As an alternative method of identifying high tax-planning firms, we use the parameter estimates in the “investments in tax planning” model in Mills, Erickson, and Maydew 1998 to classify firms as high tax-planning firms. Using confidential survey data for a sample of large corporations, Mills et al. (1998) find that tax-planning costs (i.e., in-house and outsourced tax-related expenditures) decrease with firm size and increase with foreign operations, capital intensity, and the firm’s number of legal entities. They find positive but not statistically significant associations between tax-related expenditures and firm leverage and inventory. We use the following parameter estimates from their model to identify high tax-planning firms:

\[
PLANNING = 0.52 + (-0.09) \times SIZE + 0.15 \times FOREIGN + 0.22 \times LEVERAGE + 0.59 \times CAPITAL + 0.39 \times INVENTORY + 0.0006 \times ENTITY
\]

where:

- \(PLANNING\) = the sum of tax department salaries and outside legal, accounting, and other tax-planning expenditure reported in Mills et al. 1998, expressed as a percentage of selling, general, and administrative (SG&A) expenses.
- \(SIZE\) = the natural log of total sales (data 12) plus 1.
- \(FOREIGN\) = a dummy variable equal to 1 if \([\text{domestic income (data 272)}]/[\text{domestic income (data 272)} + \text{foreign income (data 273)}] \approx 0.5\). We note that Mills et al. (1998) define \(FOREIGN\) equal to 1 if their sample firm reports foreign assets.
- \(LEVERAGE\) = long-term debt (data 9) divided by total assets (data 6).
- \(CAPITAL\) = property, plant, and equipment (data 8) divided by total assets (data 6).
- \(INVENTORY\) = inventory (data 3) divided by total assets (data 6).

Because the number of subsidiaries, branches, and joint ventures per company (\(ENTITY\)) is not publicly available, we do not incorporate this variable into our analysis. Omitting this variable should not significantly influence our results because the analyses in Mills et al. 1998 suggest that \(ENTITY\) has a very small effect on \(PLANNING\). For each sample firm, we estimate \(PLANNING\) using the above parameter estimates. The Pearson correlation between our estimated values of \(PLANNING\) and \(ETR\) in our sample is \(-0.29\), which is very similar to that in Mills et al. 1998 (i.e., \(-0.25\)). We rank the estimated values of \(PLANNING\) by year.
and two-digit SIC industry and classify firms in the top 20 percent of PLANNING per year and industry as high tax-planning firms. We then reestimate our regression analyses comparing the information content of estimated taxable income for high tax-planning firms with all other firms. Inferences based on these analyses are identical to those reported in the tables (i.e., the relative and incremental information content of estimated taxable income declines for high tax-planning firms).

**Measurement error in taxable income**

As discussed in section 3, we calculate taxable income from income statement disclosures. We perform several sensitivity tests to assess whether our results are robust to various sources of measurement error in taxable income. Our first two tests address the fact that tax expense is reported after tax credits (e.g., investment tax credit, research and development, and foreign tax credit), which reduces current tax expense and understates our measure of taxable income relative to actual taxable income. In addition, for firms with foreign operations, there is an issue as to which tax rate is appropriate to use in grossing up tax expense to arrive at taxable income. To the extent that tax expense reflects amounts paid to foreign governments at different tax rates from those in the United States, our measure of taxable income contains measurement error. We address these issues by reestimating our analyses after eliminating multinational firms and firms with high levels of research and development activities.

We classify firms as multinationals if their ratio of domestic income (data 272) over domestic plus foreign income (data 273) is less than or equal to 50 percent. We classify firms as high research and development firms if their ratio of research and development expenses (data 46) to sales (data 12) is in the upper quartile. Inferences remain the same.

We also employ an alternative specification of taxable income (taxable income without permanent differences) that may be less susceptible to the measurement error concerns associated with tax credits and foreign taxes. We estimate taxable income without permanent differences (TIPD) as follows:

\[
TIPD_{jt} = \frac{(PTB_{jt} - MI_{jt}) - (DTE_{jt}/str)}{DTE_{jt}/str} \quad (10),
\]

where \(PTB\) is pre-tax book income (data 170), \(MI\) is minority interest (data 49), \(DTE\) is deferred tax expense (data 50) for firm \(j\) at time \(t\), and \(str\) is the statutory tax rate applicable at time \(t\). \(TIPD\) represents a measure of taxable income before permanent differences. We reestimate our analyses using \(TIPD\) from (10) in place of \(TI\) from (1). Inferences remain the same, suggesting that measurement error related to permanent differences does not significantly influence our results.

Because current tax expense is truncated at zero for firms with negative taxable income, taxable income for these firms may be overstated. We address this issue in our main analysis by subtracting the change in net operating loss carryforward from our estimate of taxable income. In sensitivity tests, we duplicate our tests using firm-years in which the change in NOL is zero. Conclusions are the same.

Finally, in our main analyses we gross up federal tax expense and foreign tax expense by the U.S. statutory tax rate and subtract any change in net operating
losses to estimate taxable income. To mitigate concerns associated with uniformly using the statutory U.S. tax rate in this calculation, we estimate our analyses replacing our estimate of taxable income with the three components of the taxable income calculation: current federal tax expense ($FTE$), current foreign tax expense ($FOTE$), and the change in net operating loss ($\Delta NOL$). Results are also robust when we reestimate these analyses using cash taxes paid instead of current federal and foreign tax expense.

**Segregation into cash flows and accruals**

In our primary analysis, we find that the information content of estimated taxable income relative to book income is significantly lower for high tax-planning firms and significantly higher for low earnings-quality firms than for all other firms. In supplemental analyses, we test whether these relations hold when we separate the change in book income into the change in book accruals and the change in cash flows, and separate the change in estimated taxable income into the change in estimated tax accruals and the change in cash flows. Taxable income is based on accrual concepts, but some of the rules for revenue recognition and deductions are based on cash flows, such that taxable income is a mixture of accrual and cash flow concepts that vary by transaction. Thus, there are substantial differences between taxable income and both cash flows and book income. Hanlon et al. (2005) report that both book and taxable income exhibit greater relative and incremental information content than cash flow from operations in their sample. Their findings are consistent with prior research, which shows that book income is relatively more informative to investors than cash flows from operations, which suggests that, on average, accruals are beneficial to investors (Dechow 1994). The evidence in Hanlon et al. 2005 is also consistent with estimated taxable income being a useful measure for investors.

We identify cash flows from a firm’s cash flow statement (data 308). Results, in general, are consistent with those reported in the tables. The differences in information content of estimated tax accruals and book accruals are statistically significant for high tax-planning firms relative to all other firms (i.e., tax accruals are less informative for high tax-planning firms). For the low earnings-quality firms, we find that, post-1993, the information content of tax accruals relative to book accruals is significantly higher for low earnings-quality firms than for all other firms. In sum, results suggest that the relation between cash flows and estimated taxable income does not unduly influence our primary findings.

**Hedge portfolio return tests**

As an alternative to comparing adjusted $R^2$s, prior literature (e.g., Alford et al. 1993; Francis and Schipper 1999; Ali and Hwang 2000) uses a hedge portfolio approach to assess the proportion of total realized returns that could be earned if one had perfect foresight of the income measure at the start of the period. This approach does not assume a linear relation between accounting information and returns, and it controls for changes in market volatility. However, the hedge portfolio approach “does not fully utilize the information about the relative magnitudes
of earnings within each portfolio” (Ali and Hwang 2000, 13). Because market volatility across time or across samples is less of a concern in our setting, we use test statistics based on the adjusted $R^2$ (i.e., the adjusted $R^2$ ratio) in our primary tests. Nevertheless, in sensitivity tests, we employ an approach similar to that employed in prior literature (e.g., Ali and Hwang 2000; Alford et al. 1993; Francis and Schipper 1999) by calculating the following hedge portfolios:

1. **TIHP** (taxable-income-based hedge portfolio): For each group (tax planners versus all other firms for Hypothesis 1, or low earnings-quality firms versus all other firms for Hypothesis 2), we rank the change in taxable income by year and two-digit SIC industry and take a long position in firms ranked in the top 30 percent and a short position in firms ranked in the bottom 30 percent.

2. **BIHP** (book-income-based hedge portfolio): For each group (tax planners versus all other firms for Hypothesis 1, or low earnings-quality firms versus all other firms for Hypothesis 2), we rank the change in pre-tax book income by year and two-digit SIC industry and take a long position in firms ranked in the top 30 percent and a short position in firms ranked in the bottom 30 percent.

3. **RHP** (return-based hedge portfolio): For each group (tax planners versus all other firms for Hypothesis 1, or low earnings-quality firms versus all other firms for Hypothesis 2), we rank the change in returns by year and two-digit SIC industry and take a long position in firms ranked in the top 30 percent and a short position in firms ranked in the bottom 30 percent.

With these variables we calculate the following measures for each group of firms (tax planners and all others for Hypothesis 1 and low earnings-quality firms and all others for Hypothesis 2):

\[ B_{ret} = \frac{BIHP}{RHP} = \frac{\text{returns from the book income hedge portfolio}}{\text{returns from the return-based hedge portfolio}}; \]

\[ T_{ret} = \frac{TIHP}{RHP} = \frac{\text{returns from the taxable income hedge portfolio}}{\text{returns from the return-based hedge portfolio}}; \]

\[ T/B = \frac{TIHP}{BIHP} = \frac{\text{returns from the taxable income hedge portfolio}}{\text{returns from the book income hedge portfolio}}. \]

**BIHP (TIHP)** represents the total realized returns that could be earned for the year if book (taxable) income is known in advance (i.e., if one had perfect foresight). The measure $B_{ret}$ ($T_{ret}$) represents the proportion of information in returns that is captured by book income (taxable income), while $T/B$ is simply the ratio of the returns earned from perfect foresight of taxable income to returns earned from perfect foresight of book income. A higher $T/B$ suggests a relatively more informative taxable income. To test our hypotheses, we compare the mean and median differences in $T/B$ across groups (tax planners versus all others for Hypothesis 1 and low earnings-quality firms versus all others for Hypothesis 2).
Inferences for Hypothesis 1 and Hypothesis 2 are similar to those reported in our primary tests. Specifically, the returns earned from perfect foresight of taxable income relative to returns earned from perfect foresight of book income decrease for high tax-planning firms and increase for low earnings-quality firms.

**The relative information content of estimated taxable income across quintiles**

In our main analyses, we designate firms in the bottom (top) quintile of current effective tax rates (absolute value of abnormal accruals) in each two-digit SIC industry and year as high tax-planning (low earnings-quality) firms. To evaluate further the relation between the information content of taxable income and tax planning and earnings quality, we investigate how the relative information content of estimated taxable income to book income changes across ETR and abnormal accrual quintiles. Figure 1 indicates that, in general, as the current effective tax rate decreases, the relative information content of estimated taxable income to book income across ETR and abnormal accrual quintiles.

**Figure 1**  The relative information content of taxable income to book income across ETR and abnormal accrual quintiles (from the highest to the lowest ETR quintile and from the lowest to the highest abnormal accruals quintile)

![Diagram showing the relative information content of taxable income to book income across ETR and abnormal accrual quintiles.](image)

**Notes:**

Figure 1 shows how the adjusted $R^2$ ratio (adjusted $R^2_{\text{taxable income}}$/adjusted $R^2_{\text{book income}}$) changes from the top quintile to the bottom quintile of firms ranked by year and two-digit SIC industry by ETR and Cash ETR, and from the bottom quintile to the top quintile of firms ranked by year and two-digit SIC industry by the absolute value of abnormal accruals.
income also declines. The largest decline occurs for firms in the lowest ETR quintile. The results across abnormal accrual (i.e., earnings quality) quintiles are less stark. Specifically, we find that the relative information content of estimated taxable income to book income only improves for firms in the top quintile of high abnormal accruals. In sum, these results suggest that the effects of tax planning and earnings quality on the information content of taxable income are most pronounced for those firms in the lowest ETR and highest abnormal accruals quintiles, respectively.

6. Conclusion
On the basis of extant literature and anecdotal evidence, we identify two settings (high tax planning and low earnings quality) that may impair or enhance the information content of taxable income relative to book income. Following Hanlon et al. 2005, we estimate the relative information content of tax and book income using separate annual regressions of stock returns on first differences in estimated taxable income and book income. We designate firms ranked in the lowest 20 percent of accumulated current effective tax rates for each two-digit SIC industry and year as high tax-planning firms. We designate firms ranked in the highest 20 percent of modified Jones model abnormal accruals (absolute value) for each two-digit SIC industry and year as low earnings quality firms.

Consistent with expectations, we find that the relative information content of estimated taxable income for high tax-planning firms is much lower than that of other firms. Additional analyses suggest that the relative information content of taxable income for high tax-planning firms versus other firms decreased significantly post-1992, a period commonly perceived to be characterized by high tax shelter activity. From a tax policy perspective, this evidence suggests that tax planning results in a taxable income number that does not map well into the market’s perception of firm performance, especially during periods of high tax shelter activity. The results from our incremental information content tests are also consistent with the information in taxable income being impaired for high tax-planning firm-years. However, the incremental information content of taxable income, on average, is moderate. Thus, we conclude that the incremental information loss to investors from tax planning is quite modest.

We also find that the relative information content of estimated taxable income to book income for firms with large abnormal accruals is significantly larger compared with other firms. Our evidence also suggests that the relative information content of taxable income for low earnings-quality firms versus other firms increased significantly post-1992, a period marked by increased concerns of opportunistic earnings management. Conclusions from our incremental information content tests are similar, but the incremental information content of taxable income is quite modest. In sensitivity analysis, we compare the information content of estimated taxable income and book income for firms subject to SEC enforcement action for overstating earnings. We find that both the relative and incremental information content of estimated taxable income is particularly high for these firms. Among other implications, these results suggest that the relative explanatory
power of taxable income increases substantially in those settings where managers may have used opportunistic discretion in reporting book income.

This study makes several contributions. Consistent with speculation in Desai 2006, results suggest that tax planning obscures the relation between taxable income and firm performance (as proxied by annual stock returns). Second, our analyses contribute to the recent literature investigating taxable income as an alternative performance measure. Consistent with speculation in Seida 2003, results suggest that taxable income becomes a more useful performance measure in settings where management may have used discretion in reporting book income. Nonetheless, consistent with Hanlon et al. 2005, we find that book income better explains annual stock returns, on average, for firms with large abnormal accruals. In sum, our evidence suggests that investors view taxable income as a supplemental, and not superior, performance measure. Third, results suggest that tax planning and low earnings quality have contrasting effects on the information content of taxable income. Given that both tax planning and events that result in low earnings quality can generate book-tax differences, our findings may be particularly useful for researchers investigating book-tax differences as a measure of discretion or earnings quality. In particular, our analyses suggest that existing tax-planning and low earnings-quality proxies are sufficiently powerful to detect settings where book-tax differences are likely attributable to discretion in reporting book or taxable income. Finally, evidence that taxable income becomes less informative for high tax-planning firms and more informative for firms with low earnings quality suggests that investors, at least in part, are able to distinguish sources of book-tax differences. In the low earnings-quality setting, this evidence is consistent with the market using taxable income to assess firm performance when earnings may be questionable.

Our study is subject to certain limitations. As discussed in section 3 (“Research Methods”) and section 5 (“Sensitivity Analyses”), we estimate taxable income from publicly available financial statements. While this calculation contains measurement error, it is the measure that is available to the market, which is pertinent in our setting. We also identify tax-planning firms using a firm’s effective tax rate. The effective tax rate is problematic because, among other things, it measures actual taxes paid with error, and it excludes benefits related to employee stock option deductions. We address these limitations by accumulating the effective tax rate over five years and using alternative measures of tax planning, alternative specifications of taxable income, and sensitivity analyses. We group firms according to abnormal accruals, which is a somewhat nebulous measure of earnings quality. We use abnormal accruals to define earnings quality because we are interested in the ability of taxable income to inform investors in settings where managers may have used discretion in reporting book income and/or where book income may be more difficult to evaluate as represented by large abnormal accruals. In sensitivity analyses, we investigate the relative informativeness of estimated taxable income and book income for firms subject to SEC enforcement action for overstating earnings. We find that the information content of estimated taxable income for these firms is particularly acute, suggesting that our results, at least in
part, capture low earnings quality. Finally, we find that after 1992 the relative and incremental information content of estimated taxable income decreased significantly for high tax-planning firms and increased significantly for firms with lower earnings quality. These results are consistent with increased concerns of aggressive tax sheltering and opportunistic earnings management during this period. Nonetheless, we are unable to eliminate the possibility that other events influenced the relative and incremental information content of estimated taxable income for these firms during this period.

Endnotes

1. Proponents of book-tax conformity argue that companies should either pay tax on their financial reporting income (e.g., tax laws and accounting rules should be rewritten to reduce the differences between the two systems) or, at the minimum, disclose more tax return information to investors. Given the potential consequences to the capital markets and the Treasury (McClelland and Mills 2007), these proposals have sparked considerable debate by regulators, practitioners, and academics. See Hanlon and Shevlin 2003; Lenter, Shackelford, and Slemrod 2003; Mills and Plesko 2003; Yin 2001; etc.

2. The term “information content” is used by some researchers to examine long-window associations between earnings and returns (e.g., Ball and Brown 1968; Alford, Jones, Leftwich, and Zmijewski 1993) but is used by others to refer to an event study that examines, for example, whether earnings announcements have a stock price effect at the time of the announcement (for a discussion, see Watts and Zimmerman 1986, 39). Given the nature of our tests, we use the same terminology as in Hanlon et al. 2005.

3. Because tax return data are not publicly available, we are not able to estimate our analyses with actual tax return data. However, Plesko (2006) reports that he is unable to reject the null hypothesis of no difference between taxable income estimated from the financial statements (grossing up federal tax expense, COMPUSTAT data 63 [unless otherwise noted, “data” refers to COMPUSTAT data items]) and either taxable income from Form 1120 (line 28) or taxable income subject to tax from Form 1120 (line 28 less special deductions and NOL carryovers) for 37,853 firm-years from 1994 to 2001. Thus, our tests should be significantly powerful to detect those settings in which taxable income is more or less informative as an alternative performance metric. As discussed in detail later in the text, we conduct several sensitivity analyses to address the measurement error in taxable income.

4. Sloan (1996) defines low-quality earnings as earnings composed primarily of accruals and finds that accruals are less persistent than cash flows. Subsequent studies (e.g., Xie 2001) find that abnormal accruals are less persistent than “normal accruals” or cash flows. We use abnormal accruals to define earnings quality because we are interested in the ability of taxable income to inform investors in settings where managers may have used discretion in reporting book income and/or where book income may be more difficult to evaluate as represented by large abnormal accruals. Hribar and Nichols (2006) question the ability of unsigned abnormal accruals to detect earnings management. While firms that manage earnings represent a subset of firms with low earnings quality, our tests using abnormal accruals are not intended to isolate these firms. In sensitivity analyses (discussed later), we investigate a sample of firms with...
low earnings quality resulting from earnings management (i.e., firms subject to Securities Exchange Commission [SEC] enforcement action for overstating earnings). As expected, we find that the relative and incremental information content of taxable income is enhanced for these firms.

5. Results are similar when we use cash effective tax rates (Dyreng, Hanlon, and Maydew 2008) to identify high tax-planning firms.

6. There are situations in which firms prefer reporting lower income because, for example, of political costs and compensation contracts. See Watts and Zimmerman 1986 for a discussion of the contracting reasons associated with political costs and Healy 1985 for evidence regarding compensation contracts.

7. To the extent that the shocks to taxable income and book income are similar, we do not anticipate that taxable income will be incrementally informative to book income.


9. The incentive to smooth taxable income is a function of the convexity of the present value of income taxes in taxable income that is attributable to (a) a progressive tax rate schedule, (b) the alternative minimum tax and investment tax credit, and (c) asymmetric treatment of taxable income and losses. Graham and Smith (1999) suggest that the asymmetric treatment of taxable income and losses creates most of the observed convexity of income taxes in taxable income.

10. Joos et al. (2000) examine whether investors shift their reliance from book income to taxable income when firms have large book-tax differences. They find that the information content of taxable income does not change when book-tax differences are large. In contrast, we predict and find that two sources of book-tax differences (tax planning and low earnings quality) have opposite effects on the relative information content of taxable and book income.

Frank et al. (2006) find that aggressive tax planning accompanies lower earnings quality. This effect biases against our predicted results in our second hypothesis because we expect that aggressive tax planning for firms with low earnings quality will reduce the information content of taxable income.

11. Statutory tax rates \( (str) \) equal 46 percent for 1986 and prior tax years, 40 percent for 1987, 34 percent for tax years 1988 through 1992, and 35 percent thereafter.

12. If federal income tax expense is missing from COMPUSTAT, we estimate \( TI \) as the difference between total income tax expense (data 16) and deferred taxes (data 50) divided by the top statutory tax rate for year \( t \), \( str_t \), less the change in NOL carryforwards, \( \Delta NOL_{jt} \).

Mills et al. (2003) examine COMPUSTAT’s reporting of NOLs in a setting that focuses on U.S. income. Because we are examining worldwide income, the screens they suggest that help mitigate problems with COMPUSTAT NOLs are not applicable to our calculations.

13. Plesko (2000, 2006) restricts the sample of firm-years used in his primary tests to exclude firms with foreign operations, and any apparent differences in consolidation for book and tax purposes. Plesko (2006) also compares financial statement and tax return data for an unrestricted sample of 37,853 firm-years from 1994 to 2001. For this sample, he is unable to reject the null hypothesis of no difference between taxable income estimated from the financial statements (grossing up federal tax expense,
data 63) and either taxable income from Form 1120 (line 28) or taxable income subject to tax from Form 1120 (line 28 less special deductions and NOL carryovers). Lisowsky (2007) also finds that total tax after credits from the tax return (Form 1120, line 31) is highly and significantly correlated with FTE (data 63) for 4,011 publicly traded U.S. corporations (excluding foreign-controlled firms) from 2000 to 2004.

14. To the extent that high tax-planning firms are more likely to record a tax cushion that narrows the gap between book income and our estimates of a firm’s taxable income, this will bias against finding that the taxable income for high tax-planning firms is less informative. In sensitivity analysis, we estimate taxable income in (1) using cash taxes paid instead of the sum of current tax expense and current foreign tax expense, which mitigates the concerns of the effects of any tax cushion on our analyses. Results are similar using this alternative measure of taxable income.

15. From a financial statement analysis perspective, measurement error in taxable income is less of an issue because we use a measure of taxable income available to the market. Specifically, analyzing the relative information content of financial statement disclosures of taxable income may be viewed as interesting and relevant as analyzing the information content of actual taxable income. However, from a tax policy perspective, measurement error in taxable income remains an issue because policymakers are concerned with actual taxable income. Thus, we need a reasonable proxy of taxable income to investigate whether tax planning results in a taxable income number that does not reflect the firm’s actual performance.

16. We use a 16-month return window to maintain consistency with Hanlon et al. 2005. Results are robust if we use a 12-month return window ending 4 months after the end of fiscal year t.

17. Since Lev 1989, many studies use the adjusted $R^2$ to assess the value relevance of accounting information. These studies compare the adjusted $R^2$ across time (e.g. Collins, Maydew, and Weiss 1997; Lev and Zarowin 1999; Francis and Schipper 1999) or across countries (e.g., Alford et al. 1993; Ali and Hwang, 2000). Francis and Schipper (1999), Brown, Lo, and Lys (1999), and Gu (2002) point out, however, that the adjusted $R^2$s from different samples are not directly comparable because the total variance of the dependent variable (i.e., stock returns) is not constant across different samples causing the explanatory power of the independent variable to suffer. Our test statistics are similar in spirit to one used by Hanlon et al. 2005 (426) and do not suffer from problems caused by volatility of the dependent variable because we hold returns for the firm constant (i.e., we compare the explanatory power of taxable and book incomes within the same firm). Additionally, in tests of Hypothesis 1 and Hypothesis 2 between groups, return volatility is less of a concern because we are comparing our test statistics across two groups of firms incorporated in the same country during the same time period. In sensitivity tests, discussed later, we also employ hedge portfolio return tests to examine our hypotheses, and inferences remain unchanged.

18. Hanlon et al. (2005) test the incremental information content of estimated taxable income by analyzing the statistical significance of including $\Delta TI$ in (6). Because we are comparing the incremental information content of estimated taxable income across differing groups of firms, we test incremental information content by analyzing the increase in adjusted $R^2$ from (4) to (6).
19. In sensitivity analyses, we identify high tax-planning firms as firms whose annual ETRs (or, alternatively, annual ETRs computed using actual cash taxes paid) were in the lowest quintile (by two-digit SIC industry) in four of the previous five years. Results are robust to this alternative specification.

Similar to book-tax differences, our “accumulated” measure of ETR may be influenced by managerial discretion used in financial reporting and mechanical differences between book and taxable income. To the extent that our classification of high tax-planning firms captures managerial discretion used in financial reporting, results are biased against expectations (i.e., we expect taxable income to be less informative for high tax-planning firms, whereas we expect taxable income to be more informative for low earnings-quality firms). We rank ETR by year and two-digit SIC industry to identify high tax-planning firms to control for mechanical differences between book and taxable income that vary by industry. In sensitivity analyses (discussed later), we identify high tax-planning firms using the Mills, Erickson, and Maydew 1998 model of investments in tax planning. Results are robust to this other specification.

20. As a modification to (8), we subtract special items (data 17) from PTBjm in the denominator (Dyreng et al. 2008). We also incorporate this change in our cash taxes paid measure of tax planning discussed below. Results are robust to these alternative specifications.

21. See Hanlon 2003 for a more complete discussion of this issue.

22. Similar to Dyreng et al. 2008, we calculate cash effective tax rates as the five-year sum of cash taxes paid (data 317) divided by the five-year sum of pre-tax book income (data 170). Because the cash flow statement is only available after 1987, our sample for these tests begins in 1992.

We note that accumulated ETR does not capture “income smoothing” as a tax-planning strategy. As suggested in Graham and Smith 1999, the majority of firms have little in the way of tax incentives to smooth income. We leave the investigation of tax-motivated smoothing to future research.

23. In sensitivity analysis, we compare the relative information content of estimated taxable income to book income for firms in the top 20 percent of signed abnormal accruals with firms in the middle 60 percent of signed abnormal accruals. We do the same for firms in the bottom 20 percent of signed abnormal accruals. We find that the relative information content of estimated taxable income is higher for firms in the top 20 percent (bottom 20 percent) of signed abnormal accruals than that for firms in the middle 60 percent. In addition, we find no significant difference in the relative information content of estimated taxable income to book income for firms in the top 20 percent of signed abnormal accruals compared with firms in the bottom 20 percent. In sum, our results are robust to using signed abnormal accruals to identify low earnings-quality firms.

Managers may use discretionary accruals to reduce information asymmetry and increase the information content of earnings (Subramanyam 1996). To the extent that our measure of abnormal accruals reflects discretion that increases the information content of earnings, this biases against finding our predicted results.

24. This restriction reduces the sample by 441 observations for the tax-planning analysis using accrual-based ETR to identify high tax-planning firms, by 470 observations for
the tax-planning analysis using cash-based ETR to identify high tax-planning firms, and by 3,366 observations for the earnings-quality analysis. Including these observations does not change our inferences.

25. We do not eliminate firms with accumulative negative pre-tax book income from our “earnings-quality” analyses because this restriction eliminates a disproportionately large percentage of the low “earnings-quality” sample (approximately 48 percent), and thus raises the concern of “throwing the baby out with the bathwater”. Consistent with this concern, results for our earning-quality analysis are weaker when we eliminate firms with accumulative negative pre-tax book income, suggesting that alternative performance metrics (e.g., taxable income) may be particularly important for firms with more extreme operating performance. In sensitivity analyses, we test whether the increased relative information content of estimated taxable income for firms with high abnormal accruals is limited to firms with extreme negative or positive operating performance (e.g., top and bottom 20 percent of return on assets [ROA] by year). Results are consistent between this group and the group of firms with less extreme operating performance (e.g., middle 60 percent of ROA by year). In addition, all our analyses are robust to excluding firms with a loss in the current year.

26. We winsorize (reset) regression variables at the most extreme 1 percent level each year to mitigate the influence of extreme observations in our regressions.

27. In additional analyses, we compare total assets, market value, earnings per share, growth (measured by the book-to-market ratio), and market risk (measured by beta) for high tax-planning firms and low earnings-quality firms to other firms. Due to the large sample size, these measures are generally different between these groups, though the differences are quite small. We know of no reason why these factors may explain the differences in the information content of estimated taxable income relative to book income. In sensitivity tests, we reestimate our analyses including the logarithm of total assets, the logarithm of market value, earnings per share, the logarithm of the book-to-market ratio, and beta in our models (3, 4, and 6). Results are similar to those presented in the tables.

28. Our sample of high tax-planning firms has less persistent earnings than other firms. For example, the Spearman correlation between one-year-ahead deflated earnings (book income scaled by lagged market value of equity) and current-year deflated earnings for high tax planners is 0.44 compared with 0.50 for all other firms. However, if the tax-planning sample simply captures firms with low earnings persistence, we would expect this to bias against Hypothesis 1, which predicts a lower adjusted $R^2$ ratio for high tax-planning firms. Specifically, less persistent book earnings should reduce the denominator of the adjusted $R^2$ ratio, making it more difficult to support Hypothesis 1. In our regression analyses (discussed later), we find that the book income for high tax-planning firms explains a slightly higher but similar proportion of returns than other firms. Thus, the lower adjusted $R^2$ ratio for high tax-planning firms that we find is solely attributable to less information content for taxable income (i.e., the numerator in the adjusted $R^2$ ratio). This evidence is not consistent with an earnings persistence explanation.

29. $0.004/0.159 = 2.5\%; 0.011/0.151 = 7.3\%$.

30. We note that the adjusted $R^2$ for estimated taxable income for the AAER firms (0.046) is not significantly higher than the adjusted $R^2$ for estimated taxable income for the “all
other firms’ sample in Table 4 (0.045). Comparisons of adjusted $R^2$s across groups
(i.e., instead of adjusted $R^2$ ratios across groups) are problematic because they require
much stronger assumptions regarding the distribution of the returns of the comparison
groups.

31. Approximately 40 percent of the high tax-planning sample identified using the Mills
et al. 1998 model is also classified as high tax-planning firms in our main analysis —
that is, using ETR. This evidence suggests that although the two methods of identifying
high tax-planning firms do not create identical samples, there is considerable overlap in
the sample, providing some comfort that both measures capture a similar construct.

32. Post-1992 results presented in Tables 2, 3, and 4 suggest that the investment tax credit
(phased out beginning in 1986) does not affect our inferences.

33. This specification mitigates the measurement error concerns associated with foreign
taxes on permanent differences but not temporary differences.

34. The cash flow statement is only available after 1987, so we also identify cash flows as
the difference between pre-tax income and TACC defined in (9). Inferences are the
same using either definition of cash flows.

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