The Incentives for Tax Planning

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Abstract: We use a proprietary data set with detailed executive compensation information to examine the relationship between the incentives of the tax director and GAAP and cash effective tax rates, the book-tax gap, and measures of tax aggressiveness. We find that the incentive compensation of the tax director exhibits a strong negative relationship with the GAAP effective tax rate, but little relationship with the other tax attributes. We interpret these results as indicating that tax directors are provided with incentives to reduce the level of tax expense reported in the financial statements.

Keywords: tax director incentives; equity incentives; effective tax rate; book-tax difference

JEL Classification: H25, M41, M52

1. Introduction

This paper investigates the type of tax planning included in tax directors' compensation contracts. Using detailed data on tax director incentive compensation, we examine whether the incentives provided to *tax directors* are associated with lower effective tax rates and/or a wider book-tax gap. We also examine whether tax director incentives are more strongly linked to measures of the impact of taxes on cash flows (i.e., cash effective tax rates and taxable income) or earnings (i.e., GAAP effective tax rates and pre-tax book income). Finally, we investigate whether tax director incentives are associated with proxies for aggressive tax planning.

Our study complements and extends the recent literature that links tax planning with *top executive* incentive compensation (e.g., Desai and Dharmapala, 2006; Rego and Wilson, 2010) and executive/corporate culture (e.g., Frank et al., 2009; Dyreng et al., 2010).[1] Although these studies show that both the incentives of top management and corporate culture have a significant impact on effective tax rates, it is not clear whether top management directly engages in tax planning or whether the documented tax effects are a byproduct of the investing, financing, and operating decisions made within the firm. For example, an observed relationship between top management's incentives and measures of tax planning may be an indirect outcome of the investment decision rather than from deliberate tax planning. To understand the link between performance measures and observed tax attributes, it is necessary to explicitly consider the incentive compensation of the *tax director*, who is the executive charged with overseeing the firm's tax function. However, an alternative scenario is that all tax planning decisions are

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[1] This literature suggests that a firm's culture, representing the shared beliefs within the firm regarding the optimal course of action, can lead to endemic aggressiveness in all of a firm's business decisions, including the tax function (e.g., Cronqvist et al., 2007).

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merely dictated by top management to the tax director, who has no ability to independently affect firm behavior. If tax planning is a role merely encompassed in top management's duties, then we might not observe an association between tax director incentives and measures of tax planning after controlling for the incentives of top management.

To investigate the relative importance of various measures of tax planning in tax director incentive compensation contracts, we use a proprietary data set that includes detailed compensation information for many executives, including the members of the tax department, for a sizeable sample of mostly large U.S. firms. This unique data exhibits several advantages relative to that used in prior research. First, it allows us to directly measure the incentive compensation of the executives who are directly responsible for the firm's tax function. Second, it provides us with information about the incentive compensation of other members of the management team. This within-firm benchmark allows us to identify the attributes of the compensation plan that are unique to tax directors, as opposed to the general compensation policy of the firm.

We first examine the association between executive incentives and the GAAP and Cash effective tax rates (ETRs). Recent research presents evidence that variation in corporate tax planning is captured by ETRs (Dyreng et al., 2008; Robinson et al., 2010). We find a strong negative relationship between tax director incentives and the *GAAP ETR* and no relationship between tax director incentives and the *Cash ETR*. These results indicate that tax directors are provided with incentives to reduce the tax expense reported in the financial statements. Thus, our findings are consistent with the *GAAP ETR* being a

more informative measure of the tax director's actions and, accordingly, it is allocated more weight in the incentive compensation contract

We next examine the book-tax gap, because this measure has recently received considerable attention from the U.S. Treasury, regulators, and academics. We find no evidence of a relationship between tax director incentive compensation and the spread between pre-tax book income and taxable income. Since the book-tax gap is defined as the difference between pre-tax book income and taxable income, there are econometric reasons to disaggregate this variable into its two components (i.e., pre-tax book income and taxable income). In addition, separating the book-tax gap allows us to look for evidence of conforming tax planning (i.e., where tax planning reduces both book and tax income). The results of this analysis provide no evidence of an association between the incentive compensation of tax directors and lower taxable income.

Finally, we examine the relationship between tax director incentive compensation and two measures developed to explicitly capture tax aggressiveness: a modified version of Frank et al.'s (2009) *DTAX* measure and Wilson's (2009) measure of tax sheltering. We find no evidence that tax directors' incentive compensation is associated with either measure of tax aggressiveness. Collectively, our results indicate that tax directors are provided incentives to reduce the level of tax expense reported in the financial statements, but provide little support for the notion that tax directors are compensated on the basis of the book-tax gap, the cash effective tax rate, or various measures of "tax aggressiveness."

The remainder of the paper consists of the following seven sections. Section 2 provides a description of the possible roles of the tax director, and Section 3 reviews the

prior empirical literature on tax planning. Section 4 describes our proprietary sample and other data used in our analysis. We develop our variable measurement and methodological approach in Section 5. Our results are presented in Section 6, and sensitivity analyses are provided in Section 7. Conclusions and summary comments are provided in Section 8.

2. Role of the Tax Director

Although tax directors are responsible for one of the firm's largest outflows of cash and one of the largest expenses on the income statement, little is known about how these executives are compensated. Since tax directors are rarely among the top five highest paid executives, information about their annual compensation and equity holdings is not available in annual proxy (Form DEF 14A) filings. Therefore, researchers are typically unable to directly observe the parameters of tax director incentive pay.

The tax director fills at least three roles. First, the tax director is responsible for compliance. Since multinational firms are typically required to file thousands of tax forms annually, it is not unreasonable to infer that compliance is the tax director's primary duty. Second, the tax director may serve as an advisor to the firm's senior executives by providing expertise in minimizing the tax cost of the firm's operating, financing, and investing activities. As an advisor, the tax director would be present when strategic investment decisions are made but may not be responsible for selecting the investments. Third, the tax director can be charged with actively pursuing tax planning opportunities by generating investment opportunities where the net present value of the project derives solely from tax benefits. We view this third role, termed the "active

planning" role, as relatively more tax aggressive than the other two advisory roles.[2] It is difficult to empirically distinguish the advisor from the active planner, as both roles could yield lower tax obligations, and there can easily be an overlap in duties.

In terms of selecting the compensation contract for the tax director, traditional agency theory suggests that compensation should be based on performance measures that are controllable by the agent (Holmstrom, 1979; Lambert, 2001). Therefore, if the tax director's primary responsibility is compliance, then the incentive component of pay should not be based on cash flow or earnings objectives (i.e., there are more direct measures of tax director effort, such as fines paid for noncompliance). On the other hand, the incentive compensation of a tax advisor and an active planner should be a function of the firm's financial attributes, since these performance measures are, in part, controllable by these types of tax directors.

Our characterization of the various roles of the tax director is consistent with the Tax Executive Institute, Inc.'s (TEI) 2004-2005 Corporate Tax Department Survey, which provides information on several dimensions of the operations of firms' tax departments.[3] This document is the compilation of the responses of approximately 1,300 tax departments (of which 945 were at publicly traded firms), representing a 57% response rate, to a mid-2004 survey generated by a consulting firm. Although the survey

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[2] Clearly, the advisory role can also generate positive net present value for the firm. However, we view the advisor as effectively reducing the tax cost of an incremental investment opportunity (i.e., the net present value of the project includes non-tax components). A tax advisor does not typically undertake transactions that fail the business purpose test (i.e., there are non-tax benefits to the transaction). In contrast, an active planner will need to justify why there are benefits beyond the tax attributes of the transaction (see *Gregory v. Helvering*, 293 U.S. 465 (1935)). As Hanlon and Heitzman (2010) point out, there is no universally accepted definition of tax aggressiveness. So we are left to make an (albeit coarse) attempt at segregating tax planning from tax aggressiveness for the purposes of our analysis.

[3] The Tax Executives Institute is a professional organization of roughly 5,000 business executives who are responsible for taxation matters. The TEI survey data is separate from the proprietary data used later in our analysis.

focuses on identifying the specific duties of the tax departments (e.g., time spent on foreign versus domestic compliance, types of entities responsible for, and nexus issues), it does provide descriptive information on the organization of the tax department and some performance metrics of tax department personnel.

The senior tax executives of the public survey respondents typically hold the title of tax director (40%) or vice president (35%) (described in aggregate hereafter as tax directors), and those titles suggest that these individuals hold high level positions in their respective firms. Sixty-five percent of the tax directors report to the chief financial officer. The majority (60%) of public companies report that their tax function is centralized and globally integrated, so the tax director is responsible for taxes worldwide. In terms of specific tasks, the majority of the tax director's time is spent doing research (33%) and compliance (28%).[4] The average tax director spends 9% of his or her time on the tax provision and 8% of his or her time on tax audits. In terms of the average tax department's budget, 60% is allocated toward compensation and 20% toward outside consultants. Finally, tax directors appear involved in the overall operations of the firm, as the survey reports that tax directors spend 9% of their time aiding in operational issues of the firm (including governance and Sarbanes-Oxley compliance).

The TEI Survey also provides some descriptive information on the performance metrics of a firm's top tax executive. Seventy-one percent of the survey's senior tax executives of public companies reported that "lack of surprises" was used by senior management to evaluate their performance. Since the effective tax rate (63%) is of slightly more importance than generating cash savings (57%) for performance evaluation, it appears that income statement surprises could potentially dominate cash flow surprises.

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[4] Note that time on research includes 8.1% of their time related to mergers and acquisitions.

Note that the cash savings is not necessarily solely attributable to taxes, as only 49% of respondents indicated that they were evaluated on the basis of cash taxes. Although anecdotal, our conversations with 12 tax directors suggest that their primary performance metric was "economic value added," as measured by financial statement earnings. However, only 19% of the tax directors surveyed agreed. Finally, the TEI survey reports that only 30% of the incentive compensation of executives other than the tax director was based on after-tax measures.

Our analysis is based on the maintained assumption that the tax director is not the primary executive charged with selecting the firm's investment activity. Although tax directors are involved in transaction planning and investment location decisions, their role appears to be primarily as an advisor. This characterization is consistent with the TEI survey evidence documenting that the majority of the tax director's time involves tasks related to return compliance and research. In later tests, we attempt to separate out the advisory role from the active planner role by studying specific measures intended to proxy for aggressive tax planning. To the extent that there is overlap between the duties of tax directors and other senior executives, our analyses should yield similar associations between our measures of tax planning and the incentives of the other executives. As we discuss below, the statistical differences observed across executive positions is a key feature of our methodological approach.

3. Prior Literature

3.1. Executive incentives and financial and tax reporting

In contrast to the fairly extensive literature on incentives and financial misreporting, there is relatively little work linking executives' incentives with tax

aggressiveness.[5] Slemrod (2004) develops the idea that shareholders select the level of tax aggressiveness by linking tax manager compensation with effective tax rates or stock price. However, one serious limitation in this model is that shareholders cannot observe the compensation contract or know whether managers are engaging in legal tax planning or illegal tax evasion. Thus, inappropriate aggressive behavior by the tax director constitutes a "hidden action," because tax returns are not disclosed to investors (see Crocker and Slemrod, 2005), and shareholders do not know whether to alter the executive's compensation contract until after the firm is penalized. In addition, it is difficult to contract on tax evasion, since the behavior is illegal and therefore would render any contract that is a function of this outcome unenforceable by the courts (Chen and Chu, 2005). Ultimately, Slemrod (2004) suggests that corporate tax noncompliance (tax evasion) could be the result of the design of incentive compensation plans.

For the purposes of our study, a shortcoming of the theoretical literature investigating the link between incentives and tax planning is that it fails to address the fact that large public firms are typically not assessed fines or penalties upon audit. Most settlements are made with the taxing authorities at a fraction of the dollar amount of the original assessment.[6] Therefore, non-evasive but aggressive tax planning can be viewed

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[5] See Armstrong et al. (2010) for a review of the literature on executives' incentives for financial misreporting. Much of the extant work focuses on whether equity incentives align managers' interests with respect to financial reporting with those of shareholders, or whether equity incentives instead induce managers to manipulate accounting information for personal gain. More recently, a number of studies, including Feng et al. (2009) and Jiang et al. (2010), examine the relationship between the incentives of the CFO and earnings management. Jiang et al. (2010) argue that "because CFOs' primary responsibility is financial reporting … CFO equity incentives should play a stronger role than those of the CEO in earnings management." This rationale for examining CFOs' incentives is analogous to our reasoning for examining the relationship between the incentives of the tax director and the firm's tax attributes.

[6] For example, GlaxoSmithKline PLC (Glaxo) settled a transfer pricing audit with the IRS for $3.4 billion. According to Glaxo's 20-F filings and the IRS's press release, the payment was made to cover "back taxes and interest" – *no penalties were assessed*. Press reports suggest that Glaxo settled for about 60% of the original assessment. Further, Glaxo reported in its 20-F filing that the after-tax cost of the settlement was $3.1 billion, suggesting that interest was roughly $1 billion of the settlement (assuming a 30% tax rate).

as merely a borrowing arrangement with tax authorities. These models also do not consider the nature of the underlying tax planning (temporary versus permanent tax deductions) and the tax planning's impact on the financial statements. The reversal of a permanent tax deduction will have a much larger impact on a firm's GAAP ETR than will a reversal of a temporary tax deduction. Hence, we need models that jointly consider both the cash flows and earnings implications of tax planning when considering optimal tax director incentives. Finally, note that both Crocker and Slemrod (2005) and Chen and Chu (2005) focus on incentives and *tax evasion* rather than on linking incentives to general tax director planning duties that affect either earnings or cash flows.

Desai and Dharmapala (2006) develop a model linking equity-based compensation and aggressive tax planning. They argue that there are complementarities between tax sheltering and rent extraction that imply that incentives lead to more sheltering behavior in better governed firms. Although equity incentives can motivate managers to increase tax sheltering, this decision will also lead to fewer opportunities for managers to engage in rent extraction. Thus, the relationship between equity-based compensation and tax sheltering is theoretically ambiguous.[7]

There is also a growing related literature that investigates whether corporate culture and individual managers influence a firm's level of tax aggressiveness. Frank et

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Since the dispute covered the period from 1989 to 2005, a rough estimate of the pre-tax interest rate on the settlement is 4.5% (or 3.2%, after taxes), assuming an eight year interest accrual period. If we consider that the IRS effectively forgave 40% of the assessment, then the effective borrowing rate is actually *negative*, since the initial "loan" from the government was for $4 billion (= 2.4 / 0.6) and the final payment was only $3.4 billion. In addition, the IRS Data Book (see Tables 9a and 17 for 2008 and 2009) provides an analysis of the amount of penalties assessed. Overall, for incorporated business, penalties appear to constitute only 1.45% (0.56%) of the additional taxes due in 2008 (2009). In addition, 32% (40%) of the corporate accuracy-related penalties assessed are abated in 2008 (2009).

[7] Desai and Dharmapala (2006) argue that any directional prediction for the association between tax planning and equity incentives is conditional on the firm's governance structure. However, it is not clear how the tax director would be able to extract rents from the firm. As pointed out in footnote 6, even detected aggressive tax planning can be a positive net present value project that benefits shareholders.

al. (2009) argue that a positive relationship between aggressive financial and tax reporting is consistent with a generally aggressive corporate "tone and culture." Ultimately, they find evidence of a positive relationship between earnings management and tax planning and that the market appears to reward this aggressiveness. However, they do not find meaningful evidence that the CEO and CFO are provided with incentives to undertake such behavior.

Phillips (2003) investigates whether compensating managers on a pre- versus after-tax basis affects the firm's reported tax expense. Using a proprietary dataset, he finds that compensating business unit managers on an after-tax basis is associated with lower firm GAAP effective tax rates. Consistent with the finding that equity risk-taking incentives motivate managers to undertake more aggressive tax planning, Rego and Wilson (2010) find a positive association between option vega and measures of corporate tax aggressiveness. Dyreng et al. (2010) investigate whether specific members of the top management team are associated with firms' level of tax aggressiveness. Although they conclude that top management is associated with tax planning, it is not clear whether their results are attributable to top management's explicit setting of the "tone at the top" with regard to tax aggressiveness or making strategic decisions such as investment and financing policies that are highly correlated with a firm's tax position.

Finally, Robinson et al. (2010) attempt to measure tax manager incentives by determining whether the tax department is viewed as a profit center (i.e., a "contributor to the bottom line"). Although an indirect measure of managerial incentives, this is one of the few studies to consider the incentive compensation plan of the tax manager (as opposed to the CEO, CFO, or other senior executives). They find evidence that firms

with tax departments that are viewed as profit centers have lower GAAP ETRs, but they have only weak evidence that firms with tax departments that are viewed as profit centers have lower cash ETRs.

Collectively, prior literature provides limited evidence that managerial incentives influence tax planning choices. However, there is no evidence related to the precise incentives of the tax director, who is the person most directly involved in the tax decisions of the firm. Thus, our subsequent empirical analysis focuses primarily on the compensation and incentives of the tax director and the impact of these incentives on firms' various tax attributes. However, we are careful to control for the incentives of other high level executives who might also be expected to play a role in the firm's tax planning, which allows us to isolate the unique effect of the tax director on the firm's various tax attributes.

3.2. Book-tax gap

Treasury (1999), Desai (2003), and Boynton et al. (2005) all document the growth of the spread between aggregate financial statement income and aggregate taxable income as reported by the IRS ("the book-tax gap").[8] Book income in excess of taxable income is consistent with manipulation of earnings reported to the capital markets, tax aggressiveness, or some combination of these two activities.[9] The discretion available in GAAP provides managers with an opportunity to manage book earnings upward without necessarily affecting taxable income (e.g., Badertscher et al., 2009). Similarly, Mills (1998) and Desai (2003) suggest that the expanding book-tax gap appears to be consistent

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[8] Graham, Raedy and Shackelford (2010) use financial statement data to estimate the BTG from 1993 to 2008 and find that book income has exceeded estimated taxable income in all years except 2001 and 2008 (i.e., years with excessive losses).
[9] Seidman (2010) conjectures that the growing book-tax gap could also be due to changes in accounting methods over time.

with aggressive tax planning. Phillips et al. (2003), Hanlon (2005), and Ayers et al. (2006) provide evidence that the divide between tax and financial reporting is partially attributable to earnings management. Finally, Frank et al. (2009) find evidence suggesting that firms that manage earnings also aggressively manage taxes.

Prior literature has not reached a consensus about the source of the increase in the book-tax gap.[10] For the purposes of our study, examining the link between executive incentives and the book-tax gap can provide new insights into whether firms appear to compensate managers in general, and tax directors in particular, in a manner that potentially induces a wider book-tax gap.

4. Sample

Our sample is derived from the proprietary data files provided to us by a large human resources consulting firm. The data covers the fiscal years from 2002 to 2006 and is obtained by a detailed annual survey by the consulting firm. The proprietary data provides information on the major components of executive compensation for many executive positions, including the tax director. We retain all public firms for which there is complete compensation data for CEO, CFO, general counsel, and tax director, and where we can estimate all of the tax attributes and control variables. Our final sample consists of 423 unique firms and 1,162 firm-year observations that are nearly uniformly

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[10] There continue to be many unanswered questions about the book-tax gap. It is frequently argued that tax aggressiveness must have increased over the mid- to late-1990s, as reported corporate profits surged more than did reported taxable income. However, it is unclear why firms would begin to seek to lower their tax burden more during this period rather than during others. What changed during this time period? While the sophistication of capital markets has increased over time, yielding new sheltering opportunities, the extent of the increase in the book-tax gap seems to far exceed documented examples of product sheltering (see Graham and Tucker, 2006, and Wilson, 2009). Furthermore, many new sheltering products were created because Treasury had eliminated an original transaction (e.g., the elimination of "Boss" led to the creation of "Son of Boss").

distributed across the sample period (244, 239, 222, 234, and 223 observations from 2002 to 2006, respectively).

The industry composition of the sample relative to all firms on Compustat for the same sample period (i.e., 2002 to 2006) is provided in Table 1, Panel A. Relative to the full Compustat sample, our sample of firm years includes a greater proportion of firms from Food, Textiles, and Chemicals and a somewhat smaller proportion of firms from Financial Services, but is otherwise very similar. In Panel B of Table 1, we report the representation of our sample in both the population of Compustat and the *S&P 500*. Across all years, our sample represents approximately 30% of total assets and 33% of the total cash paid for taxes of firms in Compustat. In addition, although our sample includes roughly 50% of the firms in the *S&P 500*, it includes 65% of the total assets and 60% of the total cash paid for taxes. Thus, our sample captures a large fraction of the economic activity (and taxes paid) in the U.S. economy as a whole and *S&P 500* in particular.

Descriptive statistics for our sample are reported in Table 2. The mean (median) revenue and market capitalization for our sample is $17,817 ($8,211) million and $23,555 ($9,173) million, respectively. Our sample firms are profitable, reporting both mean and median return on assets of approximately 5%. Consistent with other compensation and tax planning studies, our sample firms are highly levered, with a mean (median) debt-to-assets ratio of 20% (18%). Finally, our sample firms report mean taxable income of $1,270 billion on pre-tax income of $1,838 million. Thus, our sample is composed of very large firms that (as we will see in Section 5) have sizeable tax burdens and, therefore, a relatively greater proclivity to engage a tax director for tax planning.

5. Variable Measurement and Methodological Approach

5.1. Executive incentives

We have detailed data about the annual salary, annual bonus, annual restricted stock and option grants, and expected payouts from long-term incentive plans (e.g., stock options, restricted stock, performance units, and performance shares) for each executive in our sample. We use this information to calculate two complementary measures of incentive compensation. Our first measure is the total value of annual executive compensation, which is computed as the sum of all of the components of compensation, where restricted stock is valued using the market value at the date of the grant and stock options are valued using the Black-Scholes risk-neutral value.[11] This approach provides one measure of an agent's incentives, since total annual flow compensation should vary with performance measures that are used in the compensation contract (Lambert and Larcker, 1987). Our second measure is compensation mix, which is defined the ratio of variable compensation (i.e., bonus, stock options, restricted stock, performance units, and performance shares) to total compensation.[12] Compensation mix is a measure of variable remuneration, or how much an executive shares in the actual performance of the firm. Compensation mix is commonly used in consulting practice as a measure of managerial

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[11] The parameters of the Black-Scholes formula are calculated as follows. Annualized volatility is calculated using continuously compounded monthly returns over the prior 36 months (with a minimum of 12 months of returns). The risk-free rate is calculated using the interpolated interest rate on a Treasury Note, with the same maturity (to the closest month) as the remaining life of the option, multiplied by 0.7 to account for the prevalence of early exercise. Dividend yield is calculated as the dividends paid over the past 12 months scaled by the stock price at the beginning of the month. This is essentially the same method described by Core and Guay (2002).

[12] We also disaggregate this ratio into bonus mix and equity mix, defined as the ratio of the annual bonus to total compensation and the ratio of the value of the current year's stock and option grants to total compensation, respectively. For the sake of brevity, we do not report results from using these variables instead of compensation mix, but we find that they are generally similar to those with compensation mix which suggests that the incentives are not uniquely attributable to either the bonus or equity grants.

incentives and is similar to the measure used in prior studies such as Ittner et al. (2003) and Erickson et al. (2006).[13,14]

Descriptive statistics reported in Table 2 reveal that the mean (median) total level compensation ranges from $13,662,000 ($9,839,090) for the CEO to $787,727 ($558,714) for the tax director. The high level of CEO compensation is expected, since our sample generally consists of very large firms. In terms of compensation mix, the mean (median) for the CEO is 0.85 (0.90) and 0.59 (0.63) for the tax director. The tax director compensation mix is primarily attributable to equity (45% = 59% less 14% of bonus) and suggests that the tax director's duties extend beyond compliance. If the tax director's work were simply compliance, which is readily observable, there should be little difficulty (and, hence, less need to use incentive-based compensation) in ascertaining whether compliance tasks were performed adequately.

5.2. Effective tax rates

We begin by examining the GAAP and Cash effective tax rates. The GAAP effective tax rate is the ratio of total tax expense to pre-tax book income (TXT/PI). It is composed of a current and deferred component. Although the current tax expense is an

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[13] The incentives literature also uses the equity portfolio delta (e.g., Core and Guay, 1999) as a measure of executive incentives. This measure captures the change in the risk-neutral value of an executive's firm-specific equity portfolio holdings for a 1% change in the price of the underlying stock. One limitation of our data set is that it does not provide information about the firm-specific equity holdings of the executives, and we are therefore precluded from calculating the equity portfolio delta for either the tax director or the other executives. We suspect that the equity ownership by the tax director is modest and, thus, that analyzing the current year's compensation and compensation mix will be a reasonable proxy of managerial incentives. In addition, because we have information about the equity portfolio holdings of the CEO and CEO, we repeat all of our tabulated analyses using equity portfolio delta as the measure of the incentives of these two executives and we find that our primary results are essentially unchanged.

[14] An alternative approach is to adopt a two-stage research design in which we first regress either the executive's total compensation or variable compensation mix on the economic determinants of incentive compensation, and then use the residual from this regression in a second-stage model of the various tax attributes of interest (*BTG*, *GAAP* and *Cash ETR*, etc.). The use of this alternative measure produces results that are substantively equivalent to those reported in the tables.

estimate of the current taxes owed to the tax authorities, it does not include the tax benefit from stock options until the post-FAS123R period. Deferred tax expense captures the tax implications of differences between book and tax accrual accounting. Consistent with other studies (e.g., Dyreng et al., 2008), Table 2 reports that mean (median) *GAAP ETR* is about 30% (31%). A GAAP effective tax rate lower than the statutory tax rates implies that firms have income included in book income that will never be recorded in taxable income (e.g., municipal bond interest and permanently reinvested earnings).[15]

We model the *ETR* as a function of both economic variables that have been suggested by prior literature (see below) and the incentives of the firm's key executives. We specify the model as follows.

$$ETR_{i,t} = \beta_0 + \beta_1 Incentives_{i,t} + \beta_2 Return\text{-}onAssets_{i,t} + \beta_3 Std\ Dev.ROA_{i,t} + \beta_4 Log(Market\ Cap)_{i,t}$$
$$+ \beta_5 Leverage_{i,t} + \beta_6 Change\ in\ Goodwill_{i,t} + \beta_7 NewInvestment_{i,t} + \beta_8 Foreign\ Assets_{i,t}$$
$$+ \beta_9 GeographicComplexity_{i,t} + \beta_{10} IndustryComplexity_{i,t} + \beta_{11} Proportion\ Tax\ Fees_{i,t}$$
$$+ \beta_{12} TaxFees_{i,t} + YearIndicators + IndustryIndicators + \varepsilon_{i,t} \tag{1}$$

where *ETR* is either the *GAAP* or *Cash* effective tax rate. The *Cash ETR* measures the current cash outflows for income taxes as a percentage of pre-tax book income ((TXPD + (TXBCO + TXBCOF)) / PI).[16] Unlike the *GAAP ETR*, the *Cash ETR* reflects deferral of cash tax payments. Table 2 reveals that the mean (median) *Cash ETR* is 29% (23%),

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[15] Note that ETR differentials, such as tax credits, also drive down the effective tax rate as they effectively represent a difference of $(1-\tau)/\tau$ between book and taxable income.

[16] Unlike Dyreng et al. (2008), our measure of the cash effective tax rate considers the impact of stock options and special items. First, we view the cash benefit of stock options as a *de facto* cash payment for income taxes. Note that the tax benefit of options reduces the cash outflow for income taxes without any corresponding adjustment to book income. Hence, in the pre-SFAS 123R period, a firm that chooses to compensate employees with equity rather than cash will report a lower *Cash ETR*, not because the firm has a lower cash payment for taxes but because its book income does not include any compensation expense. The expensing of stock options under FAS 123R alleviates much this measurement error, but since our sample spans SFAS 123R adoption, it is critical for us to account for this issue. Second, Dyreng et al.'s exclusion of special items from the denominator leads to downwardly biased estimates of the cash effective tax rates as 73% of the special items reported in Compustat between 2002 and 2006 are income decreasing. In Table 2, we also report descriptive statistics on *Cash ETR w/o option benefit*, which excludes the tax benefit from stock options in the numerator. The mean and median values of this measure of the cash effective tax rate are slightly lower than the mean and median values of *Cash ETR*.

which suggests that our sample has accruals that increase pre-tax book income but not taxable income. Note that both the *GAAP* and *Cash ETRs* are censored to fall between zero and one.[17] Incentives are the incentives of the CEO, tax director, general counsel, and CFO, respectively, measured as either total annual compensation or compensation mix (described in Section 5.1). In addition, all independent variables are winsorized at the 1% level to ameliorate the effect of influential observations on the results. Since both dependent variables are bound in the (closed) interval [0,1], we estimate the models using a doubly censored Tobit specification to eliminate bias that would otherwise result from OLS estimation.[18] Finally, since prior studies have documented substantial variation in ETRs across industries and over time, we include year and industry indicator variables to capture the average effect of this variation.

5.2.1. Economic controls

We include *Return on Assets* (net income over beginning total assets) to control for the underlying economic activity of the firm. We include the standard deviation of the previous five years' ROA (*Std Dev. ROA*) to capture variability in the firm's operations. Next we include a size proxy, the natural logarithm of the firm's market capitalization (*Log(Market Cap)*). Prior studies' evidence on the relationship between *GAAP ETR* and firm size is mixed. For example, Rego (2003), Zimmerman (1983), and Omer et al. (1993) document a negative relationship between firm size and *GAAP ETR*, a finding that

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[17] The fraction of *GAAP* (*Cash*) *ETRs* that are truncated at zero and one are 6.9% (6.7%) and 1.2% (2.7%), respectively. Since these two variables are censored both below and above, we used a doubly censored Tobit in our analysis of the ETRs.

[18] All tabulated specifications were also estimated using ordinary least squares and produced almost identical results, which is not surprising given the relatively low fraction of observations that are censored at either end of the [0,1] interval. It can be shown that OLS estimates will be identical to those from a doubly censored Tobit when there are no censored observations. In addition, we report tabulated results from OLS estimation, since doing so facilitates the interpretation of the marginal effects of the coefficient estimates.

is consistent with the "political cost" hypothesis. However, Jacob (1996), Gupta and Newberry (1997), and Mills et al. (1998) do not find a statistically significant relationship. We therefore include firm size but do not predict the sign of the relationship. *Leverage*, defined as the ratio of the firm's long-term debt to total assets (LT/AT), is included to capture the extent of the tax shield of debt. *Ceteris paribus*, the greater the firm's tax shield of debt, the lower the need for incremental tax planning (see Mackie-Mason, 1990). *Change in Goodwill*, defined as the annual increase in the firm's goodwill scaled by beginning total assets (ΔGDWL/Beginning AT), is included to capture merger and acquisition activity of the firm during the year. If goodwill decreases, then *Change in Goodwill* is set to zero. *New Investment*, defined in Richardson (2006) as the sum of research and development expense, capital expenditures, and acquisitions less the sum of sales of property and depreciation all scaled by total assets ((XRD + CAPX + ACQ – SPPE – DPC) / Avg. AT), is included to control for the firm's investment activity, since investment often leads to book-tax differences because the tax and accounting rules are different (e.g., the investment tax credit, accelerated depreciation methods, and bonus depreciation).[19]

Rego (2003) finds that multinational firms with more extensive foreign operations have lower worldwide *GAAP ETRs*, a finding that she interprets as being consistent with economies of scale in tax planning. We therefore include the foreign assets of the company to control for differences in international planning opportunities. *Foreign Assets* are estimated using the methodology described in Oler et al. (2007), which uses the consolidated turnover ratio and foreign segment sales to infer foreign assets. We include

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[19] Notice that *New Investment* captures cash-based M&A activity, whereas the *Change in Goodwill* captures taxable and non-taxable M&A activity.

an estimate of the firm's foreign asset base to capture differential tax rates that typically apply to firms' foreign activities.

Finally, since more complex organizations require more executive talent (which commands higher pay) and more opportunity to tax plan, we include two measures of the complexity of the organization: *Geographic Complexity* and *Industry Complexity*. Following Bushman et al. (2004), these measures are revenue-based Hirfindahl-Hirschman indices that capture the within-firm geographic and industry segment concentration of the firm. Lower values of these measures suggest a relatively more complex organization, so we predict a negative association between these measures of complexity and the *ETR* consistent with more opportunity for tax planning.

5.2.2. External tax planning

Firms may choose to use external providers for tax planning, which might weaken the link between tax director incentive compensation and measures of tax planning. We include two proxies for the extent of a firm's use of tax consulting services. *Tax Fees* is the total tax fees paid to a firm's external auditor scaled by total assets as reported by Audit Analytics.[20] The greater a firm's tax fees are relative to its size, the more likely the firm has contracted with its auditor for tax planning purposes. *Proportion Tax Fees* is that ratio of tax fees to total fees paid to the external auditor. The greater this ratio, the more emphasis a firm places on tax planning and reporting. Measures of external tax services could either be positively or negatively associated with measures of tax planning. If a firm faces a relatively high tax burden, then external tax consultants could be engaged to help the tax director. On the other hand, the firm may have a relatively low tax burden

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[20] Note that to the extent the firm utilizes non-auditor tax consulting services, our *Tax Fees* measure will underestimate the extent to which the firm obtains outside tax assistance.

because external tax consultants were engaged. Hence, we make no prediction on the direction of the association with measures of tax planning.

5.3. Book-tax gap

The next tax attribute we examine is the book-tax gap (*BTG*) because, assuming the *BTG* reflects tax planning, we can use the BTG and its components to investigate both conforming and non-conforming tax planning. If, after controlling for firm performance, the tax director's compensation is associated with a smaller book-tax gap, then we can infer that the tax director is compensated for managing taxable income in a manner that avoids the scrutiny of the tax authorities (Mills 1998). On the other hand, as firms face taxes in multiple jurisdictions, we conjecture that the *BTG* may better capture "tax planning" by measuring activity that reduces pre-tax income.[21] If tax directors have incentives to reduce taxable income even at the expense of reducing book income (i.e., conforming tax planning), then we should observe either a negative or no association with the *BTG* and a negative association with both taxable income and pre-tax book income. On the other hand, non-conforming tax planning may manifest in a positive association between the incentive compensation of the tax director and the *BTG*.

We model the book-tax gap as a function of both economic variables that have been suggested by prior literature and the incentives of the firm's key executives. We specify the model as follows.

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[21] For example, consider two firms, A and B, that both have a foreign affiliate that generates 50% of the consolidated entity's income (with the other 50% generated by the domestic parent). Suppose the tax rate in A's affiliate is 40% and the rate in B's affiliate is 20%. Further suppose that firm A's tax director shelters 20% of its affiliate's income. However, B's tax director shelters only 10% of its affiliate's income. It is unclear which firm has the "better" tax director. On an after-tax basis, Firm B has a lower *GAAP ETR* (assuming PRE designation under APB 23) and *Cash ETR*. Yet Firm A's tax director has generated a "larger" book tax difference. This is the reason we consider the *BTG* tests as capturing "pre-tax" tax planning.

$$BTG_{i,t} = \beta_0 + \beta_1 Incentives_{i,t} + \beta_2 Operating\ Cash\ Flow_{i,t} + \beta_3 Std\ Dev.\ ROA_{i,t} +$$
$$\beta_4 log(Market\ Cap_{i,t}) + \beta_5 Leverage_{i,t} + \beta_6 Change\ in\ Goodwill_{i,t} + \beta_7 New$$
$$Investment_{i,t} + \beta_8 ForeignAssets_{i,t} + \beta_9 Geographic\ Complexity_{i,t} + \beta_{10} Industry$$
$$Complexity_{i,t} + \beta_{11} Proportion\ Tax\ Fees_{i,t} + \beta_{12} TaxFees_{i,t} + Year\ Indicators +$$
$$Industry\ Indicators + \varepsilon_{i,t} \hspace{2cm} (2)$$

where *BTG* is the book-tax gap measured globally and scaled by total assets at the beginning of the period. The *BTG* is measured as the difference between pre-tax income less income attributable to minority interest (Compustat PI − MII) and taxable income (defined as current federal tax expense (TXFED) grossed up by the maximum federal statutory tax rate (i.e., 35%) plus pre-tax foreign income (PIFO) less the annual change in NOLs (NOL)) scaled (by total assets).[22] *Incentives* are the incentives of the CEO, tax director, general counsel and CFO, respectively, measured as either the level of compensation or compensation mix. Similar to equation (1), it is necessary to specify the appropriate control variables for the *BTG*. We rely on the same controls as those included in equation (1) except that we replace *Return on Assets*, which is effectively a component of our measure of the BTG, with *Cash Flow From Operations* scaled by average assets to control for the underlying economic activity of the firm. All of the remaining variables are as defined above.

5.3.1 Components of the book-tax gap

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[22] We adjust for the minority interest on the assumption that it represents a greater than 20% ownership stake by the minority. We continue to find similar results if we do not remove the minority interest. In addition, we estimate foreign taxable income by using reported pretax income, which implicitly assumes a relatively high level of book-tax conformity on foreign jurisdictions. Most studies estimate taxable income by grossing up current foreign tax expense by the top U.S. statutory rate, which biases taxable income (*BTG*) downward (upward) since foreign statutory tax rates are typically lower than U.S. rates. Finally, we ignore the tax benefit of stock options (TXBCO + TXBCOF) in our estimate of the BTG because the benefit of options was a known difference between book and taxable income during the majority of our sample period. The tax benefit of options, however, is considered in our measures of taxable income in later analyses. We presume that employee stock option exercise activity is exogenous to tax planning (barring extreme instances such as the one described in Matsunaga, Shevlin, and Shores, 1992). Ideally, in our *BTG* analysis, we would eliminate all differences between book income and tax income unrelated to tax planning.

Table 2 shows that the mean book-tax gap is 5.0% of total assets for our sample.[23] The positive value indicates that book income is greater than taxable income. Although the book-tax gap is an important tax construct, there are both economic and econometric reasons why the book-tax gap might be problematic as a dependent variable. The book-tax gap is measured as the difference between pre-tax book income and estimated taxable income, and each of its two components might exhibit a different relationship with the independent variables included in equation (1). From an economic perspective, the book-tax gap itself might not be the construct of interest because some executives influence the measure indirectly (e.g., the CEO's setting of the firm's investment policy) and others directly (e.g., the smoothing earnings by the CFO). Since we are specifically interested in the direct links between tax planning and managerial incentives, we disaggregate the book-tax gap into its two components and jointly estimate both equations using seemingly unrelated regression (Zellner, 1962). Joint estimation of the two resulting equations also allows us to formally compare coefficients across the two equations.

Disaggregating the book-tax gap into its components also allows us to investigate whether there is evidence of conforming tax planning. When a firm undertakes conforming tax planning, book income will be reduced because the firm seeks to lower taxable income. Since large book-tax differences may draw the attention of the tax authorities, firms may be willing to undertake conforming tax planning because it increases the likelihood that the firm will prevail under audit (Mills, 1998; Cloyd, Pratt, and Stock, 1996).

5.4. Specific measures of "tax aggressiveness"

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[23] Untabulated analysis reveals that the mean *BTG* for our sample is positive for all years during our sample period. We also find that the mean *BTG* is positive for the firms in the *S&P500* during each year of our sample period.

The final tax attribute that we examine is tax aggressiveness. As discussed above, there is no generally accepted definition of this construct, and it is thus difficult to measure. Nevertheless, we investigate two recently developed measures of tax aggressiveness: Frank et al.'s (2009) *DTAX* and Wilson's (2009) *SHELTER*. Frank et al. (2009 p. 468) define "aggressive tax reporting" as "a downward manipulation of taxable income through tax planning that may or may not be considered fraudulent tax evasion." Anecdotal evidence suggests that for public companies, the ideal tax planning transactions are those that create permanent differences.[24] By creating permanent differences, the firm reduces cash taxes paid without decreasing financial statement income.

To investigate whether incentives are associated with permanent differences and ETR differentials (hereafter "perm diffs" for expositional simplicity), we begin by computing a modified version of Frank et al.'s (2009) *DTAX* measure of discretionary perm diffs. Frank et al. (2009) compute *DTAX* as the residuals from a regression of an estimate of perm diffs on measures of intangible assets, income of unconsolidated subsidiaries, minority interest, state tax burdens, changes in NOLs, and lagged perm diffs. We modify this computation by including Oler et al.'s (2007) measure of foreign assets (*Foreign Assets*) to control for the existence of multinational operations. By including *Foreign Assets* in the first stage, we attempt to control for ETR differentials that result from "ordinary" overseas operations. Without this modification, *DTAX* would

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[24] The 1999 Treasury White Paper on corporate tax shelters noted the following: "There is a current trend among public companies to treat corporate in-house tax departments as profit centers that strive to keep the corporation's effective tax rate low and in line with that of competitors. Accordingly, in most recent corporate tax shelters involving public companies, the financial accounting treatment of the shelter item has been inconsistent with the claimed federal income tax treatment." See McGill and Outslay (2004) for further discussion of the prevalence of permanent difference creation in tax shelter arrangements.

suggest that firms with extensive foreign operations or foreign operations in low tax jurisdictions are always more aggressive tax planners.[25] Table 2 reports that the mean (median) *DTAX* is 7.5% (0.30%) of total assets. Positive levels of *DTAX* indicate that our sample firms have discretionary perm diffs that reduce taxable income relative to the population of Compustat firms that are used to estimate *DTAX*.

We investigate whether executives have incentives to engage in creating permanent differences by estimating the following model:

$$DTAX_{i,t} = \gamma_0 + \gamma_1 Incentives_{i,t} + \gamma_2 Return\text{-}on\text{-}Assets_{i,t} + \gamma_3 Std\ Dev.\ ROA_{i,t} + \gamma_4 log(Market$$
$$Cap_{i,t}) + \gamma_5 Leverage_{i,t} + \gamma_6 Change\ in\ Goodwill_i + \gamma_7 NewInvestment_{i,t} + \gamma_8 Foreign$$
$$Assets_{i,t} + \gamma_9 GeographicComplexity_{i,t} + \gamma_{10} IndustryComplexity_{i,t} +$$
$$\gamma_{11} Proportion\ Tax\ Fees_{i,t} + \gamma_{12} TaxFees_{i,t} + v_{i,t} \qquad (3)$$

where the variables are as defined above.

Finally, we investigate whether tax director incentives are associated with the predicted presence of tax shelters. We estimate Wilson's (2009) *SHELTER* measure which was developed using a sample of approximately 60 firms identified in court documents as having participated in illegal tax shelters. We use the following model to determine whether tax director incentives are associated with a high probability of sheltering behavior.

$$SHELTER_{i,t} = \gamma_0 + \gamma_1 Incentives_{i,t} + \gamma_2 Return\text{-}on\text{-}Assets_{i,t} + \gamma_3 Std\ Dev.\ ROA_{i,t}$$
$$+ \gamma_4 log(Market\ Cap_{i,t}) + \gamma_5 Leverage_{i,t} + \gamma_6 Change\ in\ Goodwill_i$$
$$+ \gamma_7 NewInvestment_{i,t} + \gamma_8 Foreign\ Assets_{i,t} + \gamma_9 GeographicComplexity_{i,t} +$$
$$\gamma_{10} IndustryComplexity_{i,t} + \gamma_{11} Proportion\ Tax\ Fees_{i,t} + \gamma_{12} TaxFees_{i,t} + v_{i,t} \qquad (4)$$

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[25] Note that Frank et al.'s measure, D*TAX*, implicitly assumes that any variation in perm diffs that does not result from the "known" sources of perm diffs included in the first stage (i.e., change in NOL, minority interest income, state income taxes, intangibles, and unconsolidated subsidiaries) are the result of tax planning. We conjecture that foreign operations are another source of perm diffs that are not necessarily discretionary tax planning and are therefore not necessarily indicative of aggressive behavior. Accordingly, we modify Frank et al.'s DTAX measure by also including foreign assets in the first-stage regression. Nevertheless, all of our reported results are robust to excluding foreign assets and measuring DTAX exactly as described by Frank et al.

6. Results

6.1. GAAP ETR

The results of estimating equation (1) where the *GAAP ETR* is the dependent variable are presented in Table 3. We first consider the role of the level of compensation, which is presented in columns (1) and (2). In the first model, where all of the positions are simultaneously considered, we find a strong negative relationship between tax director compensation and the *GAAP ETR*, but no significant relationship with the other three executives. This strong negative relationship continues to hold when we estimate the model considering only the tax executive.[26]

When we measure incentives as compensation mix in columns (3) and (4), we again find a strong negative relationship between tax director incentives and the *GAAP ETR* when all executives are considered together. We continue to find a negative relationship when only the tax director's incentives are included in the analysis (i.e. column 4). Overall, the evidence presented in Table 3 provides strong support for the notion that tax directors, but *not* the CEO, general counsel, and CFO have incentives to manage the *GAAP ETR*.

We also find a significant relationship between the *GAAP ETR* and certain control variables included in the specification. In particular, *Return on Assets* is significantly positive which indicates that more profitable firms have higher *GAAP ETRs*. Our proxy for the operating risk, *Std. Dev. ROA*, is negative and significant, consistent with convexity in the tax function (i.e., losses can reduce future earnings). *Foreign Assets* is positive and is generally significant, suggesting that firms with greater multinational

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[26] When we include the incentives of each of the other executives (CEO, CFO, GC) alone in the model, they are never significant.

activities have higher *GAAP ETRs*. Although we expected foreign activity to give rise to lower tax liabilities, our results are consistent with foreign investment being correlated with future profitability. *Geographical Complexity* is positive and significant, suggesting that firms with more dispersed geographic operations have lower effective tax rates. Consistent with Mills, Erickson, and Maydew (1998), we also we find that a higher *ProportionTaxFees* is associated relatively lower *GAAP ETRs*, which is consistent with the presence of more sophisticated tax planning.

Interestingly, these results suggest that tax directors are compensated on the basis of after-tax financial reporting measures rather than pre-tax measures. In particular, since we find no association between taxable income and tax director incentives, the negative relationship with the *GAAP ETR* is consistent with tax directors' undertaking of tax planning involving permanent differences and ETR differentials. Thus, our results corroborate Robinson et al.'s (2010) finding that firms provide incentives to the tax department to mitigate the impact of taxes on bottom-line net income.

6.2. Cash ETR

The results of estimating equation (1) with the *Cash ETR* are presented in Table 3, columns (5) through (8), and parallel our analysis of the *GAAP ETR*. When we consider the level of compensation as the measure of incentives in columns (5) and (6), we fail to find a significant relationship between the incentives of any of the executives and the *Cash ETR*. When compensation mix is used as the measure of incentives in columns (7) and (8), we again find no relationship between executive incentives and the *Cash ETR* in any of the specifications.[27]

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[27] When we use the leading three-year average *Cash ETR*, *Cash ETR (3 year),* as the dependent variables, we find no association with our various measures of incentives. Note that this analysis reduces our sample

We document several significant relationships between the cash effective tax rate and the control variables. *Return on Assets* is significantly positive which indicates that more profitable firms have higher cash effective tax rates. *Std ROA* is negative and significant, consistent with the finding that a greater variation in a firm's earnings results in a lower *Cash ETR* because of the convexity in the statutory rate structure. *Change in Goodwill* is positively related to the *Cash ETR*, a finding that suggests that M&A activity leads to lower pre-tax book income with no corresponding reduction to cash taxes paid (e.g., in-process R&D). Finally, we find that, consistent with the presence of incremental tax incentives, *New Investment* exhibits a negative and significant relationship with *Cash ETR*.

Overall, the lack of a relationship between tax director incentives and *Cash ETR* is in sharp contrast to the strong negative relationship for the *GAAP ETR* presented in Table 3.[28] Collectively, these results suggest that tax directors have incentives to reduce the GAAP ETR. One agency-theoretic explanation for this result is that the contracting weight on a performance measure is a function of its signal-to-noise ratio (Holmstrom, 1979; Lambert and Larcker, 1987; Banker and Datar, 1989; Lambert, 2001). Accordingly, an increase in either the sensitivity of the performance measure to the agent's actions (i.e., the strength of the signal about the agent's actions), or a decrease in its conditional variance (i.e., the noise with which it reflects the agent's actions) will, *ceteris paribus*, increase the relative weight placed on the performance measure in the

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to 772 firm years, since we are unable to estimate *Cash ETR (3 year)* for 2006. The negative association between *GAAP ETR* and tax director incentives continues to hold in this reduced sample.

[28] To alleviate concerns that our *GAAP ETR* results are driven solely by tax accounting accruals, we have collected data on firms' valuation allowance and cushion activity for a random subsample of our firms. When we include the change in the valuation allowance and/or cushion, we continue to find a significant negative (no) association between the tax director's compensation (both levels and mix) and the *GAAP* (*Cash*) *ETR*.

optimal compensation contract. From a "signal" perspective, the *GAAP ETR* is likely to be more sensitive to the tax director's actions than the *Cash ETR* is, because, unlike the *Cash ETR*, it contains an accrual component that estimates the future effects of actions in the current period.[29] From a "noise" perspective, the *Cash ETR* of our sample firms exhibits more variation than does the *GAAP ETR* (Table 2 reports that the standard deviation of *Cash* (*GAAP*) *ETR* is 26.2% (14.8%)). This is likely attributable to the discrete nature of items such as option exercises and tax audit cash outflows, which is undesirable from a contracting perspective.[30] Thus, our results are consistent with the *GAAP ETR* being a more informative measure of the tax director's actions, and, accordingly, it is allocated more weight in the incentive compensation contract.

Our results could also be construed as consistent with firms potentially forgoing cash savings to gain financial reporting benefits (e.g., Engel et al., 1999; Erickson et al., 2004). Finally, our results also corroborate Robinson et al.'s (2010) finding of little to no association between the profit center motive of the firm's tax department and *Cash ETR*.

6.3. Book-tax gap and its components

The results of the book-tax gap analysis are presented in Table 4. We find no relationship between the book-tax gap and either the level of compensation or the compensation mix of any of the executives. In addition, we find no relationship between the incentives of the tax director and either the *PBI* or *TI* component of the *BTG*.

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[29] In a multiperiod contracting setting, a number of authors such as Dutta and Reichelstein (2003) show that accruals are valuable for contracting because they provide a current (albeit noisy) estimate of the future cash flows generated by the agent's actions in the current period. Accordingly, accruals are useful for overcoming agency problems that result from differences in discount rates between the principal and agent.

[30] This idea is a manifestation of the controllability principal from agency theory. Lambert (2001, p. 23) defines a performance measure as "controllable" if "the agent's actions influence the probability distribution of that variable." To the extent that a performance measure that is not controllable by the agent is used in the compensation contract, it imposes additional risk on the agent for which he or she must be compensated.

In terms of the control variables, the positive association between *BTG* and *Operating Cash Flow* suggests that more profitable firms have a greater wedge between book and taxable income. When the dependent variable is pre-tax book (taxable) income, in all models, the estimated coefficient on cash flows of approximately 0.84 (0.59) indicates that pre-tax book (taxable) income is, on average, roughly 16% (41%) lower than cash flows from operations. The positive relationship between *log(Market Capitalization)* and measures of firm performance (*PBI* and *TI*) is consistent with profitable firms being more valuable. In addition, the negative association between *Industry Complexity* and the *BTG* suggests that firms with more variation in industry composition have greater book-tax gaps. However, consistent with earnings management, the association appears to stem from the fact that these firms have relatively higher pre-tax book income.

Overall, the results of the taxable income specification support the notion that there is little cross-sectional variation in the executives' incentives to reduce taxable income, at least as we can estimate this measure. As our sample is composed of large public firms, it is likely that these firms are averse to tax planning opportunities that reduce both book and tax income.

6.4. Measures of "tax aggressiveness"

Our final set of results relates to tax aggressiveness and is presented in Table 5. Using the level of compensation as our measure of incentives, we find no relationship between executive incentives and Frank et al.'s (2009) measure of discretionary permanent differences/ETR differentials. We also fail to find a correlation between any

of the measures of executive incentives and Wilson's (2009) measure of sheltering behavior (*SHELTER*).[31]

We document several significant relationships between the measures of tax aggressiveness and the control variables. Interestingly, we find that *DTAX* is positively associated with *Change in Goodwill*, a finding that is consistent with increases in permanent differences around M&A activity. The negative association between *DTAX* and *New Investment* suggests that firms with relatively more new depreciation deductions have smaller discretionary permanent differences. Finally, *Proportion Tax Fees* is significantly positively related to *DTAX*, a finding that suggests that hiring the firm's auditor for tax services complements "aggressive" tax planning.

Return on Assets exhibits a positive and significant relationship with *SHELTER* which indicates that more profitable firms have greater predicted probability of participating in tax shelters. We also find that *SHELTER* is positively related to the size of the firm which is consistent with the large fixed costs of entering into shelter transactions. The negative association between geographic complexity and *SHELTER* suggests that firms with more foreign affiliates have a higher probability of being involved in a tax shelter. However, overall, we find little evidence that the either the CEO, tax director, general counsel, or CFO are provided incentives to undertake aggressive tax planning as measured by *DTAX* and *SHELTER*.[32]

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[31] We obtain similar results when we use Compensation Mix as our measure of incentives. We also obtain similar results when we include the five variables from the first-stage *DTAX* specification that are not included in equation (3), namely, the ratio of (i) intangible assets to total assets, (ii) earnings of subsidiaries, (iii) minority interest income, (iv) state taxes, and (v) change in NOL.

[32] Note that there are limitations of the *DTAX* and *SHELTER* measures. First, *DTAX* measures only incremental permanent differences and ETR differentials ("perm diffs"), so, *ceteris paribus*, a tax director that has replaced one perm diff with another (perhaps because of a change in the tax law) will have zero *DTAX*. Second, much of the variation in *DTAX* could stem from changes in foreign operations. Although we include foreign assets in our model of *DTAX*, we still are not able to control for the tax rates of the

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7. Sensitivity Analyses

7.1. Governance characteristics

Prior literature such as Core, Holthausen, and Larcker (1999) has shown that various governance characteristics are related to firms' incentive compensation practices. In addition, recent research such as Desai and Dharmapala (2006) suggests a link between firms' governance characteristics and the extent to which they engage in aggressive tax planning.[33] We therefore repeat the analyses above, including a broad array of governance variables that have been used in prior research. In particular, prior studies linking corporate governance to compensation practices have examined three broad categories of governance constructs: (i) board of director characteristics; (ii) Board structure; and (iii) state antitakeover laws. We obtain board of director data from the Equilar analysis of proxy statements and use six variables to capture board characteristics: (i) the number of directors, (ii) the fraction of inside directors, (iii) the fraction of directors who are over 69 years old, (iv) the fraction of the board that is "busy" (which is measured as serving on at least two additional boards), (v) an indicator that equals one if the lead director is classified as affiliated, and zero otherwise, and (vi) the fraction of directors classified as outsiders who were appointed after the current CEO's term began.

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jurisdictions where the assets are located. Third, variation in *DTAX* could be attributable to changes in the tax contingency that is related to past tax planning instead of current tax planning. Regarding *SHELTER*, the majority of the variation in the measure results from firm size. Since our sample consists almost entirely of large firms, there is almost no variation in this measure within our sample (Table 2 reports that the interquartile range is from 0.946 to 0.994). Since our tests are cross-sectional, the lack of variation in these measures across our sample suggests that this measure produces a low-powered test.

[33] In particular, Desai and Dharmapala (2006) argue that "good governance" increases the link between equity compensation and aggressive tax planning.

Next, we use data from *FactSet SharkRepellent* to measure board structure similar to Gompers et al. (2003), Daines and Klausner (2001), Bebchuk and Cohen (2005), and Faleye (2007). First, we include a set of indicator variables to capture whether the company's board members are elected annually or are elected to staggered, multiyear terms.[34] We also include an indicator for whether the firm has multiple classes of shares with unequal voting rights.

Finally, similar to Bebchuk et al. (2002), Cheng et al. (2004), and Wahal et al. (1995), we include variables for state antitakeover laws. Their results suggest that the introduction of stronger antitakeover legislation leads to greater managerial entrenchment. Our results (untabulated) are robust to the inclusion of governance metrics. Specifically, we continue to find a significant negative relationship between tax director incentives and the *GAAP ETR* and no relationship between tax director incentives and *BTG*, *Cash ETR*, *DTAX*, and *SHELTER*.

7.2. Reversing the regression

Prior studies that investigate cross-sectional variation in firms' tax planning model executive compensation as a function of the firm's tax attributes (e.g., Rego and Wilson, 2010; Desai and Dharmapala, 2006). These studies find that higher levels of compensation are associated with a higher level of tax aggressiveness. In addition, this specification allows researchers to simultaneously evaluate multiple measures of tax planning. We therefore estimate regressions of both total compensation and compensation mix of the CEO, tax director, general counsel, and CFO on a variety of economic controls as well as *GAAP ETR* and *Cash ETR*. The results of the total

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[34] Activist shareholders argue that staggered terms impede shareholders' monitoring of the Board by making it more difficult for them to alter the board's composition over a short time period.

compensation regressions are reported in Table 6, and they reveal that *GAAP ETR* continues to exhibit a strong negative relationship with the level of tax director compensation.[35] Interestingly, and consistent with our signal-to-noise interpretation of the various performance measures, when we replace *Cash ETR* with *Three-year lagged Cash ETR*, we find a negative (but insignificant) relationship with the level of CEO and tax director compensation. This finding suggests that the signal becomes less noisy as the window over which *Cash ETR* is measured lengthens.

7.3. Matched-pair research design

There are two important limitations of the traditional linear regression approach used in the preceding tests of the relationship between executive incentives and firm tax attributes. First, this approach relies on a linear functional form linking the outcome variable of interest (i.e., tax attributes) with both the independent variable of interest (i.e., executive compensation) and the other control variables, or "covariates" (e.g., firm size, operating performance, and tax professional fees). To the extent that this linearity assumption is violated, the model is misspecified and can produce biased coefficient estimates. Second, to the extent that there is endogenous matching of executives with firms (and compensation contracts) on the basis of some unobserved characteristics (e.g., executive risk aversion or talent), this gives rise to traditional correlated omitted variable problems and this will bias the parameter estimates obtained from a linear model.

To mitigate these econometric concerns, we also use a propensity score matched-pair research design (Rosenbaum and Rubin, 1983; Rosenbaum, 2002; Armstrong et al., 2009), in which we form matched pairs of firm years that are similar along all of their

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[35] The coefficient on *Cash ETR* and *GAAP ETR* are statistically different for both the tax director (p = 0.027, two-tail) and the general counsel (p = 0.071, two-tail).

(observable) economic characteristics, but most dissimilar in terms of their executives' incentives.[36] After matching on these variables, any difference in outcome of interest (e.g., *BTG*, *GAAP ETR*, *Cash ETR, SHELTER*, and *DTAX*) can be more appropriately attributed to differences in the level of the executive's incentives rather than to differences in the other variables, regardless of the underlying structural form. We also assess the sensitivity of our results to unobserved correlated omitted variables by determining the magnitude of the correlated omitted variable bias that is necessary to cause any statistically significant differences between matched pairs to become insignificant.[37] Although this approach does not resolve the endogeneity problem *per se*, the computation enables us to provide some insight into whether our results are robust to endogenous matching.

A formal test of the difference in *GAAP ETR* between matched pairs is presented in Panels A and B of Table 7, respectively. We observe that both higher levels of tax director compensation and tax director compensation mix exhibit a strong negative relationship with the *GAAP ETR* (Wilcoxon p-values of 0.0001 and 0.0275, respectively, and t-statistic p-values of 0.0005 and 0.0266, respectively). Further, both the mean and median differences in the *GAAP ETR* of -0.029 and -0.018 between the firms with a

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[36] Our propensity score matched-pair research design requires a model for the conditional probability of receiving a given level or mix of compensation given observable features of the contracting environment. Consistent with many prior studies, we assume that the choice of the level and mix of compensation are a function of the economic and tax planning characteristics discussed in the Sections 5.2.1 and 5.2.2. We also required matched pairs to be from the same year and industry. The matched sample was constructed using a nonbipartite matching algorithm suggested by Derigs (1988), which is an "optimal" algorithm in the sense that it considers the potential distances between *other* pairs when forming a particular matched pair. The matching was done without replacement.

[37] An alternative way of characterizing the correlated omitted variable problem in our setting is that there is the potential for endogenous matching (or sorting) of executives and companies. If, for example, executives who are relatively more risk-tolerant decide to work for companies that offer more risky, incentive-based compensation packages (because these are the executives who are better able to bear the associated risk), any observed relationship between executive incentives and certain tax characteristics (e.g., tax aggressiveness) could be a result of differences in executive risk-tolerance rather than differences in the observed incentives.

relatively high and relatively low level of tax director compensation, respectively, and -

0.019 and -0.011 for tax director compensation mix, respectively, are economically

significant.

To provide a benchmark of the magnitude of our *GAAP ETR* results, we also

provide the propensity score matched-pair analysis for *Cash ETR*.[38] The *Cash ETR*

results in Panel B show that none of the incentives variables exhibits a significant

relationship with the *Cash ETR*. These results are consistent with the linear regressions

results presented above and suggest that the relationship is robust to possible

misspecification of the functional form linking the incentive and control variables with

the tax outcomes.

Similar to all observational studies, our results are susceptible to "hidden bias" if

there are correlated omitted variables that are not balanced across the two categories.

Rosenbaum (2002, 2007) develops a bounding approach for assessing the sensitivity of

the matched-pair results to hidden bias.[39] In untabulated sensitivity analysis, we find that

the results remain statistically significant to the existence of a correlated omitted variable

that shifts the assignment of executives to the treatment group from a 50%/50%

probability of being assigned to the high- and low-incentives categories to a

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[38] Note that a similar propensity score matched-pair analysis of *BTG*, *SHELTER*, and *DTAX* provides no evidence that any of these tax attributes exhibits a significant relationship with executive incentive compensation.

[39] In our context, hidden bias exists if two executive (denoted *i* and *j*) have the same observed (economic and tax planning) covariates, but different probabilities (denoted π) of having a particular level of incentives. The odds that each executive was assigned to the high- and low-incentives category are denoted $\pi_i/(1-\pi_i)$ and $\pi_j/(1-\pi_j)$, respectively. If the odds ratio (following Rosenbaum (2002), denoted by Γ), does not equal one, then the two executives have an unequal probability of being assigned to a category, and hidden bias exists. Rosenbaum (2002) shows that relaxing the assumption that $\Gamma = 1$ allows for a computation of the amount of hidden bias (or, the strength of a correlated omitted variable) that is needed to alter any significant inferences. Smaller values of Γ indicate statistically significant results that are more sensitive to hidden bias.

66.5%/33.5% probability assignment.[40] Thus, our results are robust to substantive correlated omitted variables, and this provides some justification for drawing causal inferences regarding the relationship between tax director incentives and *GAAP ETRs*.

8. Conclusion

Although tax directors are responsible for one of the firm's largest outflows of cash and one of the largest expenses on the income statement, almost nothing is known about how these executives are compensated. To the best of our knowledge, this is the first paper to directly study the link between the incentives of tax directors and measures of the extent of their firm's tax planning. Overall, our analyses of the book-tax gap, its components, the cash effective tax rate, and alternative measures of "tax aggressiveness" provide little evidence that our sample of large, publicly traded firms explicitly incentivize their tax function to undertake measures to lower the firm's contemporaneous cash tax burden. Instead, consistent with tax directors receiving incentives to reduce the level of tax expense reported in the financial statements, we find that tax executives' compensation is negatively associated with the *GAAP ETR*. An agency theoretic interpretation of this result is that the *GAAP ETR* is relatively controllable by the tax director and can be measured with sufficient precision so as to make it valuable for

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[40] In other words, the statistical tests conducted in Table 7 are based on the assumption that, conditional on the variables in the propensity score model, executives have a 50% probability of being assigned to both the treatment and control groups (i.e., the high- and low-incentives groups). If instead, because of some correlated omitted variable (e.g., executive risk tolerance), executives with a higher observed level of incentive compensation were actually assigned to the treatment group 66.5% of the time and assigned to the control group only 33.5% of the time (or $\Gamma = 2$), a statistically significant difference in the *GAAP ETR* between the two groups would still obtain. Since no strict benchmark exists to determine whether a given Γ is "large" or "small," the designation is inherently subjective and depends on beliefs as to the degree of endogenous selection on unobservable factors. Given the extensive controls included in the propensity score matching, we believe that it is unlikely that a correlated omitted variable exists that will produce a $\Gamma > 2$.

contracting. In contrast, the firm's other tax attributes are either not sufficiently controllable by the tax director and/or are too noisy to be valuable for contracting.

As with all empirical observational studies, there are several caveats regarding our results. First, our sample consists primarily of large profitable U.S. domiciled, multinational firms. Accordingly, our results may not generalize to smaller firms. Second, the firms in our sample are known to have (highly paid) tax directors. Clearly, the presence of a tax director is *prima facie* evidence of these firms undertaking some activity incremental to the duties of the top management team. Therefore, our results do not imply that the CEO or CFO is never responsible for the firm's tax planning function, but only that this link is attenuated in the presence of a tax director. Third, like almost all prior incentives research, we are unable to directly observe the tax directors' compensation contracts. Therefore, we do know with certainty the precise mechanism(s) through which his or her incentives are generated which, in turn, makes causality difficult to establish. Fourth, we only investigate the monetary incentives provided to tax directors. Tax directors' (and other executives') employment might be contingent on some other measure of tax planning (e.g., *Cash ETR*), but the nature of our data inhibits our ability to study termination as an incentive mechanism. Finally, we cannot directly observe tax planning, so our measures of tax planning undoubtedly include measurement error.

References

Armstrong, C.S., A.D. Jagolinzer, and D.F. Larcker, 2009. Chief executive officer equity incentives and accounting irregularities. *Journal of Accounting Research* 48, 225-271.

Armstrong, C.S., W.R. Guay, and J.P. Weber, 2010. The role of information and financial reporting in corporate governance and contracting. *Journal of Accounting and Economics* 50, 179-234.

Ayers, B., J. Jiang, and P. Yeung. 2006. Discretionary accruals and earnings management: An analysis of pseudo earnings management. *The Accounting Review* 81(3), 617-652.

Badertscher, B., J. Phillips, M. Pincus, and S. Rego, 2009. Earnings management strategies and the trade-off between tax benefits and detection risk: To conform or not to conform? *The Accounting Review* 84(1), 63-97.

Banker, R.D., and S.M. Datar, 1989. Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research* 27, 21-39.

Bebchuk, L.A., and A. Cohen, 2005. The costs of entrenched boards. *Journal of Financial Economics* 78, 409-433.

Bebchuk, L.A., J.C. Coates IV, and G. Subramanian, 2002. The powerful antitakeover force of staggered boards: theory, evidence, and policy. *Stanford Law Review* 54, 887-951.

Boynton, C., P. DeFilippes, and E. Legel, 2005. Prelude to Schedule M-3: Schedule M-1 corporate book-tax difference data 1990-2003. *Proceedings of the Annual Conference on Taxation*. National Tax Association: 131-137.

Bushman, R., Q. Chen, E. Engel, and A. Smith, 2004. Financial accounting information, organizational complexity, and corporate governance systems. *Journal of Accounting and Economics* 37: 167-201.

Chen, K., and C. Chu, 2005. Internal control versus external manipulation: a model of corporate income tax evasion. *RAND Journal of Economics* 36(1): 151-164.

Cheng, S., V. Nagar, and M. Rajan, 2004. Identifying control motives in managerial ownership: Evidence from antitakeover legislation. *Review of Financial Studies* 18, 637-672.

Cloyd, B., J. Pratt, and T. Stock, 1996. The use of financial accounting choice to support aggressive tax positions: Public and private firms. *Journal of Accounting Research* 34(1): 23-43.

Core, J., R. Holthausen, and D. Larcker, 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51, 371-406.

Core, J.E., and W.R. Guay, 1999. The use of equity incentives to manage optimal equity incentive levels. *Journal of Accounting and Economics* 28, 151-184.

Core, J.E., and W.R. Guay, 2002. Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research* 40, 613-630.

Crocker, K., and J. Slemrod, 2005. Corporate tax evasion with agency costs. *Journal of Public Economics* 89, 1593-1610.

Cronqvist, H., A. Low, and M. Nilsson, 2007. Does corporate culture matter for firm policies? Working Paper, The Ohio State University.

Daines, R., and M. Klausner, 2001. Do IPO charters maximize firm value? Antitakeover protection in IPOs. *Journal of Law, Economics, and Organization* 17, 83-120.

Derigs, U., 1988. Solving non-bipartite matching problems via shortest path techniques. *Annals of Operations Research* 13, 225-261.

Desai, M. 2003. The divergence between book and tax income. Poterba, J.M. (ed.), *Tax Policy and the Economy*, Volume 17, Cambridge, Mass.: NBER and MIT Press, 169-206.

Desai, M., and D. Dharmapala. 2006. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics* 79, 145-179.

Dutta, S., and S. Reichelstein, 2003. Leading indicator variables, performance measurement, and long-term versus short-term contracts. *Journal of Accounting Research* 41, 837-866.

Dyreng, S., M. Hanlon, and E. Maydew, 2008. Long-run corporate tax avoidance. *The Accounting Review* 83(1), 61-82.

Dyreng, S., M. Hanlon, and E. Maydew, 2010. The effects of managers on corporate tax avoidance. *The Accounting Review* 85(4), 1163-1189.

Engel, E., M. Erickson, and E. Maydew, 1999. Debt-to-equity hybrid securities. *Journal of Accounting Research* 37(2), 249-274.

Erickson, M., M. Hanlon, and E. Maydew, 2004. How much will firms pay for earnings that do not exist? Evidence of taxes paid on allegedly fraudulent earnings. *The Accounting Review* 79(2), 387-408.

Erickson, M., M. Hanlon, and E. Maydew, 2006. Is there a link between executive equity incentives and accounting fraud? *Journal of Accounting Research* 44(1), 113-143.

Faleye, O., 2007. Classified boards, firm value, and managerial entrenchment. *Journal of Financial Economics* 83, 501-529.

Feng, M., W. Ge, S. Luo, and T. Shevlin, 2009. Why do CFOs become involved in material accounting manipulations? Working Paper, University of Washington.

Frank, M.M., L. Lynch, and S. Rego, 2009. Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review* (84)2, 467-496.

Gompers, P., J. Ishii, and A. Metrick, 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* 118, 107-155.

Graham, J., J. Raedy and D. Shackelford, 2010. Research in accounting for income taxes. Working Paper, University of North Carolina.

Graham, J., and A. Tucker, 2006. Tax shelters and corporate debt policy. *Journal of Financial Economics* 81, 563-594.

Gupta, S., and K. Newberry, 1997. Determinants of the variability in corporate effective tax rates: evidence from longitudinal data. *Journal of Accounting and Public Policy* 16, 1-34.

Hanlon, M., 2005. The persistence and pricing of earnings, accruals, and cash flows when firms have large book-tax differences. *The Accounting Review* 80(1), 137-166.

Hanlon, M., and S. Heitzman, 2010. A review of tax research. *Journal of Accounting and Economics* 50, 127-178.

Holmstrom, B., 1979. Moral hazard and observability. *Bell Journal of Economics* 10(1), 74-91.

Ittner, C., R. Lambert, and D. Larcker, 2003. The structure and performance consequences of equity grants to employees of new economy firms. *Journal of Accounting and Economics* 34(1-3), 89-127.

Internal Revenue Service, 2009. *Internal Revenue Service Data Book, 2008*. Publication 55B, Washington, D.C.

Internal Revenue Service. 2010. *Internal Revenue Service Data Book, 2009*. Publication 55B, Washington, D.C.

Jacob, J. 1996. Taxes and transfer pricing: Income shifting and the volume of intrafirm transfers. *Journal of Accounting Research* 34(2), 301-311.

Jiang, J., K. Petroni, and I. Wang, 2010. CFOs and CEOs: Who have the most influence on earnings management? *Journal of Financial Economics* 96, 513-526.

Lambert, R.A., 2001. Contracting theory and accounting. *Journal of Accounting and Economics* 32, 3-87.

Lambert, R.A., and D.F. Larcker, 1987. An analysis of the use of accounting and market measures of performance in executive compensation contracts. *Journal of Accounting Research* 25, 85-125.

Mackie-Mason, J. 1990. Do taxes affect corporate financing decisions? *Journal of Finance* 45(5), 1471-1493.

McGill, G., and E. Outslay, 2004. Lost in translation: Detecting tax shelter activity in financial statements. *Tax Notes* 96(8), 1125-1146.

Mills, L. 1998. Book-tax differences and Internal Revenue Service adjustments. *Journal of Accounting Research* 36(2), 343-356.

Mills, L., M. Erickson, and E. Maydew, 1998. Investments in tax planning. *Journal of the American Taxation Association* 20, 1-20.

Oler, M., T. Shevlin, and R. Wilson, 2007. Examining investor expectations concerning tax saving on repatriations of foreign earnings under the American Jobs Creation Act of 2004. *Journal of the American Taxation Association* 29(2), 25-55.

Omer, T.Z., Molloy, K.H., Ziebart, D.A., 1993. An investigation of the firm size/effective tax rate relationship in the 1980s. *Journal of Accounting, Auditing and Finance* 8(2), 167-182.

Phillips, J., 2003. Corporate tax-planning effectiveness: The role of compensation-based incentives. *The Accounting Review* 78(3), 847-874.

Phillips, J., M. Pincus, and S. Rego, 2003. Earnings management: New evidence based on deferred tax expense. *The Accounting Review* 78(2), 491-521.

Prendergast, C., 2002. The tenuous trade-off between risk and incentives. *The Journal of Political Economy* 110(5), 1071-1073.

Rego, S., and R. Wilson, 2010. Executive compensation, equity risk incentives, and corporate tax aggressiveness. Working Paper, University of Iowa.

Rego, S.A., 2003. Tax avoidance activities of U.S. multinational corporations. *Contemporary Accounting Research* 20, 805-833.

Richardson, S., 2006. Over-investment of free cash flow. *Review of Accounting Studies* 11(2-3), 159-189.

Robinson, J.R., S.A. Sikes, and C.D. Weaver, 2010. The impact of evaluating the tax function as a profit center on effective tax rates. *The Accounting Review* 85(3), 1035-1064.

Rosenbaum, P., and D. Rubin, 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* 70, 41-55.

Rosenbaum, P.R., 2007. Sensitivity analysis for m-estimates, tests, and confidence intervals in matched observational studies. *Biometrics* 63, 456-464.

Rosenbaum, P.R., 2002. *Observational Studies*, 2nd ed. Springer Series in Statistics, Berlin.

Seidman, J., 2010. Interpreting the book-tax income gap as earnings management or tax sheltering, Working Paper, University of Texas.

Slemrod, J., 2004. The economics of corporate tax selfishness. *National Tax Journal* 57(4), 877-899.

Tax Executives Institute, Inc. 2004-2005 Corporate Tax Department Survey. Tax Executives Institute, Inc., Washington D.C.

U.S. Department of the Treasury. 1999. The problem of corporate tax shelters: discussion, analysis and legislative proposals. U.S. Government Press, Washington, D.C.

Wahal, S., K.W. Wiles, and M. Zenner, 1995. Who opts out of state antitakeover provisions? The case of Pennsylvania's SB 1310. *Financial Management* 24, 22-39.

Wilson, R., 2009. An examination of corporate tax shelter participants. *The Accounting Review* 84(3), 969-999.

Zellner, A., 1962. Estimators for seemingly unrelated regression equations: some finite sample results. *Journal of the American Statistical Association* 58, 977-992.

Zimmerman, J., 1983. Taxes and firm size. *Journal of Accounting and Economics* 5, 119-149.

Appendix A: Variable Definitions

Variable	Definition	Source and Data Codes
Total CEO Compensation, Total Tax Director Compensation, Total GC Compensation, and *Total CFO Compensation*	Total annual compensation of the CEO, Tax Director, General Counsel, and CFO, respectively, where total annual compensation is defined as the sum of salary, bonus, the market value of target long-term incentive payouts, perquisites, the market value of restricted stock, and the risk-neutral (Black-Scholes) value of stock options received during the year (with a 70% discount applied to the time to maturity).	Proprietary compensation consultant data
CEO Compensation Mix, Tax Director Compensation Mix, GC Compensation Mix, and *CFO Compensation Mix*	Ratio of variable compensation (i.e., bonus, restricted stock, and stock options) to total compensation.	Proprietary compensation consultant data
CEO Bonus Mix, Tax Director Bonus Mix, GC Compensation Mix, and *CFO Bonus Mix*	Ratio of the annual bonus to total compensation.	Proprietary compensation consultant data
Book-Tax Gap (BTG)	Difference between pre-tax book income and taxable income.	Compustat PI less TXFED/0.35 less PIFO plus ΔTLCF
Scaled Book-Tax Gap	*Book-Tax Gap* scaled by average *Total Assets*.	Compustat *BTG* divided by average AT
GAAP ETR	The GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income.	Compustat TXT / PI
Current ETR	Current effective tax rate defined as total income tax expense less deferred income tax expense scaled by pre-tax income.	Compustat ((TXT – TXDI) / PI)
Deferred ETR	Deferred effective tax rate defined as deferred income tax expense scaled by pre-tax income.	Compustat (TXDI / PI)
Cash ETR	The cash effective tax rate for the year defined as the sum of total income taxes paid and the tax benefit of stock options scaled by pre-tax income.	Compustat ((TXPD + (TXBCO + TXBCOF)) / PI)

Cash ETR (w/o Option Benefit)	Cash effective tax rate excluding the tax benefit of stock options.	Compustat TXPD/ PI
Cash ETR (3 Year)	Three-year Cash ETRs.	3 years leading
Pre-Tax Book Income	Pre-tax income less minority interest.	Compustat PI – MII
Taxable Income	Current federal tax expense grossed up by the maximum federal statutory tax rate plus foreign pre-tax income less the change in the firm's net operating loss carryforward.	Compustat TXFED/0.35 + PIFO - ΔTLCF
Taxable Income (Less Option Benefit)	Taxable income less the tax benefit of stock options grossed up by 35%.	TXFED/0.35 – (TXBCO + TXBCOF)/0.35 + PIFO - ΔTLCF
Cash Flow From Operations	Operating cash flows.	Compustat OANCF
Tax Benefit of Stock Options	The tax benefit of stock options not included in income.	Hand collection from 2002 to 2004, Compustat TXBCO + TXBCOF 2005 and 2006
DTAX	Modified discretionary permanent differences and ETR differentials as defined in Frank et al. (2009) and modified with the inclusion of estimated foreign assets.	Compustat
SHELTER	Probability that the firm engages in a tax shelter as defined in Wilson (2009).	Compustat *Tax Shelter* = - 4.86 + 5.20*BookTax Differences* + 4.08*Discretionary Accruals* - 1.41*Leverage* + 0.76*Size* + 3.51*ROA* + 1.72*ForeignIncome* + 2.42*R&D*
Market-to-Book Ratio	Market capitalization over the book value of Total Shareholders' Equity.	Compustat (CSHO * PRCC_F) / (AT – LT)
Market Capitalization	The number of common shares outstanding multiplied by the price per share at the fiscal-year end.	Compustat CSHO * PRCC_F
Revenue	Total net sales.	Compustat SALE
Return on Assets	Net income (or loss) scaled by beginning total assets.	Compustat NI_t / AT_{t-1}

Prior Year's Return	Cumulative return on the firm's stock price over the previous year.	CRSP RET
Std. Dev. ROA	Standard deviation of Return on Assets over the previous five fiscal years.	Std dev(Compustat NI_t / AT_{t-1})
Prior Year's Volatility	The volatility of the firm's monthly stock returns over the previous year.	CRSP RET
Leverage	Long-term debt over total assets.	Compustat LT / AT
Change in Goodwill	The annual change in goodwill if greater than 0; otherwise 0.	Compustat (ΔGDWL/ Avg AT)
New Investment	The annual investment as described in Richardson (2007) and defined as Research and Development expense plus Capital Expenditures plus Acquisitions minus Sale of Property minus Depreciation all scaled by average Total Assets.	Compustat ((XRD + CAPX + ACQ – SPPE – DPC) / Avg. AT)
Foreign Assets	Estimated foreign assets using the methodology described in Oler et al. (2007) over Total Assets.	Compustat
Geographic Complexity	Estimated as the revenue-based Hirfindahl-Hirschman indices calculated as the sum of the squares of each geographic segment's sales as a percentage of the total firm sales as described in Bushman et al. (2004).	Compustat
Industry Complexity	Estimated as the revenue-based Hirfindahl-Hirschman indices calculated as the sum of the squares of each industry segment's sales as a percentage of the total firm sales as described in Bushman et al. (2004).	Compustat
Audit Fees	Total annual audit fees (in $millions) paid by the firm.	Audit Analytics
Tax Fees	Total annual tax fees (in $millions) paid by the firm over total assets.	Audit Analytics
Proportion Tax Fees	Total annual tax fees (in $millions) paid by the firm over audit fees.	Audit Analytics

All compensation and control variables are measured as of time *t* except where specified. Dependent variables (ETRs, taxable income, BTG, etc.) are computed at time *t*+1.

Table 1

Panel A: Industry Composition of Sample

| | Proprietary Sample | | Compustat | |
Industry	Number	Frequency	Number	Frequency
1. Mining and Construction	23	1.98%	1,263	2.75%
2. Food	82	7.06%	859	1.87%
3. Textiles, Printing, and Publishing	74	6.37%	1,568	3.42%
4. Chemicals	80	6.88%	955	2.08%
5. Pharmaceuticals	57	4.91%	2,719	5.93%
6. Extractive Industries	36	3.10%	1,686	3.67%
7. Durable Manufacturers	277	23.84%	12,518	27.28%
8. Computers	28	2.41%	2,338	5.09%
9. Transportation	43	3.70%	2,907	6.33%
10. Utilities	72	6.20%	1,797	3.92%
11. Retail	137	11.79%	3,595	7.83%
12. Financial Institutions	174	14.97%	6,806	14.83%
13. Insurance and Real Estate	59	5.08%	2,096	4.57%
14. Services	2	0.17%	3,862	8.42%
15. Other	18	1.55%	920	2.00%
Total	1,162	100%	45,889	100.00%

This table presents the industry classification of the proprietary sample and the Compustat database over the 2002 to 2006 period. The number and frequency of the 1,162 sample firm-year observations and the Compustat database from 2002 to 2006 are reported according to their industry classification following Barth et al. (1998).

Panel B: Proportion of Sample Tax Expense and Cash Paid for Taxes

	Ratio of Proprietary Sample to Compustat			Ratio of Proprietary Sample in S&P500 to Total S&P500			
	Assets	Tax Expense	Cash Paid for Taxes	# of Firms	Assets	Tax Expense	Cash Paid for Taxes
2002	31.07%	36.05%	34.61%	50.80%	64.78%	64.67%	62.96%
2003	30.32%	32.55%	32.09%	50.80%	64.64%	61.35%	62.55%
2004	29.03%	28.35%	32.94%	51.20%	64.19%	58.61%	60.72%
2005	28.84%	28.93%	36.27%	50.60%	62.51%	57.43%	58.26%
2006	28.09%	28.45%	33.86%	49.20%	60.83%	55.26%	56.28%

Columns (1) to (3) of this table present the ratio of total assets (TA), total tax expense (TXT), and total cash paid for taxes (TXPD) for the proprietary sample to the total Compustat population of firms with data available, respectively. Columns (4) to (7) present the percentage of the S&P 500 firms in the proprietary sample, and the ratio of total assets (TA), total tax expense (TXT), and total cash paid for taxes (TXPD) for the S&P 500 firms in the proprietary sample to all S&P 500 firms.

Table 2
Descriptive Statistics

	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Compensation Variables					
Total CEO Compensation	13,662,000	9,839,090	13,722,377	4,670,010	17,645,995
Total Tax Director Compensation	787,727	558,714	695,740	340,909	974,043
Total GC Compensation	2,114,037	1,355,193	2,200,675	758,726	2,642,015
Total CFO Compensation	1,178,060	888,292	980,002	550,343	1,445,396
CEO Compensation Mix	0.848	0.902	0.161	0.823	0.939
Tax Director Compensation Mix	0.593	0.629	0.205	0.483	0.747
GC Compensation Mix	0.718	0.762	0.183	0.644	0.848
CFO Compensation Mix	0.682	0.722	0.181	0.604	0.811
CEO Bonus Mix	0.133	0.105	0.120	0.056	0.182
Tax Director Bonus Mix	0.138	0.128	0.090	0.078	0.189
GC Bonus Mix	0.138	0.119	0.103	0.069	0.188
CFO Bonus Mix	0.139	0.127	0.098	0.075	0.190
Tax Variables					
Book-Tax Gap	274	67	2,153	-41	358
Scaled Book-Tax Gap	0.050	0.016	0.340	0.000	0.043
GAAP ETR	0.297	0.313	0.148	0.246	0.358
Cash ETR	0.287	0.233	0.262	0.123	0.338
Cash ETR (w/o Option Benefit)	0.283	0.230	0.262	0.118	0.333
Cash ETR (3 Year)	0.331	0.267	0.274	0.179	0.356
Pre-Tax Book Income	1,838	683	3,730	187	1,791
Taxable Income (Less Option Benefit)	1,270	446	3,178	96	1,387
Taxable Income	1,397	470	2,984	104	1,419
Cash Flow From Operations	2,283	796	4,126	271	2,140
Tax Benefit of Stock Options	44.50	0.00	374.27	0.00	11.90
DTAX	0.102	0.010	0.478	-0.015	0.075
SHELTER	0.941	0.981	0.114	0.946	0.994
Financial Variables					
Market-to-Book Ratio	3.38	2.42	3.39	1.62	3.79
Market Capitalization	23,555	9,173	42,365	3,060	21,329
Revenue	17,817	8,211	31,817	3,183	17,854
Return on Assets	0.052	0.049	0.066	0.016	0.090
Prior Year's Return	0.093	0.128	0.329	-0.021	0.257
Std. ROA	0.159	0.128	0.144	0.065	0.203
Prior Year's Volatility	0.008	0.004	0.014	0.002	0.008
Leverage	0.202	0.184	0.132	0.104	0.285
Additional Control Variables					
Change in Goodwill	0.027	0.001	0.072	0.000	0.014
New Investment	0.038	0.020	0.065	0.001	0.055
Foreign Assets	0.268	0.166	0.313	0.000	0.458
Geographic Complexity	0.730	0.853	0.298	0.462	1.000
Industry Complexity	0.657	0.773	0.368	0.314	1.000
Audit Fees	7,154	4,140	11,289	1,963	8,127
Tax Fees	0.159	0.067	0.221	0.013	0.222
Proportion Tax Fees	0.183	0.137	0.164	0.050	0.271

This table presents descriptive statistics for the sample of 985 firm-year observations for which we have all of the variables in the table. All variables are as defined in Appendix A.

Table 3

Determinants of the GAAP and Cash Effective Tax Rates

	GAAP ETR					Cash ETR			
	Compensation Level		Compensation Mix			Compensation Level		Compensation Mix	
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
Intercept	0.411***	0.461***	0.205***	0.213***		0.260	0.354**	0.234***	0.204***
	(3.09)	(4.26)	(2.90)	(3.17)		(1.54)	(2.33)	(2.76)	(2.65)
CEO Incentives	-0.001		0.010			-0.014		-0.107	
	(-0.09)		(0.21)			(-1.55)		(-1.59)	
Tax Director Incentives	-0.028***	-0.024***	-0.075**	-0.064*		-0.023	-0.015	-0.040	-0.010
	(-2.70)	(-2.78)	(-2.20)	(-1.95)		(-1.36)	(-1.11)	(-0.62)	(-0.21)
General Counsel Incentives	0.001		-0.008			0.011		0.016	
	(0.12)		(-0.17)			(1.12)		(0.23)	
CFO Incentives	0.008		0.019			0.022		0.118	
	(0.87)		(0.42)			(1.43)		(1.62)	
Return on Assets	0.343***	0.347***	0.371***	0.374***		0.264**	0.272**	0.267**	0.289**
	(3.67)	(3.72)	(3.95)	(4.05)		(2.21)	(2.26)	(2.23)	(2.42)
Std. Dev. ROA	-0.089**	-0.09**	-0.091**	-0.092**		-0.118***	-0.113***	-0.116***	-0.115***
	(-2.53)	(-2.52)	(-2.56)	(-2.57)		(-3.14)	(-3.03)	(-3.07)	(-3.07)
Log(Market Cap)	0.008	0.009	0.005	0.005		0.003	0.004	-0.001	-0.001
	(1.20)	(1.44)	(0.81)	(0.89)		(0.37)	(0.50)	(-0.12)	(-0.08)
Leverage	-0.018	-0.017	-0.021	-0.021		-0.022	-0.019	-0.024	-0.021
	(-0.34)	(-0.32)	(-0.41)	(-0.41)		(-0.32)	(-0.28)	(-0.34)	(-0.30)
Change in Goodwill	-0.027	-0.026	-0.025	-0.025		0.196*	0.199*	0.190	0.201*
	(-0.49)	(-0.47)	(-0.45)	(-0.45)		(1.70)	(1.73)	(1.64)	(1.74)
New Investment	0.074	0.074	0.081	0.082		-0.362***	-0.362***	-0.354***	-0.361***
	(0.82)	(0.83)	(0.90)	(0.93)		(-3.24)	(-3.23)	(-3.14)	(-3.26)
Foreign Assets	0.037*	0.036*	0.037*	0.037*		0.018	0.019	0.017	0.019
	(1.83)	(1.85)	(1.86)	(1.86)		(0.76)	(0.83)	(0.71)	(0.81)
Geographic Complexity	0.095***	0.093***	0.095***	0.094***		0.044	0.041	0.040	0.042
	(3.68)	(3.58)	(3.64)	(3.63)		(1.34)	(1.22)	(1.23)	(1.26)
Industry Complexity	-0.005	-0.004	0.000	0.000		0.006	0.008	0.009	0.010
	(-0.30)	(-0.23)	(0.00)	(0.03)		(0.30)	(0.37)	(0.43)	(0.48)
Proportion Tax Fees	-0.042	-0.044	-0.052*	-0.053*		-0.044	-0.050	-0.046	-0.055
	(-1.34)	(-1.41)	(-1.66)	(-1.67)		(-1.09)	(-1.21)	(-1.14)	(-1.36)
Tax Fees	0.012	0.014	0.022	0.022		0.062	0.064	0.063	0.069
	(0.27)	(0.31)	(0.49)	(0.49)		(0.95)	(0.98)	(0.97)	(1.06)
Nobs	985	985	985	985		985	985	985	985
Adjusted R^2	12.7%	12.6%	12.3%	12.3%		9.4%	8.9%	9.2%	8.7%

This table presents the estimates of equation (1) where the dependent variable is either the *GAAP ETR* or the *Cash* ETR. *GAAP ETR* is the financial effective tax rate for the year defined as total income tax expense scaled by pre-tax income (Compustat TXT / PI). *Cash ETR* is the cash effective tax rate for the year defined as the sum of total income taxes paid and the tax benefit of stock options scaled by pre-tax income ((TXPD + (TXBCO + TXBCOF)) / PI). *Incentives* for the CEO, tax director, general counsel, and CFO are measured as either *Compensation Level* (i.e., the natural logarithm of total annual compensation) or *Compensation Mix* (i.e., the ratio of variable compensation to total compensation). The remaining variables are as defined in Appendix A. Year and industry indicators are included but unreported. *t*-statistics calculated using robust standard errors (based on two-way clustering by firm and year) are reported in parentheses below the coefficient estimates. *, **, and *** denote statistical significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Table 4

Determinants of the Book-Tax Gap and Components

	Compensation Level				Compensation Mix			
	BTG	PBI	TI	Diff	BTG	PBI	TI	Diff
Intercept	0.183*	-0.110*	-0.14**	0.240	0.100	-0.117***	-0.091**	0.470
	(1.78)	(-1.74)	(-2.00)	(0.63)	(1.39)	(-2.86)	(-2.19)	(0.49)
CEO Incentives	-0.001	-0.004	-0.003	0.020	-0.045	-0.033**	-0.013	0.970
	(-0.17)	(-1.36)	(-1.34)	(0.90)	(-0.94)	(-1.98)	(-0.62)	(0.32)
Tax Director Incentives	-0.007	-0.006	0.002	3.340	-0.033	-0.001	0.027	3.910
	(-1.08)	(-1.46)	(0.45)	(0.07)	(-1.31)	(-0.06)	(1.62)	(0.05)
General Counsel Incentives	0.003	0.003	0.001	0.390	0.055*	0.013	-0.018	3.700
	(0.85)	(1.11)	(0.44)	(0.53)	(1.81)	(0.81)	(-1.04)	(0.05)
CFO Incentives	-0.004	0.005	0.004	0.100	0.008	0.033*	0.019	0.730
	(-0.74)	(1.42)	(1.08)	(0.76)	(0.24)	(1.91)	(1.11)	(0.39)
Operating Cash Flow	0.155*	0.836***	0.591***	17.250	0.153*	0.839***	0.593***	17.450
	(1.85)	(11.99)	(11.22)	(0.00)	(1.80)	(12.37)	(11.16)	(0.00)
Std. Dev. ROA	0.020	0.012	-0.002	0.370	0.019	0.012	-0.001	0.350
	(0.56)	(0.42)	(-0.11)	(0.54)	(0.54)	(0.43)	(-0.05)	(0.56)
Log(Market Cap)	0.002	0.014***	0.007***	3.910	0.001	0.012***	0.007***	3.540
	(0.70)	(3.96)	(3.05)	(0.05)	(0.19)	(4.23)	(3.04)	(0.06)
Leverage	-0.014	-0.016	-0.037*	0.840	-0.016	-0.015	-0.035*	0.790
	(-0.36)	(-0.64)	(-1.77)	(0.36)	(-0.44)	(-0.62)	(-1.69)	(0.37)
Change in Goodwill	0.065	-0.042	-0.067*	0.650	0.063	-0.044	-0.068*	0.620
	(1.21)	(-1.18)	(-1.72)	(0.42)	(1.15)	(-1.22)	(-1.73)	(0.43)
New Investment	-0.062	0.091	0.089*	0.000	-0.061	0.089	0.088*	0.000
	(-0.90)	(1.51)	(1.81)	(0.97)	(-0.88)	(1.46)	(1.76)	(0.98)
Foreign Assets	0.000	0.020	0.011	0.890	-0.002	0.019	0.011	0.800
	(0.00)	(1.56)	(0.93)	(0.35)	(-0.12)	(1.63)	(1.00)	(0.37)
Geographic Complexity	0.024	0.036***	0.016	1.770	0.024	0.036**	0.017	1.710
	(1.10)	(2.73)	(0.96)	(0.18)	(1.13)	(2.49)	(0.96)	(0.19)
Industry Complexity	-0.068*	-0.040*	0.010	6.550	-0.069*	-0.041*	0.010	6.600
	(-1.96)	(-1.89)	(0.44)	(0.01)	(-1.91)	(-1.83)	(0.38)	(0.01)
Proportion Tax Fees	0.000	0.031**	0.026*	0.170	0.002	0.031**	0.025*	0.240
	(0.02)	(2.03)	(1.84)	(0.68)	(0.08)	(2.18)	(1.73)	(0.62)
Tax Fees	0.016	-0.004	-0.003	0.030	0.016	-0.004	-0.003	0.010
	(1.12)	(-0.50)	(-0.36)	(0.86)	(1.16)	(-0.46)	(-0.37)	(0.92)
Nobs	985	985	985		985	985	985	
Adjusted R²	7.6%	60.8%	50.1%		8.0%	60.8%	50.3%	

This table presents the estimates of equation (2) where the dependent variable in the first column is the *Book-Tax Gap* (*BTG*). The second and third columns present results when the *Book-Tax Gap* is disaggregated into its two components, *Pre-Tax Book Income* (*PBI*) and *Taxable Income* (*TI*), and the equations are jointly estimated using Seemingly Unrelated Regression. The fourth column, *Diff,* presents the results of a chi-square test of the difference between the estimated coefficients in the *PBI* and *TI* models. *Incentives* for the CEO, tax director, general counsel, and CFO are measured as either the natural logarithm of total compensation or compensation mix. The remaining variables are as defined in Appendix A. Year and industry indicators are included but unreported. *t*-statistics calculated using robust standard errors (based on two-way clustering by firm and year) are reported in parentheses below the coefficient estimates. *, **, and *** denote statistical significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Table 5

Measures of Tax Aggressiveness (DTAX and Shelter)

	DTAX		Shelter	
Intercept	0.435	0.579	0.523***	0.542***
	(0.74)	(0.84)	(4.53)	(5.68)
CEO Incentives	-0.013		0.001	
	(-0.38)		(0.20)	
Tax Director Incentives	-0.079	-0.072	0.003	0.005
	(-0.83)	(-1.03)	(0.37)	(0.72)
General Counsel Incentives	-0.048		0.005	
	(-1.08)		(1.04)	
CFO Incentives	0.079		-0.002	
	(0.82)		(-0.32)	
Return on Assets	-0.006	0.018	0.183*	0.184*
	(-0.01)	(0.04)	(1.87)	(1.88)
Std. Dev. ROA	-0.317	-0.383	-0.221	-0.216
	(-0.38)	(-0.46)	(-1.64)	(-1.64)
Log(Market Cap)	0.008	0.008	0.033***	0.033***
	(0.23)	(0.21)	(6.08)	(6.32)
Leverage	-0.047	-0.031	-0.073*	-0.074*
	(-0.18)	(-0.12)	(-1.79)	(-1.83)
Change in Goodwill	1.483**	1.489**	0.025	0.025
	(2.23)	(2.25)	(0.54)	(0.53)
New Investment	-1.119*	-1.136*	-0.038	-0.035
	(-1.86)	(-1.89)	(-0.58)	(-0.53)
Foreign Assets	0.032	0.031	0.019	0.019
	(0.23)	(0.22)	(1.07)	(1.08)
Geographic Complexity	0.006	0.003	-0.060**	-0.060**
	(0.04)	(0.02)	(-2.38)	(-2.43)
Industry Complexity	-0.019	-0.020	-0.006	-0.005
	(-0.15)	(-0.15)	(-0.43)	(-0.39)
Proportion Tax Fees	0.586**	0.570**	-0.051	-0.051
	(2.35)	(2.36)	(-1.57)	(-1.57)
Tax Fees	-0.270	-0.274	0.064	0.065
	(-0.92)	(-0.94)	(1.59)	(1.62)
Nobs	985	985	985	985
Adjusted R^2	10.4%	10.1%	41.9%	41.9%

This table presents the estimates of equations (3) and (4) where the dependent variable is either *DTAX* (i.e., excess permanent differences and ETR differentials as defined in Frank et al., 2009 and modified with the inclusion of estimated foreign assets) or *Shelter* (i.e., Wilson's (2009) measure of the probability that the firm engages in a tax shelter). *Incentives* for the CEO, tax director, general counsel, and CFO are measured as the level of total compensation. The remaining variables are as defined in Appendix A. Year and industry indicators are included but unreported. *t*-statistics calculated using robust standard errors (based on two-way clustering by firm and year) are reported in parentheses below the coefficient estimates. *, **, and *** denote statistical significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Table 6

Reverse Regression - Compensation Level

	CEO	Tax	GC	CFO
Intercept	12.617***	10.015***	10.85***	11.041***
	(26.57)	(28.74)	(24.79)	(38.60)
Return on Assets	2.291***	1.829***	2.104***	2.041***
	(4.04)	(4.53)	(4.10)	(5.21)
Std. Dev. ROA	-1.771***	0.317	0.955	-0.374
	(-2.66)	(0.60)	(1.39)	(-0.65)
Log(Market Cap)	0.381***	0.350***	0.294***	0.287***
	(10.99)	(12.55)	(7.73)	(12.55)
Leverage	-0.180	0.018	-0.073	0.066
	(-0.65)	(0.08)	(-0.26)	(0.33)
Change in Goodwill	0.027	-0.045	0.029	0.069
	(0.06)	(-0.17)	(0.07)	(0.24)
New Investment	0.533	0.231	0.557	0.261
	(0.92)	(0.60)	(1.10)	(0.70)
Foreign Assets	-0.046	0.050	0.015	-0.005
	(-0.33)	(0.47)	(0.13)	(-0.05)
Geographic Complexity	-0.197	-0.056	-0.263	-0.212*
	(-1.10)	(-0.39)	(-1.43)	(-1.76)
Industry Complexity	0.184	-0.048	0.134	0.120
	(1.63)	(-0.56)	(1.22)	(1.54)
Proportion Tax Fees	-0.375	0.125	-0.239	-0.315*
	(-1.59)	(0.64)	(-1.00)	(-1.77)
Tax Fees	0.778**	0.093	0.551*	0.36*
	(2.32)	(0.36)	(1.70)	(1.65)
GAAP ETR	-0.138	-0.363***	-0.140	-0.087
	(-0.54)	(-2.63)	(-0.70)	(-0.64)
Cash ETR	0.044	0.123	0.262*	0.155
	(0.25)	(0.98)	(1.71)	(1.33)
GAAP ETR vs. Cash ETR (F-stat)	0.008	4.90**	3.27*	0.64
p-value	0.927	0.027	0.071	0.426
Nobs	985	985	985	985
Adjusted R^2	36.1%	44.9%	31.7%	43.1%

This table presents the estimates of regressing CEO, tax director, general counsel, and CFO incentive compensation on economic determinants of incentive compensation and the *GAAP ETR* and *Cash ETR*. The dependent variables are measured as the natural logarithm of the level of total annual compensation. The remaining variables are as defined in Appendix A. Year and industry indicators are included but unreported. *t*-statistics calculated using robust standard errors (based on two-way clustering by firm and year) are reported in parentheses below the coefficient estimates. The *F*-statistic and associated *p*-value from the test of the equality of the estimated coefficients on *GAAP ETR* and *Cash ETR* are reported. *, **, and *** denote statistical significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Table 7
Propensity Score Matched-Pair Analysis

Panel A: Differences in GAAP ETR

Treatment	Wilcoxon	p-value	t-statistic	p-value	Mean Difference in GAAP ETR	Median Difference in GAAP ETR
CEO Compensation	0.557	0.577	-0.446	0.655	-0.003	0.005
Tax Director Compensation	-4.050***	0.000	-3.519***	0.000	-0.029	-0.018
General Counsel Compensation	0.321	0.749	0.202	0.840	0.001	0.000
CFO Compensation	-0.890	0.373	-0.230	0.818	-0.002	-0.006
CEO Comp Mix	-0.477	0.633	-1.224	0.221	-0.009	0.000
Tax Director Comp Mix	-2.204**	0.028	-2.223**	0.027	-0.019	-0.011
General Counsel Comp Mix	0.275	0.784	0.125	0.901	0.001	0.000
CFO Comp Mix	-1.389	0.165	-0.734	0.463	-0.005	-0.008

Panel B: Differences in Cash ETR

Treatment	Wilcoxon	p-value	t-statistic	p-value	Mean Difference in Cash ETR	Median Difference in Cash ETR
CEO Compensation	0.062	0.951	0.402	0.688	0.005	-0.003
Tax Director Compensation	0.679	0.497	-0.004	0.997	0.000	0.015
General Counsel Compensation	-0.233	0.816	-0.712	0.477	-0.009	0.000
CFO Compensation	0.920	0.357	1.567	0.118	0.020	0.000
CEO Comp Mix	-1.381	0.167	-1.079	0.281	-0.014	-0.009
Tax Director Comp Mix	0.110	0.912	0.180	0.857	0.002	0.000
General Counsel Comp Mix	0.592	0.554	0.687	0.492	0.009	0.000
CFO Comp Mix	0.989	0.323	0.793	0.428	0.010	0.011

This table presents the results of the difference in *GAAP ETR* (Panel A) and *Cash ETR* (Panel B) between the matched pairs of firms for different treatments which are either the level or mix of compensation for the CEO, tax director, general counsel, and CFO. The first column presents the treatment for which we modeled the conditional probability of having a certain level of the treatment (conditional on economic and tax planning characteristics) and then matched firms with the most similar conditional probability of treatment but the largest difference in the observed level of treatment. The second and third columns present a Wilcoxon statistic of the rank-sum difference in the median ETR between the matched pairs of firms and the corresponding p-value (two-sided). The fourth and fifth columns present a t-statistic for a test of the difference in the mean ETR between the matched pairs and the associated p-value (two-sided). The sixth and seventh columns present the mean and median difference in *GAAP ETR* (Panel A) and *Cash ETR* (Panel B) between the matched pairs. *, **, and *** denote statistical significance (two-sided) at the 10%, 5%, and 1% levels, respectively.