Inferring U.S. Tax Liability from Financial Statement Information*

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Abstract

Using a multi-year matched tax return-financial statement dataset, this study builds an empirical model inferring U.S. tax liability on the corporate tax return from publicly available financial statement disclosures, including those of Statement on Financial Accounting Standards No. 109, *Accounting for Income Taxes* (*SFAS 109*). Results show the current U.S. tax expense, as well as the tax benefit from stock options, current-year tax cushion accrual, consolidation book-tax differences, and R&D, are informative in inferring actual tax, while intraperiod tax allocation is not. Additionally, pretax book income and net operating loss carryforward status can be used as partitioning variables to estimate actual tax. In general, for every dollar of current federal tax expense reported on the financial statements, approximately $0.70 is reported in U.S. tax liability. The models are validated using a holdout sample, providing support that public parties can reliably use these results to estimate a firm's tax position.

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* Confidential tax return data are obtained from the Internal Revenue Service, Large and Mid-Size Business Division (LMSB), Strategy, Research & Program Planning Office (SRPP), and are not publicly available. Because tax return data are confidential and protected by data non-disclosure agreements under the Internal Revenue Code, all statistics are presented in the aggregate. Any opinions are those of the author and do not necessarily reflect the views of the Internal Revenue Service.

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INTRODUCTION

This study examines the empirical association between actual tax liability reported on the corporate tax return Form 1120 and publicly available corporate financial statement (10-K) disclosures during the period 2000-2004. It evaluates the extent to which tax-related financial statement disclosures in general and the Statement on Financial Accounting Standards No. 109, *Accounting for Income Taxes* (*SFAS 109*) disclosures in particular are able to infer contemporaneous U.S. tax liability reported to the Internal Revenue Service (IRS). Of specific interest is the relationship between current federal (U.S.) tax expense and tax return Total Tax after Credits, or simply "Total Tax" (Form 1120, Line 31).[1] In modeling this relationship, I consider the extent to which other items, such as the tax benefit from stock options, current-year accrual of the tax contingency reserve (or tax cushion), intraperiod tax allocation, and consolidation book-tax differences contribute to our understanding of estimating Total Tax from current U.S. tax expense and other disclosed financial information.

In doing so, I also evaluate whether pretax income and net operating loss (NOL) carryforward status, extensively used in the marginal tax rate research (e.g., Shevlin 1990, Graham 1996a, 1996b, and Plesko 2003), can be useful partitioning variables in inferring Total Tax on the tax return.[2] Further, I examine the extent to which other tax-related disclosed financial information, such debt and non-debt tax shields, cash taxes paid, total tax expense, and change in taxes payable provide incremental information in estimating Total Tax.

Tests indicate that the sign of financial income and existence of net operating losses are informative in estimating Total Tax. In the economically important sub-sample of firms with positive pretax domestic book income and no NOL carryforward, results indicate a strong positive relationship between current U.S. tax expense and Total Tax. Specifically, for every dollar of current U.S. tax expense

[1] Total Tax after Credits (Form 1120, Line 31) is the tax return liability for a tax year that is conceptually comparable to financial statement current tax expense for the year. In my study, tax liability does not refer to financial statement taxes payable, but rather Total Tax after Credits. Also, for brevity, I use the term "Total Tax" interchangeably with "Total Tax after Credits" when referring to Form 1120 Line 31.

[2] This study focuses on estimating the effective (average) tax burden while the prior named research has largely focused on estimating marginal tax rates. I apply the insight from literature on marginal tax rates to aid in estimating effective taxes for reasons discussed below.

reported on the financial statements, about $0.70 is reported in Total Tax to the IRS. Items such as the tax benefit of stock options, current-year accrual of the contingent tax liability reserve (tax cushion), and consolidation book-tax differences are incrementally informative to current U.S. tax expense in explaining Total Tax. However, intraperiod tax allocation is not. Additionally, the non-debt tax shield R&D is incrementally useful in estimating Total Tax, while the debt tax shield (i.e., leverage) is not. Validation tests reveal that the model and parameters developed in this study can be used by the public to estimate Total Tax.

Additional tests show that other tax-related financial information can be used to infer Total Tax. Specifically, cash taxes paid, total tax expense, and total current (but not deferred) tax expense aid in estimating Total Tax. Interestingly, the change in income taxes payable is not informative when considered separately from cash taxes paid and total tax expense. In general, the usefulness of the empirical models reported in this study stems from the ability to use public sources to estimate confidential tax information.

This study's motivation and goal is to help researchers, investors, policymakers, and government budget forecasters reliably estimate a corporation's actual U.S. tax position. Prior research suggests that users of a corporation's financial statements cannot reasonably infer how much tax liability is owed in a given year to the U.S. (or other) government from the corporation's financial statement tax expense, in spite of detailed tax footnotes (e.g., Hanlon and Shevlin 2002; Manzon and Plesko 2002; McGill and Outslay 2002, 2004; Hanlon 2003; Plesko 2003; Mills and Plesko 2003; Hanlon 2005; and Weber 2006). McGill and Outslay (2004) discuss that researchers and watchdog groups estimated Enron's actual tax liability in 2000 to be between a $278 million *credit* to a $112 million *liability*; in fact, Enron's liability was $63.2 million, a number that did not appear in the financial statements. Hanlon (2003) explains in detail that the current U.S. tax expense may differ from actual tax liability because of divergent accounting for stock options[3], the accrual of the contingent tax liability reserve (tax cushion), intraperiod tax allocation, and different book-tax consolidation rules.[4]

[3] For example, under Accounting Principles Board No. 25 (*APB No. 25*) accounting for stock options, the current tax expense is overstated if a corporation has nonqualified stock options because the tax benefit from option exercise is recorded in stockholder's equity rather than reducing tax expense. Specifically, the value of the option exercise

In fact, corporations are not required to publicly reconcile the current tax expense amount to the tax return liability and explain these differences to financial statement users. Such a reconciliation has been proposed (Hanlon 2003, 851; McGill and Outslay 2004, 753), but only the reconciliation of book to taxable income has been achieved using the relatively recent Schedule M-3. However, this information is reported only to the IRS and is not publicly available.[5]

Differences in filing deadlines may exacerbate the problem; tax expense is determined and reported within three months after the fiscal year-end for Securities and Exchange Commission (SEC) filings while the tax return liability is determined and filed with the IRS within eight-and-a-half months after year-end (including extensions). Therefore, in nearly all cases, reconciling amounts based on adjustments using the later information ("true-ups") are incorporated in the subsequent year's financial statements, but are not separately disclosed.

Finally, although current tax expense is separately disclosed for U.S. versus foreign tax expense if the separation is material, the statement of cash flows only reports a single worldwide amount for taxes paid. Therefore, it is unclear to what degree the tax disclosures are in fact helpful in inferring a firm's true taxable position.

This paper contributes to the literature by providing empirically valid estimates that can be used by the public to infer Total Tax. It uses Hanlon (2003) as a guide in modeling financial variables that may explain the difference between Total Tax and current U.S. tax expense. This paper primarily addresses the reporting limitations outlined in Hanlon (2003) and McGill and Outslay (2004) and offers a potential solution to inferring a corporation's actual tax burden from public sources as no formal reconciliation is currently available. In doing so, the model may improve financial statement-based estimates for taxable

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increases additional paid in capital and reduced taxes payable rather than reducing tax expense. *APB No. 25* (via *SFAS 123*) governed the accounting for stock options during my sample period 2000-2004. See Hanlon and Shevlin (2002) for more information.

[4] Mills and Plesko (2003) explain that differences in which entities are consolidated for book and tax purposes present problems when comparing a financial statement to a tax return In addition to differences in consolidation rules, not all taxpayers fully consolidate their tax return data as required. Improper consolidation of firms' intercompany balances and dividends limit the interpretations of Form 1120 Schedule M-1 (and M-3) book-tax reporting differences (see Boynton, DeFilippes, Lisowsky, and Mills, 2004). Finally, book-tax differences due to consolidation issues have been growing since the early 1990s (see Mills, Newberry, and Trautman, 2002 and Lisowsky and Trautman, 2007).

[5] As of 2004, corporate taxpayers with tax assets of $10 million or more are required to reconcile income differences between their books and the tax return on the IRS Form 1120 Schedule M-3.

income and tax burden. For example, Dyreng, et al. (2008) explain that measuring actual tax burden, and thus tax avoidance, from public sources is problematic because of the issues outlined in Hanlon (2003). These issues are empirically examined here. Also, this study extends the insights from the marginal tax rate literature by finding that the partitioning variables of the sign of book income and NOL status is helpful in inferring actual tax burden (see Shevlin 1990; Omer, et al. 1991; Graham 1996a, 1996b; Gupta and Newberry 1997; Manzon and Plesko 2002; Plesko 2003).

The empirical model also contributes to the IRS Large and Mid-Size Business (LMSB) Division's assessments of tax aggressiveness and audit risk. Mills (1998) finds that greater book-tax differences are positively associated with IRS proposed audit adjustments. One proxy for book-tax differences used in Mills (1998) is the difference between current U.S. tax expense and Total Tax after Credits. This result suggests that the greater the difference between the tax burden reported to shareholders and that reported to the IRS may signal a possibly aggressive tax position subject to IRS audit scrutiny. To the extent this study successfully accounts for the known and measurable differences between current U.S. tax expense and Total Tax, the IRS can more directly assess audit risk by pinpointing which book-tax differences are associated with somewhat benign items such as stock options, and which are associated with less benign items, such as the tax cushion.

Because tax returns are filed approximately five-and-a-half months after financial statements, the model may aid government budget forecasters (e.g., the Congressional Budget Office and the Treasury Department's Office of Tax Analysis) in developing more robust estimates of corporate tax receipts by supplementing their current revenue forecasting models with more timely financial statement information.[6] Finally, understanding the circumstances under which the model provides a good or poor fit will assist policymakers and the regulatory bodies such as the FASB (Financial Accounting Standards Board) and the IASB (International Accounting Standards Board) in addressing the limitations of current

[6] The Congressional Budget Office provides analyses of budgetary and economic decisions covered by the federal budget. The Treasury Department's Office of Tax Analysis is responsible for estimates included in the Tax Expenditures section of the President's budget. It also estimates the revenue consequences of all the Administration's legislative tax proposals and major Congressional tax proposals.

practice in the financial reporting of tax information.[7] This study may also inform tax policy discussions where the estimation of corporate tax burdens is of paramount interest (e.g., Yin, 2003).

This paper is organized as follows. The next section discusses the financial accounting for income taxes and related research. The third section explains the methodology, sample, model, and variables. The fourth section reports the results. The fifth section concludes.

BACKGROUND

Reporting a Firm's Tax Position in the Financial Statements

Several standards and rules govern the reporting of a corporation's income tax position on its financial statements. Most central, the Statement of Financial Accounting Standards No. 109, *Accounting for Income Taxes* (*SFAS 109*), effective for fiscal years ending on or after December 15, 1992, governs the recording and disclosure of income taxes and its components on the financial statements.[8] *SFAS 109* (1992, 4) states that the objectives of the accounting for income taxes are "to recognize (a) the amount of taxes payable or refundable for the current year and (b) deferred tax liabilities and assets for the future tax consequences of events that have been recognized in an enterprise's financial statements or tax returns." This paper largely focuses on the first objective.

SFAS 109 takes a balance sheet approach to computing total tax expense, specifying that deferred income taxes are assets and liabilities, not residual charges. The corporation calculates the total tax expense on expectations of its net income and applicable tax rates. Next, the firm segregates the deferred tax component of the total tax expense. The deferred tax expense is the increase (decrease) in the balance sheet deferred tax liabilities (assets) and represents the current year recognition of intertemporal tax events. The current tax expense, therefore, is the difference between the total tax expense and the deferred tax expense derived from changes in the deferred tax balance sheet accounts, and represents the current

[7] Although it recently issued Financial Interpretation No. 48 (*FIN 48*) (2006) outlining guidelines for the financial recognition of uncertain tax positions, the FASB does not mandate that differences between current U.S. tax expense and Total Tax (or book income and taxable income for that matter) be disclosed in detail for financial statement users. Limitations in tax data prevent a supplementary analysis of Total Tax and recent *FIN 48* disclosures. However, these models may indicate the extent to which tax cushions may be used in the pre-*FIN 48* period.

[8] Previous to *SFAS 109*, the Accounting Principles Board No. 11 (*APB No. 11*) (1967-1987) and Statement of Financial Accounting Standards No. 96 (*SFAS 96*) (1987-1992) governed the reporting of income taxes on the financial statements. *APB No. 11* took an income statement approach, focusing on deferred tax expense while *SFAS 96* recognized deferred tax liabilities (but not deferred tax assets).

year recognition of contemporaneous tax events. Current U.S. tax expense, therefore, is the conceptual equivalent to Total Tax after Credits on the tax return.

If material, *SEC Regulation S-X, Rule 4-08(h)* requires corporations to separately disclose the components of tax expense by jurisdiction (domestic, foreign, state, and other).[9] Amounts applicable to foreign income (loss) and amounts applicable to foreign or other income taxes which are less than five percent of the total of income before taxes or the component of tax expense, respectively, need not be separately disclosed. Thus, many large firms separately report federal, foreign, and other (state and local) income tax expense components while small firms do not. Further, *Rule 4-08(h)* states that reconciling items in the effective tax rate computation should be stated separately if they equal or exceed 5 percent of the hypothetical tax expense (income before taxes times the applicable statutory federal income tax rate). No reconciliation is required if the total reconciling differences are less than 5 percent of the hypothetical tax expense, unless the reconciliation would be "significant in appraising the trend of earnings" (*Rule 4-08(h)(2)*). Reconciling amounts due to estimation errors ("true-ups") are typically incorporated in the subsequent year's financial statements and are not separately disclosed.[10]

The principal interest of this paper is to examine the association of the *SFAS 109* financial statement disclosures, namely current U.S. tax expense, to the actual corporate tax liability. However, several items identified in prior research must be considered in order to accurately estimate actual tax burden. I turn to these issues next.

Prior Research

This paper extends two broad streams in the extant literature: (1) researcher use of financial information in estimating tax positions; and (2) IRS use of book-tax difference measures to infer tax aggressiveness and compliance risk. Although these issues are not necessarily independent or exhaustive, I present them in the following manner to highlight distinct aspects in the literature.

[9] See http://www.sec.gov/divisions/corpfin/forms/regsx.htm

[10] Earnings are not restated if the estimate of the tax liability is simply revised. However, earnings typically are restated due to a material error.

Estimating Tax Positions using Financial Statement Information

Because tax returns are not publicly available, researchers and investors must use financial statement information to infer the tax position of a firm, whether it is the tax burden (e.g., McGill and Outslay 2002, 2004; Hanlon 2003) or taxable income (e.g., Manzon and Plesko 2002; Lev and Nissim 2004; Hanlon 2005; and Weber 2006). These researchers acknowledge the limitations in using financial statement information to infer actual taxable income or tax liability. For example, Plesko (2006) reports that incorporating actual tax return data when studying their relation to financial statement data yields different inferences in his study than if tax variables were constructed from financial statement data alone.[11] He notes that tax disclosures "do not effectively convey sufficient information to adequately estimate key aspects of a firm's tax attributes, such as current year tax liability" (p. 26). In her analysis, Hanlon (2003) explains that stock option accounting, the tax cushion, intraperiod allocation, and consolidation rules may account for the divergence between reported current U.S. tax expense and Total Tax on the tax return, and thus may explain these reporting and estimation difficulties. However, it is unknown to what degree each item on average contributes to the divergence, and thus should be considered by researchers. Further, to the extent current tax expense is used to estimate taxable income, employing a fuller model linked to actual tax may aid in these efforts. I use Hanlon's (2003) analysis as a guide in constructing financial variables for items that may be helpful in estimating actual IRS tax.

First, Hanlon (2003) explains that divergent stock option accounting may cause a difference between current U.S. tax expense and Total Tax on the tax return. Under *APB No. 25* (and *SFAS 123*), effective during the sample period, stock option expense is not typically recognized on the income statement, causing current tax expense to be overstated relative to actual tax liability; the corresponding credit after option exercise increases Additional-Paid-In-Capital rather than decreasing tax expense. An overstated current tax expense can result even if stock options are expensed on the financial statements, as is current practice. Under *SFAS 123(R)* (2004), the expense related to stock options is required to be

[11] Plesko's (2006) primary focus is on earnings management. He uses actual tax data provided by the IRS to supplement his analysis. He finds that income-increasing financial statement accruals are reflected less in taxable income than income-decreasing accruals, unless tax costs are small. This asymmetry in reporting implies that managers increase book income if the associated increase in tax income is low, while a decrease in book income is

reported on the income statement in the year in which the option is *granted*. Then the estimated tax benefit from exercise becomes a deferred tax asset as the deduction is not realized until the option is *exercised*. When the corporation receives the actual deduction at the date of exercise, any difference between the estimated tax benefit and the actual tax benefit will be reported in the Statement of Cash Flows rather than reducing tax expense. So even under both regimes, this type of stock option reporting may account for the difference between current U.S. tax expense and actual tax. To the extent possible, I control for the tax benefit of stock options and expect a negative relation to Total Tax.[12]

Second, Hanlon (2003) explains that the accrual of the contingent tax liability reserve, or tax cushion, can create a divergence between reported current U.S. tax expense and Total Tax. This reserve is included in current tax expense as an estimate of taxes to be paid in the future in the event the IRS audits and adjusts the tax return. In their seminal study on the tax cushion, Gleason and Mills (2002) find that it is positively related to expected tax losses. This result suggests that a cushion is accrued to reflect an understatement, whether due to aggressiveness or uncertainty, of current-period Total Tax. Therefore, I would expect a negative relationship between the current-year tax cushion accrual and Total Tax.

Third, Hanlon (2003) explains that intraperiod tax allocation may account for the difference between current U.S. tax expense and Total Tax. Current tax expense is the allocation of tax cost only to continuing operations, while items related to discontinued operations and extraordinary items are reported net of tax on the financial statements. However, Total Tax on the tax return is the aggregation of all tax liability accrued by the firm, regardless of financial classification. It is likely that intraperiod tax allocation has a negative relationship with Total Tax. If discontinued operations are unprofitable—in fact, operations are typically discontinued because of unprofitability—the current U.S. tax expense is overstated relative to Total Tax, which includes the losses of these unprofitable operations.

Fourth, Hanlon (2003) discusses differences in consolidation rules between book and tax as explanations for the divergence between current U.S. tax expense and Total Tax. In short, financial accounting includes domestic subsidiaries owned between 50 and 80 percent and foreign subsidiaries

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typically coupled with a decrease in tax income. His inferences are altered when estimates of taxable income are derived from financial statement data using *SFAS 109* disclosures than when actual tax return data are used.

owned by more than 50% while the tax return does not. The financial statement also includes the share of income for subsidiaries owned from between 20 and 50 percent while the tax return does not. Finally, the tax return does not include a reduction in income for minority interest when firms are greater than 80%, but less than 100%-owned; the financial statements do make such an adjustment. In subsequent tests, I account for minority interest, equity method earnings, and foreign income in accounting for the difference between current U.S. tax expense and Total Tax.

The difficulty for investors and analysts in measuring tax burden or taxable income is seen in capital markets research. Lev and Nissim (2004) examine the association between earnings growth and a measure of earnings quality based on book-tax differences, defined as the ratio of estimated net tax income to net financial statement income. To derive an estimate for net tax income from financial statements, they incorporate information on permanent, temporary, and tax accrual differences.[13] They find some support that a higher earnings quality ratio is associated with higher future earnings growth and higher stock returns. However, investors underweight the value of this ratio as a signal of future performance. Weber (2006) extends Lev and Nissim (2004) by finding that analyst forecasts contain systematic errors that are related to book-tax differences. His results suggest that analyst forecast errors related to book-tax differences may play a role in the systematic stock mispricing found in Lev and Nissim (2004). These results suggest that investors and analysts may not fully impound information, including taxes and estimates of taxable income, from publicly available disclosures when assessing stock prices. In an attempt to aid investors, I develop empirical models that provide such estimations.

Separately, Shevlin (1990) and Graham (1996a, 1996b) use financial statement income and tax net operating loss (NOL) carryforward information in simulations to estimate corporate marginal tax

[12] Note that the deduction on the tax return is related only to non-qualified options (NQO), whereas incentive stock options (ISOs) are not deductible. These two classes of options are not differentiated for financial reporting.

[13] Phillips, et al. (2003) and Hanlon (2005) focus on one category, temporary book-tax differences, in assessing earnings quality. Phillips, et al. (2003) assess the usefulness of deferred tax expense, a measure of temporary differences, in detecting earnings management. They find a positive relationship between deferred tax expense and the probability of managing earnings to avoid reporting an earnings decline and a net loss. Hanlon (2005) finds that firms with large temporary book-tax differences have less persistent accruals and cash flows than firms with small book-tax differences. However, investors underestimate the persistence of total earnings for firms with large positive book-tax differences and overestimate the persistence of accruals for firms with large negative book-tax differences.

rates.[14] Plesko (2003) evaluates the relationship between actual tax return data and simulated average and marginal tax rates.[15] He finds that the simulation methods perform no better in estimating corporate marginal tax rates than using a simple binary variable based on the sign of a firm's income and NOL position. I apply the insight from the marginal tax rate studies and examine whether the sign of pretax book income and NOL status of the firm are related to Total Tax on the tax return.[16]

Finally, policymakers use financial data to inform debates on tax policy. Yin (2003) examines firms in the S&P 500 to determine the trend in reported effective tax rates and finds a steady decrease from 1995 to 2000. The recent Enron debacle spurred questions on how much tax is paid by U.S. corporations, if any. The Joint Committee on Taxation issued a report on Enron in February 2003, disclosing that Enron's true tax liability was $63.2 million, a number that did not appear on the financial statements. As McGill and Outslay (2004) note, the estimates of Enron's tax liability ranged from a $278 million credit to a $112 million liability. This paper provides a potential solution to financial statement users and policymakers by reporting a useful methodology for estimating Total Tax from public sources.

IRS Use of Book-Tax Differences: Measuring Compliance Risk

Besides researchers and investors, the IRS's Large and Mid-Size Business (LMSB) Division is also interested in analyzing differences in reported tax burdens to infer compliance risk and potential tax aggressiveness. Using tax return data, Mills (1998) is the first to document a positive relationship between book-tax differences and compliance risk. Specifically, Mills (1998, Table 3 Panel B) finds that the difference between financial current federal tax expense and Total Tax after Credits on the tax return is positively related to IRS proposed audit adjustments..

The variable of great interest to the IRS is the actual tax burden of a firm. Quantifying and understanding the empirical relationship between actual tax liability on the one hand and current U.S. tax expense, tax benefit from stock options, tax cushion, intraperiod tax allocation, and consolidation book-

[14] Also see Contos, et al. (2006) and Graham and Mills (2007).
[15] Plesko (2003) does not focus on the direct empirical relationship between Total Tax after Credits and federal tax expense, but rather on the accuracy of average and marginal tax rates inferred from financial statements.
[16] Note again that Total Tax is a measure of effective (or average) tax, while the previous literature examines *marginal* taxes.

tax differences on the other hand can assist IRS auditors in estimating compliance risk or tax aggressiveness. Specifically, Gleason and Mills (2002) find a positive relationship between the tax cushion and IRS audit adjustments. Separately, Dyreng, et al. (2008) use cash taxes paid as a proxy for short- and long-run tax avoidance. To the extent this study successfully identifies proxies for items that may be related to U.S. tax liability, the IRS and tax researchers may more directly assess audit risk by understanding which items, such as stock options, tax cushion, or firm (consolidation) structure warrant further scrutiny.

Summary

The extant academic research suggests that financial statement disclosures of tax information provide at best cloudy estimates of a firm's tax liability. Although investors and analysts treat these disclosures as relevant, they appear to be unsure of their magnitude as book-tax differences are systematically associated with future earnings, stock returns, and forecast errors. Finally, the IRS and tax researchers are interested in understanding the differences between current U.S. tax expense and Total Tax in order to supplement their models of tax aggressiveness or tax avoidance. To address these issues, this study now develops the model for linking key financial variables to Total Tax.

METHODOLOGY

Sample

The research sample begins with Compustat and Internal Revenue Service (IRS) corporate tax return data successfully matched on Employer Identification Number (EIN) from years 2000 to 2004. Only publicly traded Subchapter C corporations (i.e., not Subchapter S, RIC, and REITs) are included in this initial sample.[17] This initial merged dataset contains 26,388 firm-year observations (see Table 1). The data are also matched with Execucomp to infer the tax benefit of stock option compensation.[18]

[Insert Table 1 about here]

I first restrict the initial sample to taxpayers with no foreign person owning 25 percent or more of the corporation (from Form 1120, Schedule K, Line 7), eliminating 9,612 firm-year observations. This

[17] S, RIC, and REIT corporations are excluded because they normally do not pay corporate income taxes. Subchapter C corporations are subject to the corporate income tax as calculated from the IRS Form 1120.
[18] I do not, however, require a firm to have complete data in Execucomp to remain in the sample. If Execucomp data are missing, the fields are simply coded zero.

step focuses the sample on U.S.-only domiciled firms by eliminating any foreign-controlled U.S. corporations. This elimination mitigates against potential differences in international tax and financial reporting rules that may confound the results. Next, I require non-negative Implied Stock Option Expense reported in Compustat (#399), eliminating 127 firm-year observations. I also delete observations in the financial (SIC 6000-6999) and utility industries (SIC 4900-4942), whose regulatory environment, capital requirements, and data availability systematically differ from the remaining industries. Finally, I delete 1,685 observations with negative current U.S. tax expense (Compustat #63, or #16 minus #50 if #63 is zero or missing, < 0). I delete these observations to provide consistency across variables because Total Tax, the conceptual counterpart to current U.S. tax expense, as well as the tax benefit of stock options, is bound at zero. This final elimination leaves a Full Sample of 10,561 firm-year observations, representing 3,705 unique publicly traded U.S. corporate taxpayers during the 2000-2004 sample period. I also isolate the economically significant sub-sample of 3,829 observations (1,710 unique taxpayers) with positive pretax domestic book income and no net operating loss carryforward.

Empirical Model

I empirically test the relationship between Total Tax after Credits per the tax return and publicly available financial variables by running the following pooled cross-sectional regression by firm *f* in year *t* (see Table 2 for list of variables):

$$\begin{aligned} TOT\_TX_{f,t} = {} & \alpha + \beta_1 Curr\_Fed_{f,t} + \beta_2 TaxBenefit\_NQO_{f,t} + \beta_3 \Delta Cushion_{f,t} + \beta_4 Intraper\_Dummy_{f,t} + \\ & \beta_5 Minority\_Int\_Dummy_{f,t} + \beta_6 Eq\_Earn\_Dummy_{f,t} + \beta_7 PercFrgnInc_{f,t} + \\ & \beta_8 NOLDummy_{f,t} + \beta_9 DomBkLoss_{f,t} + \beta_{10} R\&D_{f,t} + \beta_{11} Amort\_Intan_{f,t} + \\ & + \beta_{12} ln(Assets)_{f,t} + \beta_{13} Leverage_{f,t} + \sum_{y=14}^{17} \beta_y Year_{f,t} + \sum_{i=18}^{25} \beta_i Ind_{f,t} + \varepsilon_{f,t} \end{aligned}$$

where

TOT_TX = Form 1120 Line 31, Total Tax after Credits ("Total Tax")

Curr_Fed = Current Federal Tax Expense (Compustat #63)[19]

TaxBenefit_NQO = Tax Benefit from Non-Qualified Stock Options:

[19] If Compustat #63 = 0, then *Curr_Fed* = Total Income Tax Expense (Compustat #16) less Deferred Income Tax Expense (Compustat #50).

TaxBenefit_NQO = [(1 minus [sum(PCTTOTOP) per year per firm]) multiplied by Implied Stock Options Expense (Compustat #399)] divided by 65%, multiplied by 35%; where PCTTOTOP = Percent of Total Options Granted to Employees (from Execucomp), i.e., options granted to each executive as a percent of options granted to all employees.[20]

ΔCushion = [(*Curr_Fed –Tax_Paid – TaxBenefit_NQO – ChITP*)]
(adapted from Blouin and Tuna 2007):
Curr_Fed = as defined above;
Tax_Paid = cash taxes paid (Compustat #317);
TaxBenefit_NQO = as defined above; and
ChITP = Change in Income Taxes Payable (Compustat #305).

Intraper_Dummy = 1 if absolute value of Discontinued Operations (Compustat #66) divided by Income from Discontinued Operations and Extraordinary Items > 5% (adapted from Blouin and Tuna 2007); 0 otherwise.

Minority_Int_Dummy = 1 if Minority Interest Income (Compustat #49) is not zero or missing; 0 otherwise.

Eq_Earn_Dummy = 1 if Equity in Earnings of Unconsolidated Subsidiary (Compustat #55) is not zero or missing; 0 otherwise.

PercFrgnInc = Foreign Pretax Income (Compustat #273) divided by Total Pretax Income (#170) × 100; if #273 is missing, then Foreign Pretax Income = 0.

NOLDummy = 1 if Tax Loss Carryforward (Compustat #52) is not zero or missing; 0 otherwise.

DomBkLoss = 1 if Domestic Pretax Book Income (Compustat #272) $\leq$ 0. If #272 = 0 or missing, then *DomBkLoss* = Pretax Book Income (Compustat #170); 0 otherwise.

R&D = R&D Expense (Compustat #46); if #46 is missing, *R&D* = 0.

Amort_Intan = Amortization of Intangibles (Compustat #65); if #65 is missing, *Amort_Intan* = 0.

ln(Assets) = Natural log of Total Assets (Compustat #6)

Leverage = Total Debt / Total Assets (Compustat [#9 + #34]/#6)

Industry = 1 if observation is in 1-digit SIC code industry *i*; 0 otherwise (if SIC3, Manufacturing).

Year = 1 if observation is in year *t* (2000-2003), 0 otherwise (2004).

ε = robust standard error term adjusted for firm clustering.

Huber-White robust standard errors are used to adjust for potential serial correlation among multiple observations per firm. Additionally, all continuous variables are winsorized at the 1 and 99% levels to control for the effect of outliers.

[Insert Table 2 about here]

[20] See Table 2 for further explanation of this construct.

The primary regression model tests the relationship between Total Tax after Credits (*TOT_TX*) and current U.S. tax expense (*Curr_Fed)*, the tax benefit of non-qualified stock options (*TaxBenefit_NQO*), the current-year accrual of the tax cushion (*ΔCushion*), intraperiod tax allocation (*Intraper_Dummy*), and consolidation book-tax differences (*Minority_Int_Dummy*, *Eq_Earn_Dummy*, and *PercFrgnInc*). I use these variables in an attempt to operationalize the issues identified in Hanlon (2003) as described above.

First, as expected by *SFAS 109* reporting, *Curr_Fed* should be a first approximation of *TOT_TX*; both items measure the U.S. tax costs arising from the current year's operations. I expect a strong positive relationship between *TOT_TX* and *Curr_Fed*.

Second, *TaxBenefit_NQO* controls for the divergent book-tax accounting treatment of stock options. Because only non-qualified stock options (NQOs) are deductible on the tax return while both NQOs and ISOs (incentive stock options) are not expensed on the financial statement prior to 2005, a permanent book-tax difference arises for NQO stock options. The options exercised are recorded into Additional Paid in Capital on the financial statement, thus not reducing current income tax expense. Therefore, current tax expense is overstated by the tax benefit of NQOs. As such, the regression models control for the tax benefit of NQO stock options (*TaxBenefit_NQO*). Further details of this calculation are outlined in Table 2.[21] I predict a negative relationship between *TOT_TX* and *TaxBenefit_NQO*.

Third, *ΔCushion* accounts for the current-year accrual of uncertain or aggressive tax positions reserved for in the tax cushion. This measure is adapted from Blouin and Tuna (2007). In particular, they derive the change in cushion as the difference between current tax expense, the tax benefit of stock options, cash taxes paid, and the change in income taxes payable. Because I am interested in U.S.-only figures, I adapt current tax expense to only include current *federal* tax expense. For consistency, I also estimate the tax benefit of stock options as above in *TaxBenefit_NQO*.

[21] My calculation for *TaxBenefit_NQO* is consistent with NQO estimates from prior research (Sullivan 2000; Hall and Liebman 2000; Jacquette, et al., 2003). Specifically, prior research finds that on average between 80% and 97% of the total stock option tax benefit comes from NQOs; my calculation yields an estimate of 95%.

Fourth, *Intraper_Dummy* captures the potential effect on Total Tax of the intraperiod tax allocation in financial statements, where Total Tax includes the tax effects of all the firm's operations (ignoring consolidation/foreign issues) while financial reporting delineates tax expense between continuing and discontinued operations, as well as extraordinary items. Because tax expense related to extraordinary items and discontinued operations may contain current tax expense that is not included in *Curr_Fed*, I account for them. As Blouin and Tuna (2007) explain, the most common extraordinary item, accounting change, is tied largely to timing differences and thus would have no impact on current U.S. tax expense. However, discontinued operations may contain both current and deferred income taxes. So I adapt the measurement of intraperiod tax allocation as in Blouin and Tuna (2007). If the absolute value of firms' discontinued operations (#66) is greater than 5% of income before discontinued operations and extraordinary items (#18), I code *Intraper_Dummy* equal to one.

Fifth, I use three proxies for consolidation book-tax differences. *Minority_Int_Dummy* accounts for observations where minority interest allocation is present, which causes a divergence between *TOT_TX* and *Curr_Fed*. Next, *Eq_Earn_Dummy* captures the extent to which partial investments may be consolidated differently for book and tax purposes. Finally, *PercFrgnInc* attempts to generally capture overseas operations that are consolidated for financial purposes, but not for tax. I expect a negative relationship between *PercFrgnInc* and *TOT_TX*.

I include *PercFrgnInc* as well because multinational firms may have foreign tax credits (FTCs) available to reduce their U.S. tax liability and may be able to take advantage of cross-jurisdictional interest stripping, income shifting, or transfer pricing schemes. These schemes can be structured to take advantage of foreign tax rates by recognizing deductions in high-tax jurisdictions (e.g., the U.S.) and recognizing revenues in low-tax jurisdictions, thus increasing differences in tax and financial statement reported amounts. Similarly, multinational corporations may use their foreign operations to structure their dividend and debt policies to minimize U.S. taxes (Hines 1996 and Mills and Newberry 2004). Further, repatriated and unrepatriated (worldwide) earnings are consolidated for financial statement reporting, but only repatriated earnings are consolidated for U.S. tax reporting. U.S.-based taxable income, and therefore actual federal tax liability, will be lowered by these deductions and the foreign tax credit.

However, worldwide pretax income, including those revenues generated from lightly-taxed sources, will be consolidated on the financial statement and be the basis for calculating current federal tax expense. Therefore, the consolidation of unrepatriated but reported earnings is expected to have a negative relationship with actual U.S. tax liability.

Further, I include an incremental analysis of debt and non-debt tax shields on Total Tax. Specifically, I include variables for *Leverage* and *R&D*. In terms of *Leverage*, interest payments from debt are deductible on the tax return where dividends paid on equity are not; *ceteris paribus*, increased leverage is a tax-advantaged form of financing over equity (Graham 1996a). Therefore, a negative relationship would exist between *Leverage* and *TOT_TX*. However, *Leverage* may not have *incremental* information to current U.S. tax expense in these models because interest expense is already implicitly accounted for. Next, although R&D expenditures are expensed on the financial statements and deductible on the tax return, a tax credit exists equal to 20% of incremental R&D expenditures beyond a baseline amount (I.R.C. §41). Therefore, I test whether a key non-debt tax shield may still provide incremental information in estimating *TOT_TX*. I predict a negative relationship between *R&D* and *TOT_TX*.

I also include a variable for the amortization of intangibles (*Amort_Intan*). Firms in my entire sample period are permitted to amortize intangible goodwill for tax purposes under some circumstances, but *SFAS 142* disallowed its amortization for financial statement purposes in fiscal years beginning after December 15, 2001. After this date, intangible assets are tested annually for impairment rather than amortized on the books and tax return. Therefore, I control for any potential intangible asset amortization accounting differences.

In terms of size (*ln(Assets)*), larger firms likely pay significantly more in taxes than smaller firms, suggesting a positive relationship with *TOT_TX*. This relationship is also consistent with the political cost hypothesis in prior research (Zimmerman 1983). Using 1-digit SIC codes, I control for potential differences in industry tax incentives and reporting practices. To control for potential serial correlation, I include *Year* dummies.

Initial tests examine whether partitioning along the sign of domestic pretax book income (*DomBkLoss*) and NOL carryforward (*NOLDummy*) is informative in estimating actual tax. These tests

draw upon insights from the marginal tax rate literature, where these two variables are significantly helpful in estimating tax rates. Results here show that these two variables are indeed informative, so the key tests reported later in this study focus on the economically significant sub-sample of 3,829 firm-year observations where domestic pretax income is positive and no NOL carryforwards exist.

RESULTS

Descriptive Statistics

The Full Sample consists of 10,561 firm-year observations, representing 3,705 unique publicly traded taxpayers over the five-year reporting and filing periods 2000 through 2004.[22] It contains an economically significant cross-section of companies. The average aggregate (book) sales per year are almost $1.5 trillion. The average aggregate taxes paid per year (per the tax returns) for this sample are $19.4 billion. The taxes paid by the publicly traded corporate taxpayers in this sample represent almost 18% of the approximately $108 billion in taxes collected by the U.S. government from all (public, private, domestic, and foreign-controlled) corporations in 2003 (IRS, 2004).

Examining details at the firm level, the mean (median) total asset size reported in the financial statements is approximately $520.6 million ($42.2 million) while the mean (median) total asset size reported on the tax return is approximately $558.9 million ($40.7 million) (Table 3, Panel A). Average tax return assets are not significantly larger from average financial statement assets ($p=0.15$) (Table 3, Panel B). The mean (median) U.S. pretax book income is $24.8 million (loss of $0.02 million) while the mean (median) tax return Taxable Income before Net Operating Losses and Special Deductions (Form 1120 Page 1 Line 28) is only $9.8 million (loss of $0.3 million). U.S. pretax book income significantly exceeds average taxable income ($p<0.01$).

[Insert Table 3 about here]

The descriptive statistics for the main variables of interest show that the mean (median) current U.S. tax expense reported on the financial statements (*Curr_Fed*) is $8.8 million ($0.03 million) while the mean (median) Total Tax After Credits (*TOT_TX*) from the tax return is $6.1 million (zero). The mean

[22] This period may be somewhat unique with economic recession in 2001, as well as the enactment of the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and the Jobs and Growth Tax Relief Reconciliation Act in 2003 (JGTRRA). However, data limitations do not allow for examination in time periods outside 2000-2004.

current U.S. tax expense significantly exceeds the mean Total Tax on the tax return ($p<0.01$), indicating that the coefficient on *Curr_Fed* in a multivariate setting should be less than one.

The mean (median) tax benefit from stock options (*TaxBenefit_NQO*) is almost $1.4 million ($0.2 million). Of all options granted, the average (median) percent of NQOs is 95% (100%) (untabulated), consistent with prior estimates (Sullivan 2000; Hall and Liebman 2000; Jacquette, et al, 2003). Option usage, although not large in dollar terms for many firms, is prevalent across the sample. Over 75% of the sample reports some tax benefit from options. The mean (median) *ΔCushion* is -$1.8 million (zero). Just over 7% of the sample allocated taxes on an intraperiod basis (*Intraper_Dummy*). In terms of consolidation book-tax differences, 9.4% of observations report minority interest in the financial statements while 11.1% report equity method consolidation. The Full Sample also reports an average (median) of 5.7% (zero) of total pretax income as foreign-source (*PercFrgnInc*). For other variables, mean (median) *R&D* is $5.7 million (zero) while mean (median) amortization of intantible assets is $1.1 million (zero). In terms of capital structure, leverage has a mean (median) of 42.9% (17%).

Reporting on the partitioning variables of domestic pretax book income and NOL carryforward, approximately 51% of the sample observations report negative or zero pretax book income (*DomNetLoss*) and 39% report a tax loss carryforward (*NOLDummy*) in the financial statements. Although the number of firms reporting negative/zero domestic pretax income seems high, the sample period includes the economic downturn of 2001-2002. Finally, in terms of industry distribution (Table 3, Panel C), the largest proportion of the sample hails from manufacturing (SIC 3000-3999) at 26.7%, while the smallest comes from agriculture (SIC 0000-0999) at 0.25%. The distribution of observations across the five years is approximately equal, with slightly more in the earlier years (Table 3, Panel D).

Correlation Analysis

Simple correlation analysis for the Full Sample shows that current U.S. tax expense (*Curr_Fed*) is positively correlated with Total Tax (*TOT_TX*) ($p<0.01$) (Table 4, Panel A). The analysis provides initial support that *Curr_Fed* is a very strong first approximation of actual tax liability reported on the tax return, with a correlation coefficient of 0.929. This finding is consistent with the first objective of *SFAS 109*.

[Insert Table 4 about here]

Surprisingly, the analysis shows that the tax benefit from stock options (*TaxBenefit_NQO*) is *positively* correlated with Total Tax ($p<0.01$). Although it is initially unclear why this is the case as the stock option deduction reduces Total Tax, it is possible that implied stock option expense proxies for firm size, and that size is positively related to Total Tax. Supplemental analysis (untabulated) reveals that *TaxBenefit_NQO* is indeed positively correlated to firm size ($p<0.01$), and that size is positively related to Total Tax ($p<0.01$). Further, multivariate tests later show that *TaxBenefit_NQO*, when significant, is indeed negatively related to Total Tax after controlling for size.

The current-year tax cushion accrual (*ΔCushion*) is negatively related to *TOT_TX* ($p<0.01$), indicating that an increase in the tax cushion, which reserves for uncertain tax benefits or aggressive tax positions, is related to a reduction in Total Tax. Next, *Intraper_Dummy* is not significantly related to *TOT_TX*. However, the consolidation book-tax difference proxies *Minority_Int_Dummy*, *Eq_Earn_Dummy*, and *PercFrgnInc* show a significant correlation to Total Tax (all at $p<0.01$).

One item of potential concern is multicollinearity between *Curr_Fed*, *TaxBenefit_NQO*, and *ΔCushion*, whose correlation coefficients exceed (absolute) values of 0.38. Therefore, in regression tests, I report additional results that omit *TaxBenefit_NQO* and *ΔCushion*. Results remain largely identical.

Turning to the partitioning variables, both *NOLDummy* and *DomBkLoss* are negatively related to *TOT_TX* (both $p<0.01$) (Table 4 Panel B), confirming that unprofitable firms pay less tax. The amortization of intangibles (*Amort_Intan*) and size (*ln(Assets)*) are positively related to Total Tax (both $p<0.01$) while *Leverage* is negatively related to Total Tax ($p<0.01$). Finally, however, the signs on R&D Expense (*R&D*) are different using Pearson and Spearman correlations. Therefore, inferences related to *R&D* will not be drawn in this setting. To gain a fuller understanding of the relationship of Total Tax with financial statement disclosures, book-tax differences, and firm characteristics, I turn to multivariate analysis.

Multivariate Analysis

First, I examine the potential usefulness of partitioning the sample along the signs of domestic pretax book income and tax loss carryforward status in inferring Total Tax (*TOT_TX*), as similarly

performed in marginal tax rate studies mentioned above.[23] In the multivariate setting, I find a significantly negative relationship between *TOT_TX* and *DomBkLoss*, as well as with *NOLDummy* ($p<0.01$, see Table 5, *Model 2*).[24] These results show that the additional information in knowing the sign of domestic pretax book income and the existence of a tax loss carryforward aid in estimating *TOT_TX*, given all other variables. These results extend the insight from the marginal tax literature on partitioning and find they are also helpful in estimating effective tax rates.

[Insert Table 5 about here]

In light of the results that the partitioning variables are significantly useful in estimating Total Tax, I focus on the most economically significant sub-sample of 3,829 observations where domestic pretax book income is positive and there are no tax loss carryforwards. I do so because Total Tax is likely positive in this sub-sample and inferences are most useful to researchers.[25]

In the core model (see Table 6 Panel A, *Model 1*), the OLS regression reports that current U.S. tax expense (*Curr_Fed*) is positively related to *TOT_TX*, Total Tax after Credits, as expected ($p<0.01$). This relationship holds in all model specifications. The coefficient on *Curr_Fed* suggests that on average, for each dollar in current U.S. tax expense reported on the financial statements, about $0.70 is reported in Total Tax after Credits on the tax return. Both *TaxBenefit_NQO* and *ΔCushion* are negatively related to *TOT_TX* ($p<0.01$), indicating reductions in Total Tax due to stock option deductions and provisions for uncertain or aggressive tax positions.

[Insert Table 6 about here]

The core model also reports that the reporting of minority interest (*Minority_Int_Dummy*) is negatively related to *TOT_TX* ($p<0.10$), indicating large partial investments by outsiders reduce the U.S.

[23] Due to the high number of zero-value dependent variable (*TOT_TX*) observations, I employ Tobit regression in analyzing the partitioning variables. I largely limit the analysis of the Tobit results to these partitioning variables (Model 2 in Table 5), although several specifications are provided for completeness. Later, on the sub-sample of firms with positive pretax book income and no NOL carryforward, I employ an OLS specification as the dependent variable, *TOT_TX*, reports considerably fewer zero values and the interpretability increases.

[24] I provide results on Models 1 and 2 and their variations given potential multicollinearity between *Curr_Fed*, *TaxBenefit_NQO*, and *ΔCushion*. Results are largely identical, except that when the partitioning variables are included, *Intraper_Dummy* becomes insignificant. The signs and significance of other variables remain consistent.

[25] Due to the relatively small number of zero-value dependent variable (*TOT_TX*) observations, I employ Ordinary Least Squares regressions in these analyses.

tax liability. Higher foreign-source income (*PercFrgnInc*) is strongly negatively related to *TOT_TX*, indicating that more foreign-source income is related to less U.S. tax reported on the tax return. The results indicate that for each percentage point increase in the share of foreign income, Total Tax is reduced by about $0.1 million. This relationship may exist because of foreign tax credits or sourcing earnings overseas without repatriation back to the U.S. Finally, *Eq_Earn_Dummy* is only marginally significant in certain specifications only. Because of multicollinearity concerns, Models 1a and 1b run the analyses without *ΔCushion* and *TaxBenefit_NQO*, respectively, yielding materially identical results.

When firm characteristics are added (*Model 2*), the core results remain materially unchanged. However, the additional variables provide further insight into modeling Total Tax. Most notably, there is a significantly negative relationship between *R&D* and *TOT_TX* (*p<0.01*), indicating that R&D-related deductions and tax credits provide additional information in estimating Total Tax. This is an interesting result because R&D is implicitly considered in calculating *Curr_Fed* but the results show it is nevertheless incrementally useful. Specifically, for every dollar in R&D Expense reported on the financial statement, about $0.1 million less is reported in Total Tax on the tax return. This result suggests that firm characteristics and activities are informative beyond tax disclosures in estimating Total Tax.

Next, *Leverage* is not significant, indicating no additional information on Total Tax in capital structure relative to other variables included in the model. Finally, there is a significantly positive relationship between size (*ln(Assets)*) and *TOT_TX* (*p<0.01*) while no significant relationship for the control for change in amortization accounting, *Amort_Intan*. In sum, the models explain about 89% of the variability in Total Tax, indicating a strong ability to explain Total Tax.

Supplemental Analyses

I perform additional analyses on the sub-sample that reports positive pretax domestic book income and no tax loss carryforward. I first validate the models' ability to estimate Total Tax by re-running the analysis on a holdout sample. I then investigate whether aggregate measures of tax expense, cash taxes paid, and the change in income taxes payable may aid in explaining Total Tax.

Validation Tests

To assess the predictive ability of *Models 1* and *2* in Table 6 Panel A, I re-run the analysis in the following manner. First, I re-run the *Model 1* and *Model 2* regression specifications on observations in years 2000 through 2003, leaving the 2004 observations as a "hold-out" sample. Second, I calculate an estimated *TOT_TX*, so-called *Tot_Tx_Score*, by applying the firm-specific values of the independent variables from the 2004 observations on the estimated coefficients from the 2000-2003 model; *Tot_Tx_Score1* uses the variables from *Model 1* and *Tot_Tx_Score2* uses all variables as in *Model 2*. Finally, using only the 2004 observations, I run one OLS regression of actual *TOT_TX* on *Tot_Tx_Score1* and another of *TOT_TX* on *Tot_Tx_Score2*.

Results from the validation tests indicate a strong positive relationship between *TOT_TX* and *Tot_Tx_Score 1*, as well as with *Tot_Tx_Score2* (both $p<0.01$) (see Table 6 Panel B).[26] The *Tot_Tx_Score*s capture between 78 and 83% of the variability in Total Tax, indicating strong predictive ability. These results suggest that the models can be used by researchers, investors, analysts, and others in the public domain to estimate Total Tax. It also suggests that policymakers, tax administrators, and government budget forecasters can use these models to supplement their current methods of estimating tax burden in the most economically significant public U.S. corporations.

Utilizing Additional Disclosed Tax Information

The second supplemental analysis examines to what degree other disclosed financial data on taxes, such as cash taxes paid, aggregate measures of tax expense (i.e., total current tax expense, total deferred tax expense, and total tax expense), and the change in income taxes payable, are useful in explaining Total Tax after Credits. Although these variables are significantly related to each other and to Total Tax in univariate correlations (untabulated), cash taxes paid seems to be the most incrementally useful in inferring Total Tax in the multivariate tests (see Table 7).

[Insert Table 7 about here]

[26] Results using the 2000-2003 observations are materially identical to the 2000-2004 models reported in Table 6 Panel A (untabulated).

The first model (*Model A*) examines the incremental usefulness of cash taxes paid from the Statement of Cash Flows (*Tax_Paid*) in explaining *TOT_TX*. This model does not include the tax benefit from stock options as it would already be included in the cash taxes paid. Results show that *Tax_Paid* is significantly related to Total Tax, significantly supplementing *Curr_Fed*. It also provides initial support to the choice of Dyreng, et al. (2008) using cash taxes paid as a measure of tax burden in analyzing short- and long-run tax avoidance. This model explains 90% of the variability in Total Tax after Credits, the highest R^2 of all models specified in this study.

The second (*Model B1*) and third (*Model B2*) models examine whether aggregate measures of the *SFAS 109* disclosures are useful in explaining Total Tax. These models include *TaxBenefit_NQO* as it is not included in tax expense. Results from *Model B1* show that for every dollar of aggregate total tax expense (i.e., current and deferred federal and state tax expense, or *Total_Tax_Exp*) reported in the financial statements, $0.40 is reported in Total Tax. Results from *Model B2* show that for every dollar of total *current* tax expense (i.e., federal and otherwise, or *Total_Curr_Tx_Exp*), $0.73 is reported as Total Tax, while total deferred tax expense (*Total_Defr_Tx_Exp*) is not significant. The second and third models explain between 77% and 88% of the variability in Total Tax.

The fourth model (*Model C*) examines the extent to which the change in income taxes payable (*ΔTax_Payable*) is related to Total Tax. This model excludes the tax benefit from stock options because, as noted previously, taxes payable already includes this tax benefit.[27] *ΔTax_Payable* is not significantly related to *TOT_TX* in this specification. Only 42% of the variability in Total Tax is explained.

The final model (*Combined*) includes cash taxes paid, total tax expense, and the change in income taxes payable in estimating Total Tax. All three main variables are incrementally significant with *Tax_Paid* yielding the highest *t*-statistic, and *ΔTax_Payable* now being significantly positive. This combined model explains 88% of the variability in Total Tax. It is interesting to note that *Tax_Paid* yields significant incremental information to *Curr_Fed*, suggesting that a combination of cash and accrual measures of taxes in financial statements may be most helpful in inferring Total Tax. This finding

[27] Upon exercise of NQO stock options, the firm credits (increases) additional paid-in-capital and debits (decreases) taxes payable.

suggests an approach that can potentially by-pass the need to estimate the tax benefit of stock options, as it is already implicitly accounted for in *Tax_Paid*.

In other results, *PercFrgnInc* and the size proxy *ln(Assets)* are consistently significant in all models and incrementally useful to the tax disclosures in estimating Total Tax. Other information, such as the *ΔCushion*, *R&D*, and *Minority_Int_Dummy* are more sensitive to the model specifications, although their signs remain consistent with prior results. In all, the results illustrate to what degree financial information is significantly helpful in inferring Total Tax, thus providing usable models for the public.

CONCLUSION

This study examines the empirical association between actual tax liability, Total Tax After Credits, reported on the corporate tax return Form 1120, and publicly available corporate financial statement (10-K) disclosures during the period 2000-2004. I evaluate the extent to which tax-related financial statement disclosures in general and the Statement on Financial Accounting Standards No. 109, *Accounting for Income Taxes* (*SFAS 109*) disclosures in particular are able to infer U.S. tax liability reported to the IRS. Specifically, I model the relationship between Total Tax (Form 1120, Line 31) and current U.S. tax expense, tax benefit from stock options, current-year accrual of the tax contingency reserve (or tax cushion), intraperiod allocation, and consolidation book-tax differences to contribute to our understanding of estimating Total Tax from financial information. In doing so, I also evaluate whether the sign of pretax income and net operating loss (NOL) carryforward status, extensively used in the marginal tax rate research, can be useful partitioning variables in inferring Total Tax on the tax return. Furthermore, I examine the extent to which other tax-related disclosed financial information, such debt and non-debt tax shields, cash taxes paid, total tax expense, and change in taxes payable provide incremental information in estimating Total Tax.

Results indicate that the sign of financial income and existence of NOLs are informative in estimating Total Tax. In the economically important sub-sample of firms with positive pretax domestic book income and no NOL carryforward, results indicate a strong positive relationship between current U.S. tax expense and Total Tax. In particular, for every dollar of current U.S. tax expense reported on the financial statements, about $0.70 is reported in Total Tax to the IRS. Items such as the tax benefit of stock

options, current-year accrual of the contingent tax liability reserve (tax cushion), and consolidation book-tax differences are incrementally informative to current U.S. tax expense in explaining Total Tax, while intraperiod tax allocation is not. Additionally, the non-debt tax shield R&D is incrementally useful in estimating Total Tax, while the debt tax shield (i.e., leverage) is not. Validation tests reveal that the model and parameters developed in this study can be successfully used to estimate Total Tax.

Additional tests show that other tax-related financial information can be used to infer Total Tax. Most importantly, cash taxes paid, total tax expense, and total current (but not deferred) tax expense aid in estimating Total Tax while the change in income taxes payable is less informative. In all, upto 90% of the variability in Total Tax is explained by the financial variables developed in this study.

This study's principal motivation is to help researchers, investors, policymakers, and government budget forecasters reliably estimate a corporation's actual U.S. tax position. This paper primarily addresses the financial reporting limitations of inferring a firm's tax liability, as outlined in Hanlon (2003) and McGill and Outslay (2004). It offers a potential solution to inferring U.S. tax liability from public sources as no formal reconciliation is currently available to users of financial statements. The empirical model also contributes to the IRS Large and Mid-Size Business (LMSB) Division's assessments of tax aggressiveness and audit risk. To the extent this study successfully accounts for the known and measurable differences between current U.S. tax expense and Total Tax, the IRS can more directly assess audit risk by pinpointing the source of differences in reported tax burdens, whether stock options, the tax cushion, or firm (consolidation) structure. The model may aid government budget forecasters in developing more robust estimates of corporate tax receipts by supplementing their current revenue forecasting models with more timely financial statement information. Also, understanding the mapping of tax data to financial statements can assist policymakers and regulatory bodies in addressing the limitations of current practice in the financial reporting of tax information. Finally, this study may inform tax policy discussions where the estimation of corporate tax burdens is of paramount interest.

In sum, this study contributes to the literature by providing valid empirical models using public financially information to infer U.S. tax liability. It does so to address the void where a disclosed reconciliation between current U.S. tax expense and Total Tax after Credits is not currently available.

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Table 1. Sample Selection.

Criteria	Firm-Year Observations
Initial sample of publicly traded Subchapter C taxpayers with Compustat (10-K financial statement) and IRS (tax return) records matched on EIN and fiscal year, 2000-2004.	**26,388**
Less: Observations >25% foreign-owned, from Form 1120 Schedule K Line 7.	(9,612)
Less: Observations with negative Implied Stock Option Expense (Compustat #399)	(127)
Less: Observations in financial industry (SIC 6000-6999)	(4,045)
Less: Observations in regulated utility industry (SIC 4900-4942)	(358)
Less: Observations with Negative Current U.S. Tax Expense (Compustat #63 < 0; if #63 = missing or 0, then Compustat #16 less Compustat #50 is used.)	(1,685)
Full Sample	**10,561 [3,705 firms]**
Less: Observations with Net Operating Loss (Compustat #52≠0) and Zero/Negative Domestic Pretax Book Income (Compustat #272 $\leq$ 0; if #272 = missing or 0, then Compustat #170 is used).	(6,732)
Sub-Sample (No NOL, Only Positive Pretax Book Income)	**3,829 [1,710 firms]**

Table 2. Variable Definitions

Variable	Construction
Dependent Variable	
TOT_TX	Form 1120 Line 31, Total Tax after Credits ("Total Tax")
Independent Variables	
Curr_Fed	= Current Federal Tax Expense (Compustat #63); Compustat #63 = 0, then *Curr_Fed* = Total Income Tax Expense (Compustat #16) less Deferred Income Tax Expense (Compustat #50).
TaxBenefit_NQO	= Tax Benefit from Non-Qualified Stock Options: *TaxBenefit_NQO* = [(1 minus [sum(PCTTOTOP) per year per firm]) multiplied by Implied Stock Options Expense (Compustat #399)] divided by 65%, multiplied by 35%; where PCTTOTOP = Percent of Total Options Granted to Employees (from Execucomp), i.e., options granted to each executive as a percent of options granted to all employees.
ΔCushion	= [(*Curr_Fed –Tax_Paid – TaxBenefit_NQO – ChITP*)] (adapted from Blouin and Tuna 2007): *Curr_Fed* = as defined above; *Tax_Paid* = cash taxes paid (Compustat #317); *TaxBenefit_NQO* = as defined above; and *ChITP* = Change in Income Taxes Payable (Compustat #305).
Intraper_Dummy	= 1 if absolute value of Discontinued Operations (Compustat #66) divided by Income from Discontinued Operations and Extraordinary Items > 5% (adapted from Blouin and Tuna 2007); 0 otherwise.
Minority_Int_Dummy	= 1 if Minority Interest Income (Compustat #49) is not zero or missing; 0 otherwise.
Eq_Earn_Dummy	= 1 if Equity in Earnings of Unconsolidated Subsidiary (Compustat #55) is not zero or missing; 0 otherwise.
PercFrgnInc	= Foreign Pretax Income (Compustat #273) divided by Total Pretax Income (#170) × 100; if #273 is missing, then Foreign Pretax Income = 0.
NOLDummy	= 1 if Tax Loss Carryforward (Compustat #52) is not zero or missing; 0 otherwise.
DomBkLoss	= 1 if Domestic Pretax Book Income (Compustat #272) $\leq$ 0. If #272 = 0 or missing, then *DomBkLoss* equals Pretax Book Income (Compustat #170); 0 otherwise.
R&D	= R&D Expense (Compustat #46); if #46 is missing, *R&D* = 0.
Amort_Intan	= Amortization of Intangibles (Compustat #65); if #65 is missing, *Amort_Intan* = 0.

ln(Assets)	= Natural log of Total Assets (Compustat #6)
Leverage	= Total Debt / Total Assets (Compustat [#9 + #34]/#6)
Industry	= 1 if observation is in 1-digit SIC code industry *i*; 0 otherwise (if SIC3, Manufacturing). Industries: Agriculture, SIC 0000-0999 Construction, SIC 1000-1999 Chemicals, SIC 2000-2999 Manufacturing, SIC 3000-3999 Transportation, SIC 4000-4899 and SIC 4943-4999 Retail, SIC 5000-5999 Business Services, SIC 7000-7999 Healthcare, SIC 8000-8999 Diversified, SIC 9000-9999
Year	= 1 if observation is in year *t* (2000-2003), 0 otherwise (2004).

To construct a measure for the tax benefit of NQO stock options, I make two assumptions. First, I assume that all options granted to executives are ISOs, and are thus non-deductible. Second, I assume that all options granted to employees are NQOs, and are thus deductible. I make the first assumption on the grounds that it is tax-favored to grant ISOs over NQOs to individuals whose personal income tax rates and capital gains rates are higher than the corporation's tax rate (Scholes, et al. 2002, 194). It is highly likely that individuals with a higher personal tax rate than corporate tax rate are typically the executives of the firm. Therefore, I assume the executives receive ISOs. Options granted to each executive as a percent of options granted to all employees is captured by the Execucomp variable PCTTOTOP, Percent of Total Options Granted to Employees. I sum PCTTOTOP for all executives in one company each year to obtain the total executive options as a percent of total options granted to employees. Therefore, one minus the (per-company, per-year) sum of PCTTOTOP is the estimate for the share of options granted to non-executive employees. As stated above, I assume that these employee stock options are deductible NQOs, as employees are likely to have individual tax rates lower than that of the corporation. It is the deductible NQOs that determine the tax benefit of stock options.[28]

I then use the percent of NQOs and multiply it by Implied Stock Option Expense (Compustat #399). Implied Option Expense (IOE) is the estimate of the fair value of the options not expensed on the Income Statement. During my test period (2000-2004), options were typically not expensed on the income statement. Implied Options Expense, however, includes both ISOs and NQOs. Therefore, in order to obtain an estimate of the option expense attributable to NQOs only, which are deductible on the tax return and give rise to the tax benefit affecting tax expense, I multiply IOE by the percent of NQOs derived above. This product is the estimate of NQO-only Stock Option Expense (NQOEXP). However, because IOE is an *after*-tax value (and thus NQOEXP is as well), I gross up NQOEXP by dividing it by 65% (one minus the top corporate statutory tax rate of 35%). This yields the *pre*-tax value of NQO stock option expense. Finally, I multiply this pre-tax value of NQOEXP by 35% to obtain the tax benefit from NQOs (*TaxBenefit_NQO*). Admittedly, *TaxBenefit_NQO* may be a noisy proxy for the tax benefits of stock options, but hand-collection of stock option tax benefit information is prohibitive in this large sample. For alternative proxies for the tax benefit of stock options, see Blouin and Tuna (2007).

[28] Ideally I would like to use the stock options *exercised* as opposed to granted as the exercise provides the tax benefit, not the grant. However, I am simply using the share of options attributable to executive and non-executive employees to estimate the percent of NQOs that are outstanding and potentially exercisable in order to infer the magnitude of their tax benefit.

Table 3. Descriptive Statistics

Panel A: Key Variables (n=10,561)							
Continuous Variable	**5th perc**	**25th perc**	**mean**	**median**	**75th perc**	**95th perc**	**std dev**
Total Financial Statement Assets	0.307	7.229	520.593	42.190	249.595	2,178.000	1,806.434
Total Tax Return Assets	0.226	6.996	558.851	40.676	240.762	2,265.859	2,061.821
Domestic Pretax Book Income	(39.548)	(4.084)	24.751	(0.020)	11.688	159.949	122.781
Taxable Income before NOLs	(48.053)	(4.989)	9.811	(0.273)	2.993	98.498	91.488
TOT_TX	0.000	0.000	6.144	0.000	0.999	30.367	22.977
Curr_Fed	0.000	0.000	8.777	0.032	2.703	43.000	30.830
TaxBenefit_NOO	0.000	0.003	1.373	0.184	0.969	6.264	3.814
ΔCushion	(10.049)	(0.502)	(1.755)	0.000	0.000	3.281	11.955
PercFrgnInc (%)	0.000	0.000	2.539	0.000	0.000	11.848	13.500
R&D	0.000	0.000	5.733	0.000	1.705	28.292	19.845
Amort_Intan	0.000	0.000	1.121	0.000	0.015	4.300	5.188
ln(Assets)	(1.181)	1.978	3.632	3.742	5.520	7.686	2.663
Leverage	0.000	0.007	0.429	0.170	0.418	1.325	1.071

Indicator Variables	**n**	**% of Sample**
Intraper_Dummy	755	7.1%
Minority_Int_Dummy	991	9.4%
Eq_Earn_Dummy	1,172	11.1%
NOLDummy	4,090	38.7%
DomNetLoss	5,368	50.8%

Panel B: Tests for Differences in Means					
Variables	**Mean**	**Std Error**	**Std Dev**	**Lower 95%**	**Upper 95%**
Total Financial Statement Assets	520.593	17.578	1,806.434	486.137	555.050
Total Tax Return Assets	558.860	20.063	2,061.821	519.533	598.188
Difference: mean(Total Financial Statement Assets) - mean(Total Tax Return Assets)					
t-value	*-1.44*				
p-value	*0.15*				
Variables	**Mean**	**Std Error**	**Std Dev**	**Lower 95%**	**Upper 95%**
Domestic Pretax Book Income	24.751	1.195	122.781	22.409	27.093
Taxable Income	9.811	0.890	91.488	8.066	11.557
Difference: mean(Domestic Pretax Book Income) - mean(Taxable Income)					
t-value	*10.02*				
p-value	*<0.01*				
Variables	**Mean**	**Std Error**	**Std Dev**	**Lower 95%**	**Upper 95%**
Curr_Fed	8.777	0.300	30.830	8.189	9.365
TOT_TX	6.144	0.224	22.977	5.705	6.582
Difference: mean(Curr_Fed) - mean(TOT_TX)					
t-value	*7.04*				
p-value	*<0.01*				

Panel C: Distribution of Observations by Industry and Year							
Full-Sample Observations by Industry and Year							
	2000	**2001**	**2002**	**2003**	**2004**	**Total**	**% of Sample**
sic0 (Agric.)	6	6	5	5	4	26	0.25%
sic1 (Const.)	158	150	123	151	147	729	6.90%
sic2 (Chem.)	432	384	392	391	386	1,985	18.80%
sic3 (Mfg.)	748	571	492	518	491	2,820	26.70%
sic4 (Transp.)	169	160	157	166	164	816	7.73%
sic5 (Retl.)	341	286	266	264	274	1,431	13.55%
sic7 (Bus. Svc.)	414	367	315	342	333	1,771	16.77%
sic8 (Hlth.)	158	144	142	144	134	722	6.84%
sic9 (Div./Other)	61	49	53	54	44	261	2.47%
Total	2,487	2,117	1,945	2,035	1,977	***10,561***	
% of Sample	23.55%	20.05%	18.42%	19.27%	18.72%		***100.00%***

Variable Definitions:
Total Financial Statement Assets = Compustat #6. *Total Tax Return Assets* = Form 1120 Schedule L Line 15 column (d). *Domestic Pretax Book Income* = Compustat #272. If #272 = 0, then Domestic Pretax Book Income = Compustat #170, Pretax Income. (*Regulation S-X* states that the *separate* classification of foreign and other income and income taxes is not necessary if it is immaterial. See "Background" for full details. Because only U.S.-domiciled taxpayers are examined, if no domestic pretax income is reported, then I assume their foreign and other operations are immaterial and therefore, Total Pretax Income likely represents Domestic Pretax Income.) *Taxable Income before NOLs* = Form 1120 Page 1 Line 28. See Table 2 for remaining variable definitions. All continuous variables are winsorized at the 1 and 99% levels. Continuous variables (except for *PercFrgnInc* and *Leverage*) are in $millions.

Table 4. Correlation Table.
Spearman Correlations are below the diagonal; Pearson correlations are above.

Panel A: Total Tax with Current U.S. Tax Expense, Stock Options, Contingent Tax Reserve, Intraperiod Allocation, and Consolidation Variables

	TOT_TX	*Curr_Fed*	*TaxBenefit_ NQO*	*ΔCushion*	*Intraper_ Dummy*	*Minority_Int_ Dummy*	*Eq_Earn_ Dummy*	*PercFrgnInc*
TOT_TX		0.801***	0.234***	-0.301***	-0.045***	0.073***	0.110***	0.165***
Curr_Fed	0.929***		0.318***	-0.300***	0.006	0.156***	0.162***	0.209***
TaxBenefit_NQO	0.422***	0.498***		-0.244***	0.0070	0.065***	0.109***	0.145***
ΔCushion	-0.429***	-0.382***	-0.402***		0.041***	-0.068***	-0.045***	-0.156***
Intraper_Dummy	-0.006	-0.005	0.014	-0.024**		0.054***	0.034***	0.007
Minority_Int_Dummy	0.065***	0.096***	0.066***	-0.072***	0.054***		0.248***	0.108***
Eq_Earn_Dummy	0.114***	0.125***	0.093***	-0.076***	0.034***	0.248***		0.057***
PercFrgnInc	0.067***	0.124***	0.167***	-0.221***	0.022**	0.120***	0.070***	

Panel B: Total Tax with Additional Financial Information & Firm Characteristics

	TOT_TX	*NOLDummy*	*DomBkLoss*	*R&D*	*Amort_Intan*	*ln(Assets)*	*Leverage*
TOT_TX		-0.298***	-0.690***	-0.171***	0.118***	0.579***	-0.062***
NOLDummy	-0.092***		0.239***	0.065***	-0.009	-0.172***	0.055***
DomBkLoss	-0.262***	0.239***		0.227***	-0.065***	-0.468***	0.050***
R&D	0.203***	0.014	0.002		0.077***	-0.009	-0.233***
Amort_Intan	0.299***	-0.005	-0.071**	0.329***		0.220***	0.026***
ln(Assets)	0.414***	-0.163***	-0.457***	0.292***	0.301***		0.068***
Leverage	-0.051***	0.055***	0.173***	-0.061***	-0.021**	-0.321***	

*, **, and *** represent significance levels at 0.10, 0.05, and 0.01 levels, respectively.
See Table 2 for full variable definitions. All continuous variables are winsorized at the 1 and 99% levels.

Table 5. Tobit Regression Results: Testing Sign of Domestic Pretax Book Income and NOL Status as Partitioning Variables

Dependent Variable: TOT_TX (Total Tax After Credits)

Independent Variable	Pred. Sign	Model 1		Model 1a		Model 1b		Model 2		Model 2a		Model 2b	
Constant		-9.233	***	-9.345	***	-9.518	***	-8.053	***	-8.617	***	-7.524	***
		(-19.56)		*(-20.33)*		*(-20.98)*		*(-12.07)*		*(-12.20)*		*(-11.25)*	
Curr_Fed	+	0.769	***	0.804	***	0.731	***	0.692	***	0.711	***	0.6650	***
		(161.43)		*(167.38)*		*(172.55)*		*(145.87)*		*(141.69)*		*(145.72)*	
TaxBenefit_NQO	–	-0.850	***	-0.649	***			-0.618	***	-0.485	***		
		(-29.10)		*(-26.27)*				*(-18.40)*		*(-14.54)*			
ΔCushion	–	-0.274	***			-0.220	***	-0.291	***			-0.273	***
		(-42.47)				*(-39.14)*		*(-39.60)*				*(-42.68)*	
Intraper_Dummy	–	-2.011	***	-1.678	**	-2.145	***	0.009		0.448		0.146	
		(-2.97)		*(-2.47)*		*(-3.23)*		*(0.01)*		*(0.61)*		*(0.21)*	
Minority_Int_Dummy	?	-1.823	***	-1.647	***	-1.718	***	-2.839	***	-2.932	***	-2.777	***
		(-3.68)		*(-3.61)*		*(-3.97)*		*(-5.61)*		*(-5.85)*		*(-5.79)*	
Eq_Earn_Dummy	?	2.605	***	2.7880	***	2.6160	***	1.2410	**	1.190	**	1.5670	***
		(5.28)		*(6.42)*		*(5.69)*		*(2.49)*		*(2.43)*		*(3.13)*	
PercFrgnInc	–	-0.080	***	-0.032	***	-0.096	***	-0.085	***	-0.054	***	-0.082	***
		(-9.79)		*(-4.20)*		*(-12.14)*		*(-9.47)*		*(-5.99)*		*(-9.21)*	
NOLDummy	–							-3.812	***	-4.079	***	-4.070	***
								(-10.05)		*(-10.13)*		*(-10.91)*	
DomBkLoss	–							-15.814	***	-17.177	***	-16.600	***
								(-33.38)		*(-34.12)*		*(-34.39)*	
R&D	–							-0.118	***	-0.076	***	-0.162	***
								(-12.93)		*(-9.94)*		*(-27.14)*	
Amort_Intan	–							-0.051	*	0.0450	*	-0.057	**
								(-1.86)		*(1.84)*		*(-2.18)*	
ln(Assets)	+							1.9230	***	1.9990	***	1.8020	***
								(18.53)		*(18.14)*		*(17.12)*	
Leverage	–							-4.073	***	-4.365	***	-3.675	***
								(-6.02)		*(-6.06)*		*(-5.41)*	
Industry Controls		Included		Included		Included		Included		Included		Included	
Year Controls		Included		Included		Included		Included		Included		Included	
Model Chi-Square		10,929.56	***	10,492.86	***	10,639.72	***	13,967.87	***	13,458.00	***	13,846.42	***
Observations		10,561		10,561		10,561		10,561		10,561		10,561	
Pseudo-R^2		0.23		0.22		0.22		0.29		0.28		0.29	

*, **, and *** represent significance levels at 0.10, 0.05, and 0.01 levels, respectively. t-statistics are presented in parentheses below coefficient estimate. All continuous variables winsorized at 1 and 99% levels.
Huber-White standard errors are used to adjust for potential serial correlation among multiple observations per firm.
See Table 2 for full variable definitions.

Table 6. OLS Regression Results

Panel A. Main Results

For sample: Domestic Pretax Book Income > 0 and *NOLDummy* = 0

Dependent Variable: TOT_TX (Total Tax After Credits)

Independent Variable	Pred. Sign	Model 1		Model 1a		Model 1b		Model 2		Model 2a		Model 2b	
Constant		0.173		-0.002		-0.137		-1.685	***	-1.901	***	-1.521	***
		(0.37)		*(-0.00)*		*(-0.29)*		*(-3.28)*		*(-3.36)*		*(-2.89)*	
Curr_Fed	+	0.714	***	0.731	***	0.683	***	0.703	***	0.720	***	0.690	***
		(36.02)		*(39.01)*		*(39.35)*		*(33.67)*		*(35.95)*		*(37.37)*	
TaxBenefit_NQO	–	-0.575	***	-0.371	**			-0.331	*	-0.180			
		(-3.09)		*(-2.10)*				*(-1.93)*		*(-1.10)*			
ΔCushion	–	-0.205	***			-0.173	***	-0.224	***			-0.214	***
		(-4.02)				*(-3.57)*		*(-4.38)*				*(-4.32)*	
Intraper_Dummy	–	1.096		1.4940		0.9840		1.256		1.592		1.274	
		(0.89)		*(1.06)*		*(0.80)*		*(1.00)*		*(1.13)*		*(1.02)*	
Minority_Int_Dummy	?	-1.832	*	-1.962	**	-1.712	*	-1.954	**	-2.122	**	-1.856	**
		(-1.93)		*(-2.01)*		*(-1.78)*		*(-2.06)*		*(-2.16)*		*(-1.96)*	
Eq_Earn_Dummy	?	1.402		1.3620		1.5760	*	1.4450	*	1.251		1.6430	*
		(1.63)		*(1.53)*		*(1.79)*		*(1.70)*		*(1.42)*		*(1.90)*	
PercFrgnInc	–	-0.133	***	-0.096	***	-0.157	***	-0.099	***	-0.070	***	-0.098	***
		(-4.64)		*(-3.54)*		*(-4.85)*		*(-3.84)*		*(-2.76)*		*(-3.80)*	
R&D	–							-0.106	***	-0.084	***	-0.132	***
								(-3.95)		*(-3.15)*		*(-4.38)*	
Amort_Intan	–							-0.089		-0.025		-0.094	
								(-0.96)		*(-0.26)*		*(-1.00)*	
ln(Assets)	+							0.574	***	0.564	***	0.520	***
								(4.27)		*(3.87)*		*(3.90)*	
Leverage	–							0.015		-0.017		0.080	
								(0.06)		*(-0.06)*		*(0.32)*	
Industry Controls		Included		Included		Included		Included		Included		Included	
Year Controls		Included		Included		Included		Included		Included		Included	
Model F-Statistic		242.80	***	247.18	***	257.62	***	236.85	***	256.68	***	243.48	***
Observations		3,829		3,829		3,829		3,829		3,829		3,829	
Adj. R^2		0.89		0.88		0.89		0.89		0.89		0.89	

*, **, and *** represent significance levels at 0.10, 0.05, and 0.01 levels, respectively. t-statistics are presented in parentheses below coefficient estimate. All continuous variables winsorized at 1 and 99% levels.

Huber-White standard errors are used to adjust for potential serial correlation among multiple observations per firm. See Table 2 for full variable definitions.

Table 6. OLS Regression Results

Panel B. Validation Results on Year 2004 "Holdout" Observations

For sample: Domestic Pretax Book Income > 0 and *NOLDummy* = 0

Estimation Sample: Firm-Year Observations in Years 2000 through 2003

Dependent Variable: TOT_TX (Total Tax After Credits)

Independent Variable	Pred. Sign	Using Model 1 in Table 6 Panel A		Using Model 2 in Table 6 Panel A	
Constant		2.795		-1.597	
		(1.51)		*(-0.99)*	
Tot_Tx_Score1	+	0.920	***		
		(49.35)			
Tot_Tx_Score2	+			1.0220	***
				(59.39)	
Industry Controls		Included		Included	
Year Controls		Included		Included	
Model F-Statistic		2,435.44	***	3,526.75	***
Observations (Yr. 2004)		699		699	
Adj. R^2		0.78		0.83	

*, **, and *** represent significance levels at 0.10, 0.05, and 0.01 levels, respectively.

t-statistics are presented in parentheses below coefficient estimate. All continuous variables winsorized at 1 and 99% levels.

Huber-White standard errors are used in years 2000-2003 estimation sample to adjust for potential serial correlation among multiple observations per firm.

See Table 2 for full variable definitions.

Table 7. OLS Regression Results: Using Other Disclosed Tax Information

For sample: Domestic Pretax Book Income > 0 and *NOLDummy* = 0

Dependent Variable: TOT_TX (Total Tax After Credits)

Independent Variable	Pred. Sign	Model A		Model B1		Model B2		Model C		Combined	
Constant		-1.282	**	-4.358	***	-2.700	***	-23.168	***	-1.959	***
		(-2.45)		*(-5.00)*		*(-3.70)*		*(-10.91)*		*(-3.12_*	
Tax_Paid	+	0.243	***							0.605	***
		(3.54)								*(15.22)*	
Total_Tax_Exp	+			*0.3990*	***					0.057	**
				(18.40)						*(2.38)*	
Total_Curr_Tx_Exp	+					*0.7270*	***				
						(34.22)					
Total_Defr_Tx_Exp	–					0.050					
						(1.13)					
ΔTax_Payable	+							0.445		0.745	***
								(1.55)		*(5.79)*	
Curr_Fed	+	0.464	***								
		(6.67)									
TaxBenefit_NQO	–			-0.004		0.002					
				(-0.02)		*(0.01)*					
ΔCushion	–	-0.017		-0.140	**	-0.086		-0.601	***	-0.316	***
		(-0.25)		*(-2.34)*		*(-1.42)*		*(-6.32)*		*(-4.65)*	
Intraper_Dummy	–	1.038		0.888		1.362		-3.320	*	0.786	
		(0.83)		*(0.47)*		*(1.01)*		*(-1.85)*		*(0.54)*	
Minority_Int_Dummy	?	-2.320	**	-2.764	*	-0.261		-1.032		-2.872	***
		(-2.51)		*(-1.94)*		*(-0.26)*		*(-0.48)*		*(-2.79)*	
Eq_Earn_Dummy	?	1.614	*	2.1790		1.907	**	2.754		1.506	
		(1.90)		*(1.50)*		*(2.04)*		*(1.34)*		*(1.60)*	
PercFrgnInc	–	-0.123	***	-0.182	***	-0.055	**	-0.294	***	-0.170	***
		(-4.52)		*(-4.13)*		*(-1.96)*		*(-5.50)*		*(-4.57)*	
R&D	–	-0.095	***	-0.131	***	-0.074	**	0.014		-0.048	
		(-3.63)		*(-3.15)*		*(-2.06)*		*(0.20)*		*(-1.42)*	
Amort_Intan	–	-0.092		0.059		0.039		0.5820	***	-0.043	
		(-1.01)		*(0.34)*		*(0.38)*		*(2.79)*		*(-0.40)*	
ln(Assets)	+	0.499	***	1.340	***	0.730	***	6.565	***	0.726	***
		(3.80)		*(6.77)*		*(4.78)*		*(12.77)*		*(4.54)*	
Leverage	–	-0.121		-0.327		0.329		0.177		-0.403	
		(-0.49)		*(-0.69)*		*(1.25)*		*(0.14)*		*(-1.26)*	
Industry Controls		Included		Included		Included		Included		Included	
Year Controls		Included		Included		Included		Included		Included	
Model F-Statistic		285.67	***	85.01	***	273.66	***	17.67	***	222.41	***
Observations		3,829		3,829		3,829		3,829		3,829	
Adj. R^2		0.90		0.77		0.88		0.42		0.88	

*, **, and *** represent significance levels at 0.10, 0.05, and 0.01 levels, respectively. t-statistics are presented in parentheses below coefficient estimate. All continuous variables winsorized at 1 and 99% levels. Huber-White standard errors are used to adjust for potential serial correlation among multiple observations per firm. See Table 2 for full variable definitions. *Tax_Paid* = Compustat #317; *Total_Tax_Exp* = #16; *Total_Curr_Tx_Exp* = #16 minus #50; *Total_Defr_Tx_Exp* = #50; and *ΔTax_Payable* = #305;