Interpreting the Book-Tax Income Gap as Earnings Management or Tax Sheltering

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Abstract

The measured book-tax gap is often used as a surrogate for one of the behaviors that influences the gap—earnings management or tax sheltering—without adjusting for the effect of other influences—GAAP changes, tax law changes, and macroeconomic conditions. This paper provides evidence on the quality of the unadjusted book-tax income gap as a proxy for earnings management or tax sheltering by adjusting for the three measurable factors: GAAP changes, macroeconomic conditions, and earnings management. I find that changes in GAAP alone explain half of the pooled cross-sectional variation in the book-tax gap between 1993 and 2004, marking GAAP changes as an important recent influence on the book-tax gap. Also, replication results using unadjusted and adjusted book-tax gap measures suggest that the unadjusted book-tax gap is a reasonable proxy for earnings management, but that adjusting for the effect of GAAP changes generates a better proxy for tax sheltering in most contexts.

Keywords: book-tax income gap, book-tax differences, tax sheltering, earnings management

JEL classification: H26, M41, M43

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1. INTRODUCTION

Conceptually, the book-tax income gap reflects factors that impact either book income or taxable income. Computation rules—Generally Accepted Accounting Principles (GAAP) and tax code and case law (tax law)—limit management's discretion in calculating book income and tax income, respectively, though certain real decisions afford management some choice in the application of these rules. Macroeconomic conditions differentially influence both book and tax income and impact the book-tax gap. Finally, the effects of management's reporting discretion in determining book income (earnings management) and taxable income (tax sheltering) also affect the book-tax income gap.[1]

Because academics, tax administrators, and policymakers are concerned about earnings management or tax sheltering, the book-tax gap is often used as a proxy for either earnings management or tax sheltering behavior. For example, Desai and Dharmapala (2006) use the book-tax gap to test the relationship between tax sheltering and managerial compensation and policy makers such as Talisman (1999) infer changes in tax sheltering behavior from changes in the book-tax gap. However, research has not empirically documented the extent to which these opportunistic reporting behaviors contribute to the book-tax gap. Additionally, variation in the book-tax gap caused by variation in the extraneous influences—GAAP, tax law and macroeconomic conditions— may make the book-tax gap a poor proxy for the desired influences—earnings management and tax sheltering.

The purpose of this paper is to assess the validity of the book-tax gap as a proxy for earnings management or tax sheltering and to explore modifications that may improve the book-tax gap as a proxy for earnings management or tax sheltering. I use annual financial statement data to validate the

[1] Throughout the paper, earnings management refers to opportunistic managerial reporting. Real decisions that also affect calculated book income, such as inventory choice, are considered part of GAAP. Similarly, tax sheltering refers to aggressive tax minimization that the IRS would likely challenge while real decisions chosen to affect taxable income, such as debt financing, are considered part of tax law.

book-tax income gap as a proxy for earnings management or tax sheltering by both decomposing the variation in the book-tax gap and by replicating prior research using a book-tax gap adjusted for the effect of certain factors. Decomposing the variation in the book-tax gap is central to testing the impact of the various factors and potentially improving the proxy. If the extraneous factors create significant variation in the book-tax gap, removing their effect purifies the variable as a measure of variation in the desired factors. Using the explained variation in the book-tax income gap as the measure of significance, I establish the relative importance of the three measured factors—changes in GAAP, earnings management, and the macroeconomic conditions faced by the firm—and suggest the maximum influence of the unmeasured factors—tax sheltering and changes to tax law.[2]

I find that a small subset of changes in GAAP alone explains 50.45% of the variation in the book-tax income gap between 1993 and 2004. Also, macroeconomic conditions and earnings management behavior are both incrementally informative. In all specifications, macroeconomic conditions are more informative than earnings management. In total, the three measured factors explain approximately 55% of the variation in the book-tax income gap. Thus, the residual variation of 45% is the upper bound of variation potentially attributable to variation in tax law and tax sheltering behavior. While quantifying the variation explained by the three factors I measure confirms their influence on the book-tax income gap, these influences confound research inferences only if the extraneous variables are correlated with other regression variables.

To demonstrate the importance of considering these other influential factors in research designs that use the book-tax gap to proxy for earnings management or tax sheltering, I next replicate two prior studies—Hanlon (2005) and Lisowsky (2009)—using both the unadjusted book-tax income gap and three alternative gap measures that separately subtract out the effect of changes in GAAP, macroeconomic conditions, and earnings management behavior. Consistent with Hanlon (2005), I

[2] While GAAP and tax law are factors which affect the book-tax income gap, changes in GAAP and changes in tax law create variation in the gap. See the model in Section 2.1.

find that firm-years with large book-tax differences have less persistent pre-tax income than firm-years with small book-tax differences, whether the book-tax gap is unadjusted or is adjusted for changes in GAAP or macroeconomic conditions. Subtracting the effect of earnings management changes the sign regarding large negative book-tax differences and significantly attenuates the effect of large positive book-tax differences. By showing that results degrade after controlling for earnings management, my results confirm Hanlon's interpretation of book-tax differences as a proxy for earnings management. Despite the relatively low explanatory power of discretionary accruals in my tests of variation, earnings management is an important factor affecting the book-tax gap. Thus, adjustments do not appear necessary when using the book-tax gap to proxy for earnings management.

I also calculate correlations between various measures of the book-tax income gap and the likelihood of a tax shelter as predicted by Lisowsky (2009). Removing effects of non-sheltering factors should increase the correlation. I find that subtracting the effect of GAAP changes from the book-tax gap increases the association between the book-tax gap and the Lisowsky (2009) predicted value. Subtracting the effect of earnings management has no significant effect on the likelihood of a tax shelter. However, subtracting the effect of macroeconomic conditions from the book-tax gap considerably lessens the association between the book-tax gap and the predicted likelihood of a tax shelter, suggesting a relationship between macroeconomic conditions and tax sheltering that may confound research if not properly considered. These results confirm that the portion of the book-tax income gap not attributable to the three factors studied here is in part attributable to tax sheltering. Adjustments to the book-tax gap to remove non-tax effects increase the gap's ability to proxy for tax sheltering. I conclude that adjusting the book-tax gap for GAAP changes and potentially for general business conditions improves the book-tax gap as a predictor of the likelihood of a tax shelter.

My research advances literature on the book-tax income gap in three ways. First, I develop a simple model that outlines five specific factors that impact the book-tax income gap and provide a framework for defining and interpreting variables. Next, I establish the variation in the book-tax

income gap explained by changes to these factors. I show that GAAP changes alone explain over 50% of the variation in the book-tax income gap between 1993 and 2004. Finally, I replicate prior research to assess the need to adjust the book-tax income gap for these factors to better isolate the effect of earnings management or tax sheltering behavior. I find that the unadjusted book-tax gap is a reasonable proxy for earnings management but that subtracting the effect of GAAP changes from the gap creates a better proxy for likelihood of tax sheltering in most contexts.

Section 2 develops a simple model of the factors that affect the book-tax income gap and discusses related research. Section 3 outlines the hypotheses. Section 4 describes the research design, including variable definitions and sample specifics. Results are reported in Section 5. Section 6 presents robustness checks. Section 7 concludes.

2. MODEL AND RELATED RESEARCH

2.1. Model of the Book-Tax Income Gap

Because the financial statements and tax returns are prepared under separate regimes whose governing bodies do not have identical objectives, natural differences exist between income reported on financial statements and income reported on tax returns. The book-tax income gap is a function of factors affecting income reported on the financial statement and income reported on the tax return: accounting rules (GAAP), earnings management behavior (EM), tax law, aggressive avoidance and tax sheltering behavior (Sheltering), and general business conditions (GBC):

$$\text{Book-Tax Gap} = f\,[\text{GAAP, EM, Tax Law, Sheltering, GBC}] + \varepsilon \quad (1)$$

Variation in these factors will cause predictable cross-sectional variation in the book-tax income gap.

$$\text{var(Book-Tax Gap)} = f\,[\text{var(GAAP, EM, Tax Law, Sheltering, GBC)}] + \varepsilon \quad (2)$$

Though variation in GAAP and tax law can occur when real decisions are made to allow more desirable reported income or when firms interpret rules differently, variation in these variables will primarily occur through standard or law changes.

$$\text{var(Book-Tax Gap)} = f\,[\Delta\text{GAAP, var(EM), }\Delta\text{Tax Law, var(Sheltering), var(GBC)}] + \varepsilon \quad (3)$$

Corporate tax law does not change significantly during the period 1993-2004. Therefore, I do not include measures of tax law changes in my tests.[3] By its nature, tax sheltering is extremely difficult to measure.[4] Instead of attempting to measure tax sheltering and variation in tax sheltering, this research focuses on estimating the variation in the Book-Tax Income gap caused by variation in factors that are more easily quantified; residual variation is the upper bound available to be explained by unmeasured variables. Equation (4) simplifies equation (3) by removing changes in tax law and variation in tax sheltering so that these unmeasurable factors fall into the residual as follows:

$$\text{var(Book-Tax Gap)} = f\,[\Delta\text{GAAP, var(EM), var(GBC)}] + \gamma \quad (4)$$

2.2. Related Research

Recent literature has expanded consideration of the book-tax gap from a measure of the tradeoffs between cash flow and reported income to a proxy for financial statement quality or tax aggressiveness. Recent research also studies variables which affect the level of the book-tax gap. Manzon and Plesko (2002) show that a relatively small set of financial statement variables, including measures of Fixed and Intangible Assets and NOL Carryforwards, explain the increase in the book-

[3] While corporate tax law does not change significantly between 1993 and 2004, a number of provisions are implemented that may affect the Book-Tax Income Gap. These include, but are not limited to, enacting tax amortization for purchased intangible assets, creating check-the-box regulations for certain domestic and foreign firms, increasing tax depreciation allowances for purchases after September 11, 2001, and enacting a tax holiday on repatriated foreign earnings. Because I interpret the residual variation as due to all omitted variables, including tax law changes, omitting tax law changes does not bias the tests. I further discuss the effect of omitting tax law changes, including their likely correlation with included variables, in Sections 6.1 and 6.2.

[4] See McGill and Outslay (2004) for instances where a thorough study of the financial statements does and does not provide sufficient disclosure to uncover a tax shelter. Most research on tax shelters uses case law or firm disclosures to identify firms that the IRS has targeted for sheltering (see Graham and Tucker, 2006); Lisowsky (2009) uses a proprietary IRS Office of Tax Shelter Analysis database.

tax income gap observed in the late 1990s. Although Manzon and Plesko (2002) find that accounting figures, some of which proxy for factors outlined in my model, are extremely informative for the book-tax income gap, they selected financial statement variables to capture the mechanical relationship rather than the underlying cause. The reader is left uncertain how to interpret the coefficient changes. My model above outlines the conceptual factors that affect the book-tax income gap and provides a framework for defining and interpreting variables.

Other recent literature more directly studies the relationship between the book-tax income gap and some of the factors outlined in my model. A number of papers link measures of the book-tax gap and earnings management. Mills and Newberry (2001) find that public firms have larger negative book-tax income gaps when in a loss position than private firms, suggesting that earnings management via "big bath" behavior affects the book-tax gap. Phillips, Pincus, and Rego (2003) show that deferred tax expense is incrementally useful in detecting earnings management to avoid an earnings decline or a loss. Hanlon (2005) finds that firms with small temporary book-tax differences have more persistent book earnings than firms with large temporary book-tax differences. Similar to Phillips et al (2003), Hanlon's results suggest that the book-tax income gap can be used to identify firms that participate in persistence-decreasing earnings management. The results in Phillips et al (2003) and Hanlon (2005) hinge on non-conforming earnings management—conforming earnings management will not alter book-tax differences or the deferred tax expense. Badertscher, Phillips, Pincus, and Rego (2009) examine restatements and find that in 63% of these events, the earnings management was non-conforming, meaning that book income was changed without affecting taxable income. Badertscher et al (2009) confirm that firms utilize non-conforming earnings management. While the above papers suggest a relationship between the book-tax gap and earnings management, these papers do not test the relative importance of this relationship or validate the book-tax gap as a proxy for earnings management behavior.

Recent literature also links the size of the book-tax income gap with the presence of a tax shelter. Desai (2003) adjusts the book-tax income gap for differential treatment of three common factors: depreciation, foreign source income, and employee compensation. He suggests, but does not empirically test, that the growing book-tax difference not attributable to these common factors is due to increasing levels of tax sheltering during the late 1990's. Wilson (2009) uses a small sample of known tax shelters and finds a positive relationship between the book-tax gap and the likelihood a firm has engaged in a shelter. Lisowsky (2009) uses a larger, proprietary sample of known tax shelters and finds that controlling for other firm characteristics, such as whether the firm has a subsidiary in a tax haven or engages in 'mezzanine financing', removes the association between the book-tax income gap and the likelihood a firm has engaged in a tax shelter. Despite some research, the exact relationship between tax sheltering and the book-tax gap remains uncertain.

3. HYPOTHESES

3.1. Predictable Variation in the Book-Tax Gap

The model in Section 2.1 outlines five factors that affect the book-tax income gap, three of which are measured in this study. My first proposition is that variation in these three measured factors explains a significant portion of variation in the book-tax gap. That is, I expect that there is predictable variation in the book-tax income gap caused by changes in GAAP across time and variation in General Business Conditions and Earnings Management across both time and industry.

3.2. Interpretation of Prior Research that Uses the Book-Tax Gap

Measures of the book-tax income gap often proxy for earnings management or tax sheltering. My model shows that a number of factors—not just earnings management and tax sheltering—shape the book-tax gap. Removing the effect of these alternative factors should improve the book-tax gap

as a proxy for earnings management and tax sheltering. Interpretation of prior results may be revised if controlling for alternative factors alters the results in prior literature.

3.2.1. Generally Accepted Accounting Principles

Generally Accepted Accounting Principles (GAAP) govern how firms prepare and present financial statements. GAAP is constantly evolving—on average, four FASB pronouncements are issued every year during the sample period of 1993-2004. These pronouncements may increase book income, decrease book income, affect only the presentation and not the calculation of income items, or not affect income items at all. Many changes in GAAP do not correspond to changes in tax law. Therefore, changes to the GAAP calculation of book income affect the book-tax income gap.

H1a: Controlling for GAAP Changes improves the explanatory power of the book-tax for earnings management.
H1b: Controlling for GAAP Changes improves the explanatory power of the book-tax gap for tax sheltering.

3.2.2. General Business Conditions

General business conditions (GBC) likely also affect the book-tax income gap. Economic fluctuations affect the level of both book income and taxable income. For example, during recessionary times both book and taxable will likely fall as consumer spending decreases. Largely due to the accrual vs. transaction-driven nature of book vs. taxable income that allows book income to reflect expectations or market values for certain accounts, book income is expected to respond more quickly to general business conditions than taxable income. For example, in expansionary times, book income will reflect increase market values for publicly traded securities as unrealized gains; taxable income will instead reflect the gains when the securities are sold. Therefore, it is unlikely that macroeconomic effects on book and taxable income are related such that the book-tax gap would be unaffected. General business conditions also influence business decisions, such as the amount and type of investment to undertake and how to finance this investment. These business

decisions impact the book-tax gap. For example, lower interest rates may increase investment in long-term assets, which will increase the book-tax income gap due to accelerated tax depreciation.

H2a: Controlling for General Business Conditions improves the explanatory power of the book-tax for earnings management.
H2b: Controlling for General Business Conditions improves the explanatory power of the book-tax gap for tax sheltering.

3.2.3. Earnings Management

Again due to the accrual vs. transaction-driven nature of book vs. taxable income, the book-tax income gap is also affected by financial reporting behavior, including earnings management (EM), which will generally be reversed for tax purposes.[5] I express these hypotheses in the alternative form consistent with my signed predictions about the direction effect of controlling for Earnings Management:

H3a: Controlling for Earnings Management worsens the explanatory power of the book-tax gap for earnings management.[6]
H3b: Controlling for Earnings Management improves the explanatory power of the book-tax gap for tax sheltering.

4. RESEARCH DESIGN

4.1. Variable Measurement

4.1.1. Dependent Variable

I follow Manzon and Plesko (2002) in defining a U.S. Federal book-tax income gap. Book income is adjusted to be net of taxes that are deductible for federal purposes and to remove affiliate

[5] Certain accounts do exist where conformity is required (namely inventory, which requires conformity on the FIFO-LIFO choice, and revenue, which often uses the book definition of 'earn') and conformity increases for firms facing Alternative Minimum Tax, but in general, accruals will be reversed for taxable income. See Guenther (1994) for a more detailed discussion of conforming and non-conforming accruals.
[6] If controlling for Earnings Management eliminates or attenuates prior results that suggested earnings management, such attenuation is evidence consistent with prior interpretations of the book-tax gap as a proxy for earnings management.

income that is not included in consolidated taxable income. The U.S. Federal Book-Tax Income Gap (**BT_GAP**) equals **BI** – **TI** where:

BI = SUM**(PRE-TAX, –CUR_STATE, –OTHER_TAX** and **–EQUITY_SUBS)**

PRE-TAX = Domestic Pre-Tax Income (DATA272 if available, DATA170 otherwise)[7]
CUR_STATE = Income Taxes State (DATA173)
OTHER_TAX = Income Taxes Other (DATA211)
EQUITY_SUBS = Equity in Earnings (DATA55)
TI = (**CUR_FED/RATE**)
CUR_FED = Income Taxes Federal (DATA63)
RATE = the 35% maximum federal statutory rate in effect all years in the sample

While the correct measure of the book-tax income gap is found in corporate tax filings with the Internal Revenue Service (IRS), the Manzon-Plesko measure approximates the book-tax income gap reported on Form 1120 using publicly available data. A number of factors confound this measure, though. Tax credits and the effect of refunds due to loss carrybacks, both of which decrease current tax expense without affecting taxable income, will cause me to understate **TI**. I am unable to remove the effect of credits or refunds from my measure. Stock option deductions, which are not included in current tax expense if the compensation was not expensed, will cause me to overstate **TI**. However, a benefit of analyzing the difference between book and tax income instead of book income and taxable income separately is that the effect of stock options is removed.[8]

[7] Compustat adjusts Pre-Tax Income (DATA170) to maintain comparability (i.e., for minority interest or preferred stock dividends.) If Compustat adjusts DATA170, both Domestic and Foreign Pre-Tax Income (DATA272 and DATA273, respectively) will be set to missing even if they were disclosed. In a small sample, I found that more than 10% of firm-years missing DATA272 had in fact disclosed Domestic Pre-Tax Income. Despite this systematic Compustat bias, I use DATA170 if DATA272 is missing to preserve the sample size. This overstates **BT_GAP** but introduces additional noise in the measure and biases against finding results. In an untabulated robustness check, I delete the 501 observations that are missing DATA170 but are likely to have foreign income, as evidenced by non-missing foreign income taxes (DATA64), foreign current exchange adjustment (DATA270), foreign pre-tax income (DATA273) or foreign deferred tax expense (DATA270). Results are unchanged.

[8] For firms not expensing options, the tax benefit of the stock option tax deduction is not allowed as a benefit for Net Income because the corresponding stock option compensation is not recorded as an expense. Therefore, neither Book Income nor current tax expense is affected by stock option compensation and the difference between the two is a clean measure with respect to the effect of option compensation. The book-tax gap I calculate understates the book-tax gap found on the Form 1120 by the amount of the stock option deduction. Firms that elect to deduct stock option expense will also have a clean book-tax gap because both their Book Income and current tax expense will consider the effect of the expense/deduction. In this case, the book-tax income gap I calculate will be approximately equal to that found on Form 1120. Therefore, omitting option compensation does not present a problem in this study. See Section 6.4 for robustness tests regarding the effect of stock options. Results are unchanged.

4.1.2. Generally Accepted Accounting Principles Variables

Generally Accepted Accounting Principles affect the calculation of book income but not taxable income. Therefore, they affect the book-tax income gap. I study the effect of changes in GAAP on the total variation in the book-tax income gap. In doing so, I measure **BI** under the current GAAP regime and test variables that quantify the effect of shifts in this regime. I study four FASB Statements that became effective between 1993 and 2004.[9]

SFAS 106, Employers' Accounting for Postretirement Benefits, effective for fiscal years beginning after 12/15/1992, requires firms to accrue postretirement benefits as employees earn them. Prior to SFAS 106, firms recorded expenses on a pay-as-you-go basis. In all years, a tax deduction is allowed only for cash payments. This GAAP change will result in a new temporary difference between the accrual expense and the transaction-based tax deduction. Starting in 1993, I measure the effect of SFAS 106 as Δ**OPEB**, the change in Postretirement Benefit Asset/(Liability) (DATA330).[10]

SFAS 121, Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to be Disposed of, effective for fiscal years beginning after 12/15/1995, provides guidance for when impairments of long-lived assets should occur. Riedl (2004) documents that impairments did occur prior to SFAS 121; the impact of SFAS 121 is to provide uniform guidance for when firms should record impairments. Impairments are not deductible under tax law; rather, tax law only permits deductions through depreciation or upon sale or disposal of the asset. A book-tax difference will exist from the time of the impairment until the time of disposition.

SFAS 144, Accounting for the Impairment or Disposal of Long-Lived Assets, effective for fiscal years beginning after 12/15/2001, provides a unifying framework for impairments that includes business segments. While SFAS 144 does not change most of the provisions of SFAS 121, SFAS 144

[9] I include GAAP changes which I expect to be material, have implications across many industries and be plausible to measure. Appendix A lists all twenty FASB Statements of Accounting Standards effective between 1993 and 2004 which affect the book-tax income gap and provides information as to their inclusion or exclusion in this study.
[10] Where missing, DATA330 is set to zero.

does remove goodwill from its scope. I measure the effect of SFAS 121 and SFAS 144 together as **IMPAIR**, which is defined as:

1. Hand-collected asset and goodwill impairment data for years 1993-1999,[11]
2. Write-down After-tax (DATA381) plus Impairments of Goodwill After-tax (DATA369) for years 2000-2001, and
3. Write-down After-tax (DATA381) for years 2002-2004.[12]

SFAS 142, Goodwill and Other Intangible Assets, replaces straight-line amortization with annual testing of impairment for goodwill and other intangible assets without a specified finite life. SFAS 142 is effective for goodwill and intangible assets acquired after 06/30/2001. Tax law mandates amortization of purchased intangible assets over 15 years. When an intangible asset is recorded for tax purposes, a temporary book-tax difference will exist for the difference between straight-line 15-year tax depreciation and cumulative impairments. However, most corporate control transactions are structured as tax-free reorganizations, which do not assign values to goodwill or other purchased intangibles. Even in a taxable stock acquisition, firms seldom restate tax basis to fair market value because a Section 338(h)(10) election requires the target to record taxable income on a deemed asset sale (Erickson, 1998). Amortization expense will not be recorded for tax purposes, because no asset is recorded for tax purposes. In the event of a tax-free reorganization, SFAS 142 will lead to permanent book-tax differences throughout the life of the book asset. I measure the effect of SFAS 142 on both goodwill and non-goodwill intangibles. I define **GW_IMPAIR** as Impairments of Goodwill After-tax (DATA369) for 2002-2004. As goodwill impairments are included in **IMPAIR** through 2002, **GW_IMPAIR** is zero for 1993-2001. I measure the effect of SFAS 142 on non-goodwill intangibles as Δ**INTANG** [change in (DATA33-DATA204)]. Prior to 2002, the change

[11] I thank Eddie Riedl and Suraj Srinivasan for sharing their 1992-2002 impairment data with me. Firm-years prior to 2000 which do not match the hand-collected impairment data are not included in the sample.
[12] Where DATA381 or DATA369 are missing and the year is 2000 or later, they are set to zero.

in non-goodwill intangibles will be affected by amortization instead of impairments. To capture only the effect of SFAS 142, Δ**INTANG** is zero for 1993-2001.

4.1.3. General Business Conditions Variables

General business conditions (GBC) influence the book-tax gap both by directly affecting the levels of income and by influencing investment decisions. First, GBC impact the current level of both book and taxable income. However, book and taxable income will not be equally affected, due primarily to different revenue and expense recognition rules. Second, GBC affect firms' current investment decisions. By both their direct effect on income and their influence on investment decisions, variation in GBC impacts variation in the book-tax gap through time and across firms.

I measure the direct income effect of general business conditions on the book-tax income gap as the industry-standardized change in Net Sales.[13] I first calculate the change in Net Sales (DATA12) for each firm, then average annually at the two-digit SIC code to get the industry-averaged rate of change in Net Sales. I multiply this rate by firm-level lagged Net Sales to create the variable Δ**SALES**. The industry-standardized change in Net Sales may impact the book-tax income gap in a number of different ways. In general, during periods of growth, income increases faster than cash flows. Dechow, Kothari, and Watts (1998) model the impact of sales shocks on certain working capital accruals, such as Accounts Receivable. Sales growth causes most accruals to increase; many of these accruals are reversed in the calculation for taxable income. To the extent taxable income is somewhat closer to cash flows, the book-tax gap increases during booms and shrinks in bad times. Income level also affects ability to use credits and carryforwards. For example, the base for the Research & Development (R&D) credit uses current period sales. As current period sales increase, the allowable R&D credit will decrease, holding R&D spending constant.

[13] To mitigate potential correlation between General Business Condition variables and one of the omitted variables, tax sheltering, I calculate rates for all GBC variables at the industry-level; this is further discussed in Section 6.1.

I next measure the impact of variation in general business conditions on firms' current investment decisions. These decisions include where to invest, in which projects to invest, and how to finance the investment. I include two variables that are intended to assess the impact of GBC on a firm's current decisions. The first variable is designed to measure the "cost" of financing, which I measure as the cost of financing with external debt. This measure gauges the ease with which the firm can make investments and how expensive it is to finance these investments. I calculate the cost of financing with external debt (**COST_DEBT**) as the industry-standardized annual interest expense. Specifically, I calculate the interest rate for each firm and then average annually for each two-digit SIC, where interest rate is Interest Expense (DATA15) divided by average interest-bearing debt (sum of DATA9 and DATA34).[14] I then multiply this rate by the firm's average interest-bearing debt. **COST_DEBT** could either increase or decrease **BT_GAP**. **COST_DEBT** could be negatively related to **BT_GAP** if increases in the cost of investing will decrease investments and therefore decrease the tax-book depreciation gap. Or, consistent with Mills and Newberry (2005), **COST_DEBT** could be positively related to **BT_GAP** if firms use off-balance sheet financing to reduce finance constraints. Thus, I do not predict a sign for **COST_DEBT**.

Changes in general business conditions may also affect the decision about which investment to undertake. Potential investments include other firms, intangible assets or tangible assets. Because the **IMPAIR**, **GW_IMPAIR**, and **ΔINTANG** variables all capture material effects of intangible assets on **BT_GAP**, I focus on the book-tax gap impact of tangible assets. I include a variable for industry-level capital expenditures because accelerated tax depreciation methods will increase **BT_GAP** during an economy of high investment. I first calculate the annual capital expenditure rate for each firm as Property, Plant, and Equipment – Capital Expenditures (DATA30) divided by

[14] Where DATA15 is missing, I set it equal to zero.

beginning Gross Assets (DATA7) and average this rate annually for each two-digit SIC group. I then multiply this rate by firm beginning Gross Assets to generate the variable **CAP_EX**.[15]

4.1.4. Earnings Management Variables

Earnings management (EM) affects the book-tax income gap by affecting book income. Because taxable income is largely calculated on a transaction-basis, earnings management does not affect taxable income.[16] For example, a firm may record a lower bad debt expense than is needed to meet an earnings target. The bad debt tax deduction is based on accounts written-off, not on accounting expense. Therefore, the decreased book expense does not affect taxable income. The recognition and subsequent reversal of accruals recorded for earnings management purposes will create temporary differences. Variation in earnings management behavior will cause predictable variation in the book-tax income gap.

I use discretionary accruals as a proxy for earnings management (Dechow, Sloan, and Sweeney, 1995). Because the modified Jones model has been shown to systematically misestimate discretionary accruals in times of growth or decline, I use the standard Jones model, calculated at the industry-level (i.e., Dechow et al, 1998).[17] I calculate the annual industry-average rate of normal accruals to assets using coefficients estimated from model (5) for each two-digit SIC group:

$$ACC_{it} = \alpha*1/TA_{it} + \beta_1 \Delta Rev_{it} + \beta_2 PPE_{it} + \varepsilon \quad (5)$$

Where the variables are defined as:

ACC_{it} = (Earnings before Extraordinary Items (DATA123) – CFO_{it})/ TA_{it-1}
TA_{it-1} = lagged Total Assets (DATA6)
ΔRev_{it} = Change in Sales (DATA12)/ TA_{it-1}
PPE_{it} = Gross PP&E (DATA7)/ TA_{it-1}

[15] Where DATA30 is missing, I set it equal to zero; this occurs for 8.9% of the observations.
[16] Earnings Management generally occurs through accruals rather than through transactions. See Nelson et al (2003) where approximately 75% of earnings management attempts reported by auditors involved accruals. Many accruals will be reversed for taxable income. That 63% of the restatements in Badertscher et al (2009) were non-conforming also supports this assumption. See footnote 5 for a more thorough discussion.
[17] I do not use performance-matched accruals as suggested by Kothari, Leone and Wasley (2005), because my sample is not an extreme performance sample where discretionary accrual misspecification is most likely. Performance-matched accruals are superior when the research design postulates that the sample is more likely to have engaged in Earnings Management than the control firms.

I calculate each firm's normal accruals by applying these industry coefficients to firm-level variables. My proxy for earnings management, (**D_ACC**), is the residual from this model multiplied by firm-specific lagged Total Assets. I expect **D_ACC** to be positively related to **BT_GAP**.

4.2. Sample Selection

Table 1 summarizes the sample selection. I use all domestic non-subsidiary firms in Compustat that separately disclose Federal Current Tax Expense and therefore have the data necessary to calculate the book-tax income gap. I begin the sample in 1993 to coincide with the adoption of SFAS 109 and ensure that firms calculate Federal Current Tax Expense under a constant regime.[18] I end the sample in 2004 because the American Jobs Creation Act of 2004 generated substantial tax changes beginning largely in 2005. The impairment data required for SFAS 121 (**IMPAIR**) reduces the sample because impairment data is only electronically available after 2000. **IMPAIR** is populated for some firm-years prior to 2000 because I use the Riedl (2004) and Riedl and Srinivasan (2009) samples, but these samples do not cover the entire Compustat universe. The **ΔSALES** and **D_ACC** calculations requires lagged variables and therefore drop the first observation for newly public firms. I drop indusry-averaged variables for industries with fewer than ten observations in a year. My final sample includes 32,460 firm-year observations for 8107 firms from 1993 through 2004.

[Insert Table 1 around here]

4.3. Descriptive Statistics and Summary Correlations

Panel A of Table 2 presents summary statistics. Though the sign and magnitude of many variables are as expected, there are a few unexpected statistics. The median book-tax income gap, **BT_GAP**, is negative, though the mean is positive as expected. When calculated annually, the mean

[18] This biases against finding results for SFAS 106, which became effective in 1993. Footnote 21 discusses further.

(median) **BT_GAP** is negative only during the years 2000-2002 (2000-2004). The electronic availability of **IMPAIR** in these later years allows these years to contribute a disproportionate number of observations to the sample, leading to negative median **BT_GAP** for the sample as a whole. The mean (median) Δ**OPEB** is negative (zero).[19] Although the implied goal of SFAS 106 is to decrease OPEB liabilities by encouraging firms to fund their OPEB responsibilities, this indicates an increasing OPEB liability. **IMPAIR** and **GW_IMPAIR** are negative by construction. These variables are zero for most of the sample; only 13% (2%) of firm-year observations have a non-zero value for **IMPAIR** (**GW_IMPAIR**). Riedl (2004) finds that firms record long-term asset or goodwill impairment in approximately 16% of his randomly selected firm-year observations, consistent with my findings. The small number of firm-year observations for **GW_IMPAIR** is not surprising because prior to the implementation of SFAS 142, goodwill impairments are dictated by SFAS 121. To avoid double-counting goodwill impairments, I set **GW_IMPAIR** equal to zero for years prior to the implementation of SFAS 142 in 2002. Due to similar treatment prior to 2002 of my other measure of SFAS 142, the change in non-goodwill intangible assets, I find that **CHG_INTANG** is nonzero for approximately 25% of the sample, with a negative mean.

[Insert Table 2 around here]

Panel B of Table 2 presents Pearson correlations and significance levels above the diagonal and Spearman correlations and significance levels below the diagonal. Although 21 (26) of the 28 Pearson (Spearman) correlations are significant at the 10% level, few are significant in magnitude. Only five (nine) statistically significant Pearson (Spearman) correlations exceed 0.10.

[19] In total, 18% of the observations are non-zero. While there are more non-zero observations in the early years in the sample, there are relatively less observations in these years. In each of the early years 1993-1999, at least 32% of the observations are non-zero. In the later years 2000-2004, 14% to 16% of the observations are non-zero.

5. EMPIRICAL RESULTS

5.1. Predictable Variation in the Book-Tax Gap

Table 3 presents the results of estimating the regression of **BT_GAP** on proxies for the effect of accounting pronouncements, macroeconomic conditions, and earnings management as outlined in equation (4).[20] Table 3 reports an R^2 of 55.43%, suggesting that the limited set of variables I include explain a large percentage of the variation in the book-tax income gap. While this high R^2 demonstrates that the variables considered here are important drivers of variation in the book-tax income gap, this result does calculate a rather significant upper bound of 45% for the omitted variables—changes to tax law and variation in tax sheltering behavior.

[Insert Table 3 around here]

The economic magnitude and sign of the estimates are largely reasonable. As expected, **IMPAIR**, **GW_IMPAIR**, **ΔINTANG**, and **CAP_EX** are positively and significantly related to **BT_GAP**. In addition, the significant GAAP change coefficients on **IMPAIR** and **GW_IMPAIR** are relatively close to their predicted value of 1.0. I find insignificant results for **ΔOPEB**.[21] **COST_DEBT** is also positively and significantly related to **BT_GAP**, consistent with the off-balance sheet financing story in Mills and Newberry (2005). **D_ACC** is unexpectedly negative, but the coefficient is small.

[20] I acknowledge a number of omitted variables, including tax sheltering. The goal of tax sheltering is to decrease taxable income without affecting book income, creating a positive book-tax income gap. Therefore, I do not expect this omitted variable to be mean zero. Primary results are estimated without an intercept so as not to force the residuals to be mean zero. This is important because the residuals are interpreted in Section 5.2. However, excluding the intercept may cause the R^2 to be overstated because it assumes the mean of the dependent variable, a component in the calculation of R^2, is zero. In untabulated results, including an intercept in the primary regression generates an R^2 of 55.44% as compared with an R^2 of 55.43% in the regression without an intercept. Coefficients and significance levels are also unchanged. Excluding the intercept does not overstate the R^2 in this setting.

[21] In untabulated results, I include observations from 1991-1992. Due to other variable requirements, this adds only 260 observations to the sample. Results are statistically similar. I next include observations from 1991-1992 while omitting the **IMPAIR** variable requirement in all years. Under this specification, the sample size nearly triples. I find a coefficient of 0.141 on **ΔOPEB**, which is significant at the 5% level, an R^2 of 23.45%, and coefficients and significance levels generally similar to those reported in Table 3 on all variables except **ΔSALES** which becomes insignificant. These results confirm that SFAS 106 had a significant impact on the book-tax income gap but that the sample requirements imposed by other GAAP changes limits my ability to document this impact.

CAP_EX, **COST_DEBT**, and **D_ACC** increase **BT_GAP**. The results imply that the book-tax income gap would have been smaller without variation in general business conditions. The coefficients on **IMPAIR**, **GW_IMPAIR**, and Δ**INTANG** suggest that FASB statements related to impairments decreased the book-tax income gap, mitigating the effect of factors that increased the book-tax income gap. After controlling for the eight variables included in Table 3 and using the residual as an adjusted measure of the book-tax income gap, 36% of the firms in my sample report a lower adjusted than unadjusted book-tax income gap, while 64% report a higher adjusted gap. Overall, the mean effect is an increase in the book-tax income gap of $5.7 million, resulting in a mean adjusted book-tax income gap of almost $6 million, nearly forty times higher than the mean unadjusted book-tax income gap reported in Table 2.

To separate the effects of the three classes of variables, I regress **BT_GAP** separately on each class of variables in Table 4. Column A reports the results of regressing **BT_GAP** on the four GAAP change variables. GAAP changes alone explain over half the variance in the book-tax income gap. This result demonstrates that GAAP changes is the most important factor affecting variance in the book-tax income gap, even considering unmeasured factors such as tax sheltering.[22] The R^2 of my three general business condition variables on **BT_GAP** in Column B is 2.37%, while the effect of earnings management, in Column C, is an R^2 of only 0.49%.[23] Overall, I find support for my expectation that these factors explain a significant portion of the variance in the book-tax gap.

[Insert Table 4 around here]

[22] Section 6.1. discusses potential correlation with the omitted variables, tax sheltering and tax law changes, and concludes that correlation between GAAP changes and either of these variables is likely nonexistent or very low.
[23] Though the sum of the three separate R^2 is roughly equal to the R^2 reported in the full regression in Table 3, I also calculate an incremental R^2 for each class of variables for robustness. In untabulated results, I find the incremental R^2 for changes in GAAP, GBC and EM is 52.82%, 3.89% and 0.62%, respectively. Interpretations are unchanged.

5.2. Interpretation of Prior Research that Uses the Book-Tax Gap

I next test demonstrate the importance of considering the full set of factors which impact the book-tax gap and test whether the book-tax income gap is a reasonable proxy for either earnings management or tax sheltering by replicating prior research. I do so using both an unadjusted book-tax income gap and a book-tax income gap separately adjusted for the three factors studied here.

5.2.1. Proxy for Earnings Management

Hanlon (2005) studies whether firm-years with large book-tax differences have less persistent earnings. The underlying assumption is that large book-tax differences include an abnormal amount of accruals, likely for the purpose of managing earnings. I study earnings persistence conditional on the size of the book-tax income gap, following the methodology in Hanlon (2005). I first use the unadjusted book-tax gap and then separately subtract the effect of each of the three factors studied here to calculate an adjusted book-tax gap measure.

Column "Base" of Table 5 replicates Hanlon's (2005) equation (2) using **BT_GAP** to sort firm-year observations into Book-Tax Difference (BTD) size groups following the rubric specified in the original paper. Results are consistent with Hanlon's Table 3.[24] Specifically, Column Base reports a negative and significant coefficient for both PTBI*LNBTD and PTBI*LPBTD consistent with Hanlon (2005).

[Insert Table 5 around here]

Next, Column A uses the residual from Column A in Table 4, the regression for GAAP changes alone, as an adjusted measure of the book-tax income gap to sort firm-year observations into adjusted BTD groups and re-estimate the model. Column A continues to report negative and

[24] Because my measure of the book-tax income gap includes both permanent and temporary differences, which includes the effect of changes in the valuation allowance, I do not drop loss firms or firms with an NOL. This dramatically increases the size of the sample. Additionally, I drop firms with a greater than 5% increase in goodwill. This is done to strengthen confidence that changes in the income and cash flow figures between periods are not a result of significant merger activity. Results presented in Column Base of Table 5 are consistent with Hanlon (2005) despite these sample differences. Results are not sensitive to the inclusion of firm-years with large goodwill changes or to the exclusion of firms with an NOL but are sensitive to excluding loss firms.

significant coefficients for both PTBI*LNBTD and PTBI*LPBTD. Although the coefficient on PTBI*LNBTD is relatively similar between Column Base and Column A, the coefficient on PTBI*LPBTD in Column A is less than half the size of the coefficient on PTBI*LPBTD in Column Base. This change provides no supports for H1a and in fact suggests that part of the lower persistence of income in firms with large positive book-tax differences is due to the GAAP changes studied here, primarily impairment-related, rather than to earnings management.[25] That the coefficient changes is somewhat intuitive—a book-tax income gap that includes impairments should be less persistent than a book-tax income gap that excludes these irregular items.

Column B uses the residual from Column B in Table 4 as the sort variable. The results in Column B are very similar to those in Column Base, suggesting that general business conditions do not significantly affect the relationship between the size of the book-tax gap and earnings persistence. These results provides no support for H2a.

Finally, Column C sorts on the residual from Column C in Table 4, which only controls for **D_ACC**, and reports results quite changed from Column Base. Column C reports that firms with large negative book-tax differences, sorted after removing the effect of discretionary accruals, have more persistent earnings than firms with small book-tax differences. Additionally, the coefficient on PTBI*LPBTD is considerably attenuated after controlling for earning management. These results strongly support H3a. Despite the small effect that the variation of earnings management has on the book-tax income gap, this result suggests that controlling for this factor is still an important consideration when using the book-tax income gap. The results in Table 5 provide no support for either hypothesis H1a or H2a, but support H3a and confirm that the lower persistence earnings observed in Hanlon (2005) are due in part to earnings management. A further important implication

[25] Though we might expect that firm-year observations with an impairment have a negative book-tax gap because the impairment decreased book-income below taxable income, there are instances where firm-years with an impairment have a positive book-tax gap. Thirty-one percent (20%) of the book-tax gaps for firm-years with a non-zero value for **IMPAIR** (**GW_IMPAIR**) are positive.

is that if researchers are using the book-tax gap as a proxy for earnings management, it is reasonable to use the unadjusted gap.

5.2.2. Proxy for Tax Sheltering

The book-tax gap is regularly used as a proxy for tax sheltering behavior. Recent literature, such as Frank, Lynch, and Rego (2009) and Desai and Dharmapala (2006), adjusts the book-tax gap to improve its ability to proxy for tax sheltering. This section is in the spirit of this recent literature.

Lisowsky (2009) models the probability of a tax shelter using proprietary data on the existence of tax shelters.[26] Proxies for tax sheltering should be positively correlated with the predicted value I calculate from the Lisowsky model.[27] Removing the effect of other influences should increase the correlation between the book-tax income gap and the predicted probability of a tax shelter. Additionally, strong proxies for tax sheltering should have a higher correlation with the Lisowsky predicted value than weak proxies. I test these predictions in Table 6.[28]

[insert Table 6 around here]

Column A presents the primary sample of the paper. Column B excludes firm-years where Taxable Income is negative: tax sheltering is less likely in those years. Column C further limits the sample to where tax sheltering is most likely—where firm-years have both positive Taxable Income and a positive book-tax income gap, indicating that they reported positive Book Income but lower Taxable Income. Finally, Column D limits the sample to firm-years with an impairment because this is likely to be where the adjustments made in Column A of Table 4 will have the greatest impact. The

[26] Wilson (2009) also models the probability of a tax shelter. Lisowsky (2009) reports an R^2 of 20.4% on his model, compared with an R^2 of 9.8% on his replication of the Wilson model, so I use the Lisowsky model here.

[27] I calculate the Lisowsky predicted value omitting two variables which he models: BTD and TaxHaven. I omit BTD because including a scaled measure of **BT_GAP** in the calculation of **predict** could induce a spurious correlation with **BT_GAP** and all adjusted versions of **BT_GAP**. I omit TaxHaven because data is not electronically available on whether a firm has a subsidiary in a TaxHaven or not.

[28] Table 6 presents Spearman correlations only. When using Pearson correlations, **BT_GAP** measures are only significantly correlated with the Lisowsky predicted values when tax sheltering is strongly predicted (**TI** > 0 and **BT_GAP** > 0); **DTAX** is never significantly correlated with **BT_GAP**.

change in correlation between **BT_GAP** and **predict** and the alternative measure and **predict** and the p-value associated with that change in correlation are detailed below the alternative measures; significant correlation changes are presented in bold.

First, Table 6 shows that **BT_GAP** is positively and significantly correlated with the Lisowsky predicted value, **predict**, in all samples. Further, Table 6 shows that in three of the four samples, the unadjusted **BT_GAP** is more positively correlated with **predict** than is **DTAX**. The stronger correlation with **predict** is consistent with Lisowsky's (2009) evidence that the Frank, Lynch, and Rego (2009) discretionary permanent book-tax gap measure (**DTAX**) does not explain his tax shelter variable.[29] The change in correlation between **BT_GAP** and **DTAX** is statistically significant at the 1% level in all cases.

The variable, **Table 4A residual**, is the residual from the regression of **BT_GAP** on the four GAAP changes. Controlling for GAAP changes increases the correlation with **predict** in a statistically significant manner in three of the four cases. When the firm-year includes an impairment, the correlation increases more than 50%.[30] However, the adjustment for GAAP changes does not increase the correlation in Column C, where the probability of tax sheltering is highest. Overall, the results in row **Δcorr(BT_GAP, 4A residual)** support H1b.

Adjustments for general business conditions, **Table 4B residual**, significantly decrease the correlation with **predict**, against the prediction in H2b. This suggests that the association between the book-tax income gap and tax sheltering found in prior research was driven in part by a common association with general business conditions, for example that tax sheltering is more likely during expansionary periods. This correlation may be problematic for researchers. A research design that uses the book-tax gap as a proxy for tax sheltering and studies a phenomenon also correlated with

[29] DTAX measures discretionary permanent book-tax differences while the tax shelters in the Lisowsky (2009) measure generate both permanent and temporary book-tax differences. This discrepancy likely decreases the correlation between **DTAX** and **predict**.

[30] In firm-years without an impairment, there is not a significant difference between the correlation between **BT_GAP** and **predict** vs. **TABLE 4B residual** and **predict**.

macroeconomic conditions (for example, Desai and Dharmapala (2006) study the relationship between tax sheltering and stock option compensation) may find results induced by the joint correlation with macroeconomic conditions rather than by a true relationship between tax sheltering and the variable of interest. Whether results of these types of studies change after removing the effect of macroeconomic variables remains an open question.

Finally, adjustments for earnings management do not significantly affect the correlation between the book-tax income gap and **predict**. The results in row **Δcorr(BT_GAP, 4C residual)** provide no support for H3b. Overall, the results in Table 6 show that **BT_GAP** is a reasonable proxy for tax sheltering but that its effectiveness can be increased, both in general and in cases where impairments exist, by adjusting for certain GAAP changes. Table 6 also suggests that researchers should be especially careful when using the book-tax gap as a proxy for tax sheltering and studying its relationship with variables that are also likely correlated with macroeconomic conditions.

6. ROBUSTNESS CHECKS

6.1. Correlation with Omitted Variables

An assumption that underlies each of the three hypotheses is that the alternative factor being examined is uncorrelated with the omitted factors—tax sheltering behavior and changes to tax law. If the examined factors are correlated with the omitted factors, I may overstate the variance attributable to the examined factors and understate the variance attributable to the omitted factors. Because of this, I am sensitive to the importance of this assumption.

The assumption of uncorrelatedness is more reasonable for some of my alternative factors than for others. First, I assert that GAAP Changes are uncorrelated with changes to tax sheltering and tax law and that changes in earnings management for financial statement purposes are uncorrelated with changes in tax law. It is difficult to construct a scenario where an exogenous GAAP change results in a change in tax sheltering behavior, as the aim of tax sheltering is to decrease taxable

income without affecting book income. To test this assumption, I regress the GAAP changes I study on leading taxable income both one and two years forward. In untabulated results, I find no significance on any of the GAAP Change variables in either regression, which supports this assumption. While it is plausible that GAAP changes result in tax law changes, significant tax law changes are few during the period so the assumption of uncorrelatedness seems reasonable during this period for both GAAP changes and earnings management.

However, it is likely that changes in general business conditions and changes in tax law are correlated. The Employment Act of 1946 formally adopted the Keynesian standard of efficiency for the U.S. government. Since then, the federal income tax system has been widely viewed as a tool for achieving the stated goals of promoting maximum employment and a stable dollar. Recent tax law changes (for example the bonus depreciation provisions enacted to encourage investment in capital assets and the repatriation tax holiday of the American Jobs Creation Act of 2004 to encourage employee training) provide evidence that the tax system is used to manage the effect of general business conditions. While this suggests that changes in tax law are a correlated omitted variable in my model, the fact that results hold when changes in general business conditions are omitted from the model provides comfort that this correlated omitted variable does not affect inferences.

Finally, both earnings management and general business conditions may also be correlated with tax sheltering. Frank, Lynch and Rego (2009) find a positive correlation between measures of aggressive financial reporting and aggressive tax reporting. These results suggest that the assumption of orthogonality between earnings management and tax sheltering may not be valid. In spite of this, excluding **D_ACC** generates an R^2 of 54.81%, very similar to that reported in Table 3, which includes **D_ACC**. Because excluding **D_ACC** does not change the tenor of my results, I am not concerned that correlation between **D_ACC** and tax sheltering may cause me to understate the importance of the unmeasured factors.

Correlation may also exist between general business conditions and tax sheltering. Table 6 even suggests this, as adjusting for macroeconomic conditions decreases, rather than increases, the correlation between the book-tax gap and the predicted probability of a tax shelter. To mitigate potential correlation, I include rates for GBC variables at the industry-level, rather than at the firm-level. I first calculate firm-level variables and then average them annually for each two-digit SIC group.[31] The industry rate is then applied to firm-level figures to scale the variables to dollars, comparable with the GAAP Change variables. I include all Compustat firm-year observations to compute the industry averages, regardless of whether the firm-year observation has the necessary variables to be included in the final sample. Although using firm-level numbers to scale the variables might introduce some correlation, calculating GBC variables at the industry-level should remove most of the potential correlation with tax sheltering because the firm characteristics shown to be related to tax sheltering will vary within industry. For example, Lisowsky (2009) finds that the probability of a tax shelter is increasing in the financial complexity of a firm and the percent of income that is foreign. Both of these characteristics vary within industry.

I investigate the issue further by alternatively using industry-scaled GBC variables and industry-averaged GAAP change variables. These tests are intended to assess whether results found using firm-scaled GBC variables are due to additional variation in the data or to correlation with tax sheltering. Specifically, I calculate **ΔSALES** as industry-averaged percent change in Net Sales times industry-averaged lagged Net Sales, **COST_DEBT** as industry-averaged interest rate time industry-averaged average interest-bearing debt, and **CAP_EX** as industry-average capital expenditure rate times industry-averaged Gross Property, Plant, and Equipment.

Panel A of Table 7 replicates Table 3, replacing firm-scaled GBC variables with industry-scaled GBC variables. While **CAP_EX** remains significant, **COST_DEBT** becomes insignificant.

[31] An alternative design would average the source variables and then calculate general business conditions using the Industry means. This approach size-weights the variables. Because size has been shown to be correlated with tax sheltering (see Lisowsky, 2008), I avoid weighting the General Business Condition variables.

The R^2 of the regression falls from 55.43% to 51.72%. In untabulated results, the industry-scaled GBC variables have an incremental R^2 of 0.18%, which has little economic effect. Contrary to the firm-scaled GBC incremental R^2 of 3.89% discussed in Section 5.1., industry-scaled GBC variables offer no explanatory power for the book-tax income gap.

[Insert Table 7 around here]

It is difficult to determine whether the significance found using firm-scaled GBC variables is due to increased power in the firm-scaled variables or whether the firm-specific variables used to scale are correlated with tax sheltering. To provide a benchmark for the power lost when firm-specific values are replaced by industry-averaged values, I annually average each of the four GAAP change variables at the two-digit SIC code. Panel B of Table 7 replicates Table 3, replacing firm-specific GAAP Change variables with industry-averaged GAAP Change variables. While **IMPAIR** remains significant, **GW_IMPAIR** loses significance; the R^2 falls from 55.43% to 3.10%. In untabulated results, the industry-averaged GAAP Change variables offer an incremental R^2 of only 0.49%, significantly less than the separate firm-specific GAAP Change incremental R^2 of 52.82% discussed in Section 5.1.

The alternative variable calculation methods presented in Table 7 provide comfort that predictable variation results found using firm-scaled GBC variables are due to the powerful variation in firm-scaled variables rather than to correlation with the unmeasured variables induced by the scaling method. Both industry-averaged GAAP Change variables and industry-scaled GBC variables provide dramatically lower explanatory power than their firm-specific or firm-scaled counterparts.

6.2. Omission of Tax Law Changes

Both because there are relatively few significant tax law changes compared to significant GAAP changes and because the effects of tax law changes are challenging to estimate from financial data, I omit tax law changes in my model and my tests. To be more complete, in this section I discuss

four significant tax law changes and their potential impact on this research. I continue to assert that omitting changes in tax law does not bias inferences from this study.

Internal Revenue Code Section 197 (IRC 197), effective for acquisitions after 08/10/1993, introduced amortization of intangible assets acquired in a taxable acquisition. Prior to IRC 197, intangible assets acquired in a taxable acquisition retained their original tax basis throughout their life. While IRC 197 becomes effective early in my study, it does not apply retroactively and so has less impact than might be originally thought. Additionally, Weston and Johnson (1999) find that two-thirds of mergers between 1992 and 1998 were non-taxable; IRC 197 only applies to taxable mergers. Omitting a control for the application of IRC 197 is not likely problematic for this study.

Effective 01/01/1997, the Internal Revenue Service put into effect new "check the box" regulations that allow unincorporated entities to choose whether to be taxed as partnerships or corporations. These new regulations offered planning opportunities for both minimizing state taxes and U.S. taxation of the foreign income of U.S. multinationals, making it easier to decrease tax expense and taxes paid and increasing the book-tax gap. Because this particular tax law change may be used for aggressive tax sheltering, I would not control for these regulations even if an adequate control were available because my research design specifies that the effect of tax sheltering, including the effect of the "check the box" regulations, should remain in the residual.

The Job Creation and Worker Assistance Act of 2002 enacted an additional first-year depreciation deduction (termed "bonus" depreciation) on property placed into service after September 10, 2001. Bonus depreciation will decrease taxable income and increase the book-tax income gap. **CAP_EX**, my general business condition variable for investment, will likely absorb some of the effect of bonus depreciation. Including firm-level capital expenditures or a dummy variable controlling for the bonus depreciation period does not change results presented in Table 3.

The American Jobs Creation Act of 2004 (AJCA 2004) created a temporary tax holiday allowing U.S. companies to repatriate earnings from their foreign subsidiaries at a substantially

reduced tax rate. This tax law change will increase estimated taxable income, decreasing the book-tax income gap. The effect of the repatriation holiday of AJCA 2004 will occur in 2004 and 2005. To ensure that results are not significantly impacted by the provisions of AJCA 2004, I exclude 2004 from the sample and re-estimate equation (4). In untabulated results, the explanatory results of GAAP changes are slightly stronger in the reduced sample while the explanatory power of measures of general business conditions and earnings management are unchanged. Excluding the four significant tax law changes does not appear problematic to the inferences in this study.

6.3. Scaled Tests

Prior literature sometimes scales the book-tax income gap, usually by current or lagged assets. For consistency, I perform the analysis in Table 3 scaling all variables by lagged Total Assets. Though the R^2 does fall to 39.89%, results are otherwise quite similar and the interpretations—that GAAP changes explain a considerable portion of the variance (incremental R^2 of 34.33%), that GBC contribute incrementally (incremental R^2 of 4.75%) and that earnings management is a weak influence (incremental R^2 of 0.04%)—are unchanged.

[insert Table 8 around here]

6.4. Consideration of Stock Option Expense

Theoretically, whether a firm expenses stock option compensation or not, the difference between book and taxable income should be clean with respect to stock options. However, because my time period covers the post-Enron, pre-SFAS 123R period when some firms were electing to expense options and others were not, I empirically test whether stock option compensation affects my results in two ways. First, I exclude firms for which Compustat has non-missing information for Stock Compensation Expense (DATA398). Compustat provides a non-missing observation for 6576 firm-years in my sample; 35% of these observations occur in 2004. In untabulated results, the R^2

increases from the 55.43% reported in Table 3 to 61.45%; the increase is attributable to GAAP changes. Second, I include Stock Compensation Expense in the primary regression. The R2 is nearly identical to that reported in Table 3. In both tests, inferences from Table 3 are unchanged, suggesting that the book-tax gap is indeed clean with respect to stock option compensation.

7. CONCLUSION

Variation in the book-tax gap caused by variation in influential factors other than earnings management or tax sheltering may cause the book-tax gap to be a poor proxy for either earnings management or tax sheltering. I assess the validity of the book-tax gap as a proxy for earnings management or tax sheltering and to explore modifications that may improve the book-tax gap as a proxy for earnings management or tax sheltering.

I test whether the book-tax income gap is a reasonable proxy for either earnings management or tax sheltering in two ways. First, I quantify predictable variation in the gap during the period 1993 to 2004. I hypothesize that cross-sectional variation in general business conditions and earnings management as well as across-time variation in GAAP caused by changes to FASB Standards will cause predictable variation in the book-tax income gap. I find that the four GAAP changes I study explain over half the variance in the book-tax gap, that variation in general business conditions contribute some explanatory power and that variation in earnings management only weakly explains variance in the book-tax income gap. In total, the three factors I study explain more than 55% of the variance in the book-tax income gap from 1993-2004.

GAAP changes are the most significant influence on variation in the book-tax income gap. General business conditions and earnings management increase the book-tax income gap, exacerbating the effect of other increasing factors such as tax sheltering and legal tax minimization. GAAP changes mitigate the effect of these increases to some extent—absent the four GAAP changes studied here, the book-tax income gap would have been even larger. While I calculate a rather

significant upper bound of 45% for the unmeasured factors, tax law changes and tax sheltering behavior, the four GAAP changes included alone explain over 50% of the variance. Though I show that macroeconomic conditions are a more important cause of variance than earnings management, this paper cannot establish the position of influence of tax law changes or of tax sheltering behavior relative to these other two factors.

Second, I investigate whether subtracting the effect of alternative factors that shape the book-tax gap impacts interpretations of prior earnings management or tax sheltering research. I find that removing the effect of earnings management from the book-tax income gap causes the results in Hanlon (2005) to change dramatically, confirming that earnings management significantly contributes to the decreased earnings persistence of firms with large book-tax differences. Results suggest that recent GAAP changes contributed to the decreased earnings persistence as well. I also study the correlation between the predicted probability of a tax shelter and various measures of the book-tax gap. I show that adjusting for GAAP changes increases the correlation between the book-tax income gap and the predicted probability of a tax shelter. I also find evidence of a positive correlation between tax sheltering and macroeconomic conditions which may be problematic for research that studies a phenomenon also correlated with general business conditions. Overall, my results suggest that the unadjusted book-tax gap is a reasonable proxy for earnings management but that subtracting the effect of GAAP changes from the gap generates a better proxy for tax sheltering in most contexts.

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TABLE 1
Sample Selection

Compustat firms with Total Assets, 1993-2004	103,097
Less: missing **BT_GAP**	24,473
Less: Missing explanatory variables	
IMPAIR	43,557
∆SALES	1,650
COST_DEBT	27
CAP_EX	511
D_ACC	419
Observations in sample	32,460

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63 /statutory rate) - 173 - 211 - 55])

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property, Plant, and Equipment

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 2
Summary Statistics and Correlation Table
(32,460 firm-year observations, 1993-2004)

Panel A: Summary Statistics (millions of dollars)

	Mean	Median	Std. Dev.	P25	P75
Dependent Variables					
BT_GAP	0.152	-0.723	603	-9.73	5.12
GAAP Change Variables					
∆OPEB	-2.09	0.00	130	0.00	0.00
IMPAIR	-9.19	0.00	300	0.00	0.00
GW_IMPAIR	-3.72	0.00	200	0.00	0.00
∆INTANG	-10.2	0.00	1,022	0.00	0.00
Industry General Business Condition Variables					
∆SALES	4,858	58.1	77,559	6.74	388
COST_DEBT	257	2.47	7,227	0.155	29.6
CAP_EX	50.1	1.89	292	0.261	12.0
Earnings Management Variable					
D_ACC	-211	-0.88	22,379	-20.67	5.37
Firm Characteristics					
TOTAL ASSETS (DATA6)	4,182	156	34,310	24.98	795
NET INCOME (DATA172)	68.4	0.770	991	-5.99	25.7

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33 - 204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property, Plant, and Equipment

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 2
Summary Statistics and Correlation Table
(32,460 firm-year observations, 1993-2004)

Panel B: Pearson Correlations above diagonal, Spearman correlations below

	∆OPEB	IMPAIR	GW_IMPAIR	∆INTANG	∆SALES	COST_DEBT	CAP_EX	D_ACC
∆OPEB	1.000	0.010 (0.071)	0.000 (0.973)	-0.017 (0.002)	-0.005 (0.379)	0.005 (0.344)	-0.079 (0.000)	0.005 (0.362)
IMPAIR	0.013 (0.016)	1.000	0.047 (0.000)	0.039 (0.000)	-0.038 (0.000)	-0.006 (0.260)	-0.079 (0.000)	0.040 (0.000)
GW_IMPAIR	-0.003 (0.629)	0.122 (0.000)	1.000	0.591 (0.000)	-0.022 (0.000)	-0.004 (0.431)	-0.027 (0.000)	0.029 (0.000)
∆INTANG	-0.010 (0.085)	0.035 (0.000)	0.060 (0.000)	1.000	-0.011 (0.042)	0.004 (0.476)	-0.046 (0.000)	0.019 (0.001)
∆SALES	-0.096 (0.000)	-0.075 (0.000)	-0.021 (0.000)	0.014 (0.014)	1.000	0.188 (0.000)	0.159 (0.000)	-0.009 (0.089)
COST_DEBT	-0.116 (0.000)	-0.107 (0.000)	-0.037 (0.000)	0.016 (0.005)	0.580 (0.000)	1.000	0.255 (0.000)	-0.142 (0.000)
CAP_EX	-0.136 (0.000)	-0.122 (0.000)	-0.019 (0.001)	0.013 (0.023)	0.700 (0.000)	0.725 (0.000)	1.000	-0.112 (0.000)
D_ACC	-0.004 (0.532)	0.108 (0.000)	0.082 (0.000)	0.031 (0.000)	-0.052 (0.000)	-0.058 (0.000)	-0.056 (0.000)	1.000

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33 - 204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property, Plant, and Equipment

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 3
Predictable Variation in the Book-Tax Income Gap
(32,460 firm-year observations, 1993-2004)

BT_GAP = f (∆OPEB, IMPAIR, GW_IMPAIR, ∆INTANG, ∆SALES, COST_DEBT, CAP_EX, D_ACC, ε)

	pred	Coef.	Std. Error	P>z
GAAP Change Variables				
∆OPEB	+	-0.040	0.093	0.67
IMPAIR	+	1.096	0.044	0.00
GW_IMPAIR	+	1.223	0.141	0.00
∆INTANG	+	0.048	0.028	0.08
Industry General Business Condition Variables				
∆SALES	+	0.000	0.000	0.06
COST_DEBT	?	0.002	0.001	0.10
CAP_EX	+	0.381	0.067	0.00
Earnings Management Variable				
D_ACC	+	-0.002	0.000	0.00

R-squared	55.43%

Statistical significance in OLS regression determined using White standard errors.

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33-204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property,

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 4
Predictable Variation in the Book-Tax Income Gap, by Factor
(32,460 firm-year observations, 1993-2004)

column A: BT_GAP = f (∆OPEB, IMPAIR, GW_IMPAIR, ∆INTANG, ε)
column B: BT_GAP = f (∆SALES, COST_DEBT, CAP_EX, ε)
column C: BT_GAP = f (D_ACC, ε)

		Column A		Column B		Column C	
	pred	Coef.	P>z	Coef.	P>z	Coef.	P>z
GAAP Change Variables							
∆OPEB	+	-0.111	0.44				
IMPAIR	+	1.057	0.00				
GW_IMPAIR	+	1.216	0.00				
∆INTANG	+	0.043	0.13				
Industry General Business Condition Variables							
∆SALES	+			0.000	0.48		
COST_DEBT	?			0.004	0.04		
CAP_EX	+			0.273	0.00		
Earnings Management Variable							
D_ACC	+					-0.002	0.10
R-squared		50.45%		2.37%		0.49%	

Statistical significance in OLS regression determined using White standard errors.

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33 - 204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property, Plant, and Equipment

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 5
Interpretation of Prior Research that Uses the Book-Tax Gap, Proxy for Earnings Management

Earnings Forecasting Equation with the Coefficients Allowed to Vary for Firm-Years with Large Book-Tax Differences
(23,490 firm-year observations, 1993-2004)

lead_PTBI = f (α, LNBTD, LPBTD, PTBI, PTBI*LNBTD, PTBI*LPBTD, ε)

	Column Base		Column A		Column B		Column C	
BTD ranking on:	**BT_GAP**		**Table 4A residual**		**Table 4B residual**		**Table 4C residual**	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
constant	-0.035	0.00	-0.034	0.00	-0.035	0.00	-0.041	0.00
LNBTD	-0.275	0.00	-0.284	0.00	-0.274	0.00	-0.262	0.00
LPBTD	0.102	0.00	0.005	0.84	0.102	0.00	0.059	0.01
PTBI	0.978	0.00	0.984	0.00	0.981	0.00	0.509	0.00
PTBI*LNBTD	-0.187	0.00	-0.196	0.00	-0.190	0.00	0.290	0.00
PTBI*LPBTD	-1.321	0.00	-0.584	0.00	-1.324	0.00	-0.525	0.00
			0.44					
R-squared	50.53%		50.41%		50.53%		50.59%	

Variable Definitions (Compustat data item in parentheses, where applicable):

lead_PTBI = pre-tax book income one year ahead (170)
BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])
Table 4A residual = residual from Column A, Table 4
Table 4B residual = residual from Column B, Table 4
Table 4C residual = residual from Column C, Table 4
LNBTD = 1 for firm-year observations in the bottom quintile of annual BTD ranking, 0 otherwise
LPBTD = 1 for firm-year observations in the top quintile of annual BTD ranking, 0 otherwise
PTBI = pre-tax book income for the current year (170)

Consistent with Hanlon (2005), all continuous variables are scaled by average total assets.

Table 6
Interpretation of Prior Research that Uses the Book-Tax Gap,
Proxy for Tax Sheltering

Correlation (Spearman) of BT_GAP with Predicted Probability of a Tax Shelter
(1993-2004)

Lisowsky (2009) predicted values

	Column A entire sample	**Column B** where TI > 0	**Column C** where TI>0 and BT_GAP > 0	**Column D** impair or gw_impair NE 0
	predicted	**predicted**	**predicted**	**predicted**
BT_GAP	0.258 (0.000)	0.262 (0.000)	0.820 (0.000)	0.098 (0.000)
DTAX	0.118 (0.000)	0.109 (0.000)	0.093 (0.000)	0.141 (0.000)
Table 4A residual	0.290 (0.000)	0.290 (0.000)	0.818 (0.000)	0.261 (0.000)
Table 4B residual	0.145 (0.000)	0.144 (0.000)	0.584 (0.000)	-0.010 (0.455)
Table 4C residual	0.260 (0.000)	0.264 (0.000)	0.821 (0.000)	0.100 (0.000)
Δcorr(BT_GAP, DTAX)	**-0.140 (0.001)**	**-0.153 (0.001)**	**-0.727 (0.001)**	**0.043 (0.001)**
Δcorr(BT_GAP, 4A residual)	**0.031 (0.001)**	**0.027 (0.001)**	-0.002 (0.371)	**0.163 (0.001)**
Δcorr(BT_GAP, 4B residual)	**-0.114 (0.001)**	**-0.118 (0.001)**	**-0.236 (0.001)**	**-0.108 (0.001)**
Δcorr(BT_GAP, 4C residual)	0.002 (0.494)	0.002 (0.494)	0.001 (0.498)	0.002 (0.493)
n	32,460	28,547	11,867	5,310

Variable Definitions (Compustat data item in parentheses, where applicable):

predict = -7.059 + (0.924*D_ACC) + (-0.697*leverage) + (1.397*size) + (2.473*ROA) + (3.569*fgn income) + (-3.023*R&D) + (0.015*lagETR) + (-0.687*Mezzanine Financing) + (1.048*Equity earnings) + (3.186*Big5) + (1.063*litigation) + (0.140*NOL CF)

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

leverage = Long-term Debt (9) / Total Assets (6)

size = log(Total Assets (6))

ROA = Pretax Book Income (170) / Total Assets (6)

fgn income = Foreign Pretax Income (273) / Lagged Total Assets (6)

R&D = R&D Expense (46) / Lagged Total Assets (6)

lagETR = Prior Period [100 * Total Tax Expense (16) / Pretax Book Income

Mezzanine Financing = Convertible Debt & Preferred Stock (39) / Total Assets (6)

Equity Earnings = 1 if Equity in Earnings from Income Statement (55) is not zero

Big5 = 1 if Auditor is Deloitte & Touche, PricewaterhouseCoopers, Ernst & Young, KPMG or Arthur Andersen (149)

litigation = 1 if Pretax (372) or After-tax (373) Litigation/Insurance Settlement < 0

NOL CF = 1 if Tax Loss Carryforward (52) > 0

DTAX = residual from model (1) in Frank, Lynch and Rego (2009)

Table 4A residual = residual from Column A, Table 4

Table 4B residual = residual from Column B, Table 4

Table 4C residual = residual from Column C, Table 4

TABLE 7
Predictable Variation in the Book-Tax Gap, Alternative Variable Calculations
(32,460 firm-year observations, 1993-2004)

BT_GAP = f (∆OPEB, IMPAIR, GW_IMPAIR, ∆INTANG, ∆SALES, COST_DEBT, CAP_EX, D_ACC, ε)

Panel A: Industry-scaled General Business Condition Variables

	pred	Coef.	Std. Error	P>z
GAAP Change Variables				
∆OPEB	+	-0.104	0.138	0.45
IMPAIR	+	1.068	0.063	0.00
GW_IMPAIR	+	1.226	0.145	0.00
∆INTANG	+	0.043	0.028	0.12
Industry General Business Condition Variables				
∆SALES	+	0.000	0.000	0.12
COST_DEBT	?	0.007	0.003	0.03
CAP_EX	+	0.375	0.077	0.00
Earnings Management Variable				
D_ACC	+	-0.003	0.000	0.00

R-squared	51.72%

Statistical significance in OLS regression determined using White standard errors.

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33-204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times industry-averaged lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times industry-averaged average interest-bearing debt (9+34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times industry-averaged Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property, Plant, and Equipment

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 7
Predictable Variation in the Book-Tax Gap, Alternative Variable Calculations
(32,460 firm-year observations, 1993-2004)

BT_GAP = f (∆OPEB, IMPAIR, GW_IMPAIR, ∆INTANG, ∆SALES, COST_DEBT, CAP_EX, D_ACC, ε)

Panel B: Industry-averaged GAAP Change Variables

	pred	Coef.	Std. Error	P>z
GAAP Change Variables				
∆OPEB	+	1.019	0.582	0.08
IMPAIR	+	2.009	0.619	0.00
GW_IMPAIR	+	0.680	0.757	0.37
∆INTANG	+	0.027	0.156	0.86
Industry General Business Condition Variables				
∆SALES	+	0.000	0.000	0.90
COST_DEBT	?	0.003	0.001	0.02
CAP_EX	+	0.288	0.065	0.00
Earnings Management Variable				
D_ACC	+	-0.001	0.001	0.27
R-squared		3.10%		

Statistical significance in OLS regression determined using White standard errors.

Variable Definitions (Compustat data item in parentheses, where applicable):

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = industry-averaged change in Postretirement Benefit Asset/(Liability) (330), averaged annually by two-digit SIC code, proxies for effect of SFAS 106

IMPAIR = industry-averaged hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = industry-averaged Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = industry-averaged change in non-goodwill intangibles (33 - 204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12) times firm-specific lagged Net

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property,

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

TABLE 8
Predictable Variation in the Book-Tax Gap, Scaled Variables
(32,460 firm-year observations, 1993-2004)

BT_GAP = f (∆OPEB, IMPAIR, GW_IMPAIR, ∆INTANG, ∆SALES, COST_DEBT, CAP_EX, D_ACC, ε)

	pred	Coef.	Std. Error	P>z
GAAP Change Variables				
∆OPEB	+	-1.193	1.726	0.49
IMPAIR	+	1.084	0.004	0.00
GW_IMPAIR	+	1.779	0.013	0.00
∆INTANG	+	-3.069	1.477	0.04
Industry General Business Condition Variables				
∆SALES	+	-0.186	0.127	0.14
COST_DEBT	?	-1.695	1.293	0.19
CAP_EX	+	3.407	2.438	0.16
Earnings Management Variable				
D_ACC	+	0.033	0.020	0.10

R-squared	39.89%

Statistical significance in OLS regression determined using White standard errors.

Variable Definitions (Compustat data item in parentheses, where applicable):
All variables are defined as below and then scaled by lagged Total Assets (6)

BT_GAP = Domestic Pre-tax Income - Federal Taxable Income (272 - [(63/statutory rate) - 173 - 211 - 55])

∆OPEB = change in Postretirement Benefit Asset/(Liability) (330), proxies for effect of SFAS 106

IMPAIR = hand-collected long-term asset and goodwill impairment data prior to 2000, Write-down After-tax and Impairments of Goodwill After-tax 2000-2001 (381 + 369), and Write-down After-tax for 2002-2004 (381), proxies for effects of SFAS 121 and SFAS 144

GW_IMPAIR = Impairment of Goodwill After-tax (369) for 2002-2004, 0 otherwise, proxies for effect of SFAS 142

∆INTANG = Change in non-goodwill intangibles (33-204), proxies for effect of SFAS 142

∆SALES = industry rate of change in Net Sales (12), averaged annually by two-digit SIC code, times firm-specific lagged Net Sales

COST_DEBT = industry-averaged annual interest rate times firm-specific average interest-bearing debt (9 + 34), where interest rate is Interest Expense (15) divided by average interest-bearing debt

CAP_EX = industry-averaged capital expenditure rate times firm-specific Gross Property, Plant, and Equipment (7), where capital expenditure rate is Property, Plant, and Equipment - Capital Expenditures (30) / Gross Property,

D_ACC = Actual Accruals - Normal Accruals, where the Normal Accrual-to-Asset rate is calculated annually using the standard Jones Model at the two-digit sic code and applied to firm-specific lagged Total Assets (6)

Appendix A – FASB Statements, effective 1993-2004,
affecting the calculation of Book Income

Included Statements

SFAS 106, Employers' Accounting for Postretirement Benefits Other than Pensions
SFAS 121, Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to be Disposed Of
SFAS 142, Goodwill and Other Intangible Assets
SFAS 144, Accounting for the Impairment or Disposal of Long-Lived Assets

Excluded Statements (organized by primary reason for exclusion)

Statement applies primarily to financial services firms

SFAS 114, Accounting by Creditors for Impairment of a Loan
SFAS 125, Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities
SFAS 134, Accounting for Mortgage-Backed Securities Retained after the Securitization of Mortgage Loans Held for Sale by a Mortgage Banking Enterprise
SFAS 140, Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities – a replacement of FASB Statement No. 125

Statement is immaterial for a majority of firms

SFAS 112, Accounting for Postemployment Benefits
SFAS 143, Accounting for Asset Retirement Obligations
SFAS 146, Accounting for Costs Associated with Exit or Disposal Activities
SFAS 150, Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity

Unable to measure effects of Statement

SFAS 115, Accounting for Certain Investments in Debt and Equity Securities
SFAS 133, Accounting for Derivative Instruments and Hedging Activities
SFAS 137, Accounting for Derivative Instruments and Hedging Activities – Deferral of the Effective Date of FASB Statement No. 133 – an amendment of FASB Statement No. 133
SFAS 138, Accounting for Certain Derivative Instruments and Certain Hedging Activities – an Amendment of FASB Statement No. 133
SFAS 141, Business Combinations
SFAS 149, Amendment of statement 133 on Derivative Instruments and Hedging Activities

Affects Book Income and Taxable Income

SFAS 123, Accounting for Stcok-Based Compensation*

Measurement of Statement Contains other Included Statements

SFAS 109, Accounting for Income Taxes

*Robustness tests include the effect of SFAS 123.