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How do CEO incentives affect corporate tax planning and financial reporting of income taxes?

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Abstract We examine how different accounting metrics used to evaluate CEO performance for annual bonuses affect the level of corporate tax planning as well as financial reporting for income taxes. We predict and find that firms using *cash flow* metrics report lower GAAP and cash effective tax rates (ETR) than firms using *earnings* metrics. We also find that firms using after-tax *earnings* metrics report lower GAAP ETRs but similar cash ETRs as firms using pre-tax earnings metrics. Further analyses show that firms using after-tax earnings metrics are more likely to designate foreign earnings as permanently reinvested and have lower discretionary reserves for tax uncertainty. Hence, it appears that both types of firms engage in similar levels of tax planning, but firms evaluating CEOs with after tax-earnings metrics incentivize different financial reporting choices.

Keywords Effective tax rate · Performance metrics · Executive compensation · After-tax compensation

JEL Classification H25 · M41 · M52

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1 Introduction

We exploit a 2006 regulation requiring enhanced disclosure of executive compensation contracts to examine how specific accounting-based performance metrics included in CEO short-term incentive compensation contracts affect corporate tax planning and financial reporting. Understanding the role that specific performance metrics play in corporate tax planning and reporting is important for at least two reasons. First, corporate income taxes are a material cash outflow and expense. In 2013, the average profitable firm in Compustat reported tax expense of $198 million (31.4 % of pre-tax income) and cash taxes paid of $178 million (24.6 % of operating cash flows).[1] Given this materiality, shareholders, regulators and researchers are interested in identifying how executive incentives influence corporate taxes (e.g., Armstrong et al. 2012; Gaertner 2014; Phillips 2003). Second, Graham et al. (2014) report that managers primarily focus on tax strategies that reduce total tax expense with only a secondary interest in strategies that reduce cash outflow. Our study speaks to how CEO incentives influence these decisions.

Despite not being actively involved in the tax function, CEOs influence corporate taxes at their firms (Dyreng et al. 2010).[2] Survey evidence suggests that CEOs care not only about the magnitude of cash taxes but also the impact of tax planning on reported financial income. Graham et al. (2014, pp. 991–992) report that "84 % of publicly traded firms respond that *top management* at their company cares at least as much about (reported tax expense) as they do about cash taxes paid and 57 %… (and says) that increasing earnings per share is an important outcome of a tax planning strategy" (emphasis added). Consistent with Dyreng et al. (2010), this evidence alludes to the role that CEOs play in influencing tax planning and financial reporting of tax expense. Yet there is limited empirical evidence about which factors contribute to CEOs' influence over corporate taxes. For example, despite documenting a CEO fixed effect, Dyreng et al. (2010) find no link between specific CEO traits (e.g., education and background) and corporate tax planning. There is also mixed evidence of how CEO equity incentives affect corporate taxes (e.g., Armstrong et al. 2012; Desai and Dharmapala 2006; Rego and Wilson 2012). Furthermore, we know of no study that examines how compensation incentives affect the reporting of income taxes in the financial statements.

We extend the line of research that examines the effect of executives' incentives on corporate taxes by hand-collecting detailed compensation disclosures to investigate how the inclusion of after-tax cash flow and earnings metrics in CEO short-term incentive contracts affects tax planning and financial reporting decisions. We use short-term bonus contracts tied to specific accounting metrics because we believe they provide a powerful test of CEOs' incentives with respect to corporate

[1] Among 3309 firms with positive pre-tax income, operating cash flows, tax expense, and taxes paid. All values winsorized at 1 %.

[2] Most CEOs do not have a tax background and are not often directly involved in corporate tax planning (Dyreng et al. 2010). However, CEOs provide input for incentivizing and evaluating other executives and managers, such as the CFO and tax director. CEOs also likely align the incentives of subordinates with their own and reward performance that increases their own incentive compensation. Therefore CEO incentives can influence taxes even without direct CEO involvement.

taxes.[3] Nearly all business decisions affect taxes, and therefore any documented association between general CEO incentives (e.g., equity holdings) and taxes could be a byproduct of investing, financing, and operating decisions and not driven by a focus on taxes specifically (Armstrong et al. 2012). Additionally, failure to find an association between CEO incentives and tax planning could stem from noisy measures of incentives, tax planning, or both. Using specific accounting metrics in short-term incentive contracts reduces the noise associated with multi-year performance metrics and allows us to isolate instances where CEOs have clear incremental incentives to lower taxes paid or tax expense. We also use both GAAP and cash effective tax rates (ETR) to disentangle tax planning from financial reporting decisions and to examine how different incentives influence each decision.

As of 2006, the SEC requires companies to disclose the performance metrics used to evaluate executives. We collect these detailed performance metrics for a sample of firms that pay an annual cash bonus to the same CEO every year from 2009 to 2011. Our data therefore spans multiple years under this enhanced disclosure regime and offers a comprehensive sample to address our research questions. For each sample firm, we examine the annual proxy statement to identify the accounting metrics used to determine CEO annual cash bonuses. We note the presence of a metric based on operating cash flow, which is net of taxes paid and therefore considered an after-tax metric. We classify earnings metrics as either pre- or after-tax expense. We use these data to test the effects of cash flow and earnings metrics on both GAAP ETRs and cash ETRs.

We make two direct comparisons. First, we examine how after-tax *cash flow* metrics affect the level of tax planning relative to *earnings* metrics. Tax planning is costly, yet Mills et al. (1998) estimate that it generates a 400 % return on investment. Therefore, despite the costs, many tax planning strategies increase operating cash flows and can thereby help CEOs meet cash flow targets. In contrast, only some tax planning strategies reduce reported tax expense. Hence CEOs evaluated using after-tax earnings metrics have fewer opportunities to use tax planning strategies to meet performance targets. Additionally, implementing costly tax planning does not increase (and may decrease) the chance for CEOs incentivized with pre-tax earnings metrics to achieve their bonuses. We therefore predict that firms incentivizing CEOs with cash flow metrics will engage in more tax planning, all else equal, as reflected in lower cash ETRs. Second, we compare firms using pre-tax and after-tax *earnings* metrics. Based on survey evidence from Graham et al. (2014), we expect firms using after-tax earnings metrics will report lower ETRs than firms using only pre-tax earnings metrics, all else equal. We also examine whether firms using after-tax earnings metrics report lower cash ETRs. These tests allow us to determine whether after-tax earnings metrics incentivize incremental tax planning that reduces cash taxes paid or whether they incentivize only lower *reported* tax expense.

[3] Annual bonus contracts provide incentives to emphasize (de-emphasize) tax planning *incremental* to incentives provided by equity. We control for CEO equity incentives but do not speak to the relative importance of short-term bonus and long-term equity incentives or to cash and stock-based incentives.

After controlling for pre-existing tax planning opportunities and CEO equity incentives, we find that firms using *cash flow* performance metrics in CEO annual bonus compensation report cash ETRs that are 2 % points lower than those firms that do not include cash flow metrics. Additionally, these firms report ETRs that are roughly 1.4 % points lower than firms using earnings metrics. These findings suggest that the presence of cash flow performance metrics encourages reductions in both cash taxes paid and reported tax expense. Among firms exclusively using *earnings* metrics, we estimate firms that include at least one after-tax earnings metric in CEO short-term incentive contracts report ETRs that are approximately 1.5 % points lower than those firms using only pre-tax performance metrics. However, in contrast to Gaertner (2014), we find no evidence that firms using after-tax earnings metrics report lower cash ETRs.[4] These findings suggest that both sets of firms realize the same *level* of cash tax savings but that after-tax firms report lower tax expense. Further analyses reveal that firms using after-tax earnings metrics designate more foreign earnings as permanently reinvested (PRE) and report lower discretionary reserves for tax uncertainty (UTB). Thus it appears that after-tax firms make financial reporting choices that reduce reported tax expense without significantly altering cash taxes paid.

Our study makes several important contributions. First, we extend the literature examining the effects of specific performance metrics in executive compensation contracts (Burns and Kedia 2006; Chen et al. 2014; Core et al. 2003; Indjejikian et al. 2014) by demonstrating how these metrics differentially affect tax planning and financial reporting choices. To our knowledge, we are the first to address the link between short-term bonus incentives and taxes using a broad sample of firms across multiple years. Second, we provide evidence consistent with CEO incentives influencing the relative importance of tax planning activities that generate financial reporting benefits versus those that generate only cash savings (Graham et al. 2014). Specifically, we find that firms using cash flow incentives report both lower cash taxes paid and income tax expense than those using earnings metrics. Given the relative scarcity of firms incentivizing CEOs with cash flow metrics in our sample, this finding should matter to compensation committees when designing contracts to incentivize tax planning. Third, we identify two mechanisms (PRE designations and reserves for tax uncertainty) through which managers reduce reported ETRs without affecting cash taxes paid, thereby providing empirical evidence of the importance CEOs place on reporting low tax expense without necessarily engaging in incremental tax planning (Graham et al. 2011). Finally, we show that, despite its smaller relative magnitude, annual cash incentives influence corporate tax decisions even after controlling for equity compensation.

We organize the remainder of this paper as follows. Section 2 discusses related literature and develops hypotheses. Section 3 details the sample selection and research design. Section 4 presents our main results. Section 5 discusses our supplemental analyses, and Sect. 6 concludes.

[4] Besides performing a battery of tests to support this finding, we attempt to reconcile our results with those of Gaertner (2014). Section 4.2.2 provides details of this process and our findings.

2 Related literature and development of hypotheses

2.1 Prior literature

Given the magnitude of corporate taxes in the U.S., firms have substantial incentives to minimize tax payments. Furthermore, large corporations rarely pay significant penalties when tax planning strategies are overturned by the IRS or the courts (Armstrong et al. 2012). Despite these benefits, we observe substantial cross-sectional variation in income tax avoidance even after holding opportunities for tax planning constant. Recent research demonstrates that shocks to the shareholder base (Cheng et al. 2012) or liquidity (Edwards et al. 2013) can motivate firms to increase their tax planning, thus providing evidence of ex ante underinvestment in tax planning at some firms. Additionally, although Dyreng et al. (2010) do not identify a specific CEO trait related to tax planning, recent studies provide some evidence that overconfident (Chyz et al. 2015) and narcissistic (Olsen and Stekelberg 2015) CEOs influence corporate taxes. Top management's attitude toward taxes is also likely a contributor to this cross-sectional variation, and CEO incentives should play a role in shaping that attitude.

Because corporate tax planning is hidden, shareholders incentivize a desired level by tying managerial compensation to effective tax rates or stock price (Slemrod 2004). Prior studies provide some evidence that *mid-level* managers respond to incentives for tax planning by documenting an association between after-tax performance metrics and lower effective tax rates (Armstrong et al. 2012; Phillips 2003; Robinson et al. 2010). Yet empirical evidence linking *executive* incentives to corporate tax planning is mixed (Armstrong et al. 2012; Desai and Dharmapala 2006; Gaertner 2014; Phillips 2003; Rego and Wilson 2012). One reason for this mixed evidence is that equity incentives provide a noisy measure of incentives for *tax planning* specifically. Stock-based incentives motivate CEOs to increase firm value in general and are often determined using multi-year performance metrics. Because taxes are affected by virtually every business decision, any documented association between CEO equity incentives and taxes could be a byproduct of investing, financing, and operating decisions and not driven by CEO focus on tax planning, per se (Armstrong et al. 2012). On the other hand, failure to find an association between CEO equity incentives and tax planning could stem from noisy measures of incentives, noisy measures of tax planning that are confounded by financial reporting incentives, or both. Thus, consistent with recent research in this area (e.g., Brown et al. 2015; Chen et al. 2014; Hui and Matsunaga 2014; Indjejikian et al. 2014), we propose that performance targets used to determine annual bonuses provide a more powerful setting to examine the link between accounting metrics and CEO behavior. These targets allow us to identify CEOs who have an incentive to focus on taxes that is incremental to equity-based incentives aimed at enhancing overall firm value.

By focusing on short-term bonus incentives, our study is most closely related to those of Phillips (2003) and Gaertner (2014). Using proprietary data for a limited sample of firms, Phillips (2003) finds no association between executives' short-term

incentives and firms' ETR. His results, however, may stem from a lack of power as opposed to a lack of association. His sample also predates the 2006 SEC requirement to disclose metrics used to evaluate executives. This requirement potentially reduces noise in the association between incentives and outcomes by decreasing compensation committees' discretion and holding them accountable for remunerating executives in line with stated performance goals. Gaertner (2014) takes advantage of this disclosure requirement. Using a sample of 354 firms from the S&P 500 in 2010, he provides evidence that the use of after-tax earnings metrics is associated with lower GAAP ETRs and cash ETRs. However, he does not identify or control for the presence of cash flow metrics, and his sample includes firms with CEOs who have limited incentives to engage in tax avoidance, such as financial firms and utilities. Thus it is difficult to disentangle the mechanisms driving his results. Our study differs from Phillips (2003) and Gaertner (2014) by (1) using a larger sample of firms that spans multiple years, (2) separately identifying after-tax earnings and cash flow metrics, and (3) considering the effect of these metrics on both the level of tax planning and financial reporting for taxes.

Our study is also related to that of Brown et al. (2015), who provide evidence that CEOs compensated with after-tax metrics receive higher compensation when they report lower cash ETRs and that tax risk moderates this relation. Whereas Brown et al. (2015) focus on compensation committees' decisions in awarding bonuses, we focus on CEOs' behavior in response to their incentives. We examine how CEOs' incentives influence reported ETRs, which in turn influences compensation outcomes. We therefore view our paper, along with the work of Brown et al. (2015), as providing a more complete picture of how taxes affect incentive compensation.

In summary, the literature provides conflicting evidence about how CEO incentive compensation influences corporate taxes. Our study moves toward reconciling this mixed evidence by identifying specific accounting performance metrics in CEO annual incentives and examining how they affect tax planning and financial reporting across firms.

2.2 Theory and hypotheses

We motivate our hypotheses with a highly simplified example in Exhibit 1. Our example assumes that a profitable firm can engage in two tax planning strategies *incremental* to those already in place.[5] Each strategy requires the firm to incur pretax cost of $100 (e.g., for hiring and incentivizing internal staff or engaging an external consultant), and each strategy reduces taxes paid in the current period at a marginal tax rate of 30 %. One strategy generates temporary tax benefits and the

[5] We assume that all firms engage in some tax planning. For example, many firms claim accelerated tax depreciation. However, not all firms engage in cost segregation studies whereby tax depreciation is further accelerated by advantageously classifying depreciable property into shorter recovery periods. We would consider such a project to be an incremental tax planning strategy of sufficient cost to warrant additional consideration before implementation.

Exhibit 1 Example of the effect of performance targets on tax planning

Description	Do nothing Action 1	Temporary Action 2	Permanent Action 3	Temporary & perm Action 4	Financial reporting Action 5
Pretax income	$5000	$5000	$5000	$5000	$5000
Tax planning cost		(100)	(100)	(200)	
EBIT	*$5000*	$4900	$4900	$4800	$5000
Temp BTD		(1000)		(1000)	
Perm BTD			(1000)	(1000)	
Taxable income	$5000	$3900	$3900	$2800	$5000
Accounting choice					(230)
Tax expense	1500	1470	1170	1140	1500
Net income	$3500	$3430	*$3730*	$3660	*$3730*
Cash taxes paid	1500	1170	1170	840	1170
Cash flow	$3500	$3730	$3730	*$3960*	$3500
CETR (%)	30	24	24	18	30
ETR (%)	30	30	24	24	25

This exhibit provides a simplified example of how performance metrics affect tax planning and financial reporting. Assume a firm with $5000 of income before taxes can engage in two legitimate and incremental tax-planning strategies, each of which will generate a book-tax difference of $1000 at a pretax cost of $100. One strategy is temporary (i.e., it defers U.S. tax payments) and one is permanent (i.e., it allows the company to avoid U.S. tax payments). In addition, the CEO can use discretion to reduce the current tax accrual. Hence CEOs can take one of five distinct actions: (1) implement neither strategy, (2) implement only the temporary strategy, (3) implement only the permanent strategy, (4) implement both strategies, or (5) use discretion to make an advantageous financial reporting choice for strategies already in place (such as designating foreign income as permanently reinvested)

The CEO is evaluated using performance targets based on one of three types of financial measures: cash flows, pre-tax earnings (EBIT), or after-tax earnings (net income). If cash flow is the performance metric, then the CEO chooses action 4. If EBIT is the performance metric, then the CEO chooses action 1 (assuming action 5 is risky). If net income is the performance metric, then the CEO chooses either action 3 or action 5. Note that the preferred selection is identified in italics for each action

other generates permanent tax benefits.[6] The firm faces five choices: (1) implement neither strategy, (2) implement only the temporary strategy, (3) implement only the permanent strategy, (4) implement both strategies, or (5) implement neither strategy but make advantageous tax-related financial reporting choices for strategies already in place. These five choices are not exhaustive, but we provide simplified options to make the example tractable. To this point, we allow advantageous financial reporting only under option 5, although in reality managers make financial reporting choices (designated in italics in Exhibit 1) for every tax strategy they implement.[7]

[6] A cost segregation study is an example of a strategy that would not reduce reported tax expense because it is temporary. In contrast, claiming a research and development tax credit is an example of a strategy that would reduce reported tax expense.

[7] Many components of the tax expense accrual require significant judgment. For example, two firms could engage in the same tax planning strategy and accrue different reserves for unrecognized tax benefits due to subjective differences in assessing the inherent risk of the strategy (e.g., De Simone et al. 2014). Our predictions remain unchanged if we allow firms to engage in a combination of tax planning *and* tax-advantageous financial reporting in each action presented in Exhibit 1.

We propose that, at the margin, managers will prefer the choice that maximizes the probability of achieving their performance target. Holding the incentive effects of equity compensation constant, the manager's choice differs predictably depending on the type of performance target that determines his or her annual bonus. Referring to Exhibit 1, a CEO incentivized with cash flow metrics will choose to implement both strategies (action 4) because this choice maximizes cash flows, all else equal. This choice also produces cash ETRs that are lower than those generated under any of the other choices presented. Using this intuition, we formally state our first hypothesis in the alternative form below:

H1 Firms that include a cash flow metric in CEO annual incentives report lower cash ETRs than firms that do not include a cash flow metric, all else equal.

It is less clear whether firms with CEOs incentivized with cash flow metrics have lower ETRs than firms that do not incentivize CEOs with cash flow metrics. The outcome depends on which action CEOs incentivized exclusively with *earnings* metrics take, on average. If CEOs incentivized with only pre-tax earnings metrics such as EBIT engage in less tax planning overall because they are less focused on increasing cash flow (action 1), then we would expect firms using cash flow metrics to report lower ETRs. On the other hand, if CEOs incentivized with after-tax earnings metrics prefer permanent tax planning strategies (action 3) or make favorable financial reporting decisions (action 5) to reduce the ETR, we would not expect firms using cash flow metrics to report lower ETRs. We therefore state our second hypothesis in null form:

H2 Firms that include a cash flow metric in CEO annual incentives report ETRs that are not different from ETRs of firms that do not include a cash flow metric, all else equal.

We next examine differences between firms compensating CEOs with pre-tax or after-tax *earnings* targets. A CEO compensated on pre-tax earnings is less concerned with after-tax earnings and cash flows, all else equal. Because tax planning is costly, this CEO strictly prefers no incremental tax planning (action 1) as this choice delivers the highest pre-tax income.[8] This prediction aligns with anecdotal evidence from tax partners who say they have difficulty in selling tax planning strategies to firms where the CEO's annual incentive compensation is based on pre-tax income.[9]

When the bonus contract includes an after-tax earnings target, the CEO has an incentive to reduce reported tax expense to achieve higher after-tax income, all else

[8] Action 5 produces an equivalent amount of pre-tax income. However, we believe CEOs compensated on pre-tax earnings will prefer action 1 because making opportunistic financial reporting choices related to tax planning could come at a cost with no corresponding benefit (i.e., no incremental effect on his/her bonus).

[9] One tax advisor revealed to us that a CEO chose not to implement a legal tax planning strategy that would have generated $20 million in tax savings because his bonus was determined exclusively based on pre-tax income. In this situation, the CEO's performance metric would have reflected the cost of the strategy (i.e., a reduction to pre-tax income reflecting consulting fees paid to implement the strategy) but not the tax benefit.

equal. Referring again to Exhibit 1, the CEO can achieve this objective by implementing incremental tax planning that reduces reported tax expense (action 3) or by implementing no incremental tax planning but making favorable tax-related financial reporting choices for tax planning strategies already in place (action 5).[10] Both of these choices result in a lower ETR relative to action 1, but only the choice to implement incremental tax planning will result in a lower cash ETR. For example, firms can lower cash taxes paid by operating in low tax jurisdictions. These firms can take incremental actions to further reduce cash tax payments through strategic transfer pricing initiatives, developing tax efficient supply chains, exploiting intracompany debt structures, etc. Even without incremental action, however, these firms can reduce reported tax expense by asserting their intention to permanently reinvest foreign earnings and not accruing incremental U.S. tax expense due upon repatriation. Asserting permanent reinvestment of foreign earnings is one way firms can lower reported tax expense without changing the cash taxes saved.

Assuming CEOs evaluated with pre-tax metrics choose action 1, we expect firms whose CEOs are evaluated using after-tax earnings metrics to report lower ETRs. If after-tax earnings metrics incentivize incremental tax planning (action 3), then we expect firms whose CEOs are compensated based on after-tax earnings targets to also report lower cash ETRs than firms whose CEOs are compensated using pre-tax earnings target (comparing action 3–action 1). However, if after-tax earnings metrics motivate different financial reporting choices rather than different investments in tax planning, we expect no difference in cash ETRs across pre-tax and after-tax firms (comparing action 1–action 5). We formally state our hypotheses below:

H3 Firms that include an after-tax earnings metric in CEO annual incentives report lower ETRs than firms that do not include an after-tax earnings metric, all else equal.

H4 Firms that include an after-tax earnings metric in CEO annual incentives report cash ETRs that are not different from firms that do not include an after-tax earnings metric, all else equal.

3 Research method

3.1 Sample

We derive our sample of CEO performance targets by identifying industrial firms (i.e., no financial firms or utilities) with CEO compensation information in Execucomp from 2009 to 2011. We limit our sample to firms that paid annual bonuses to the same CEO throughout this period. Requiring firms to have paid a bonus provides a powerful test of our hypotheses because it allows us to better attribute differences in tax planning and financial reporting for taxes to specific

[10] The firm can also implement a tax planning strategy *and* make favorable financial reporting choices. This option would exacerbate the effect on ETR, and our predictions would remain unchanged.

incentives.[11] By including only firms with the same CEO, we can attribute our findings to differences in performance metrics rather than policy changes related to different CEOs (Dyreng et al. 2010; Fee et al. 2013). We drop firms reporting a cumulative pre-tax loss from 2009 to 2011 because firms facing lower tax liabilities have few incentives to further reduce taxable income. We retain all observations with sufficient data to calculate ETR and control variables.

This procedure produces an initial panel of 468 firms from 2009 through 2011. We identify the performance targets for CEO annual incentive compensation by examining proxy statements for this panel of firms. We drop firm-years in which zero or more than four annual performance metrics are used. This procedure results in a final sample of 1394 firm-years from 465 unique firms. We then classify the annual performance targets as cash flow performance metrics, pre-tax earnings metrics, or after-tax earnings metrics.[12] All cash flow metrics in our sample are based on operating cash flows, which are presented net of cash paid for taxes, and are therefore an after-tax metric. Regarding earnings metrics, we classify firm-years with net income or EPS targets as after-tax, whereas we designate firm-years with EBITDA or sales performance targets as pre-tax. Because including both pre-tax and after-tax performance targets provides incentives to reduce taxes, we classify firm-years with a mix of both pre-tax and after-tax targets as after-tax.

Although short-term incentive compensation comprises a smaller part of total compensation than equity, on average, short-term performance targets in CEO compensation likely have an incremental effect on CEO behavior (Chen et al. 2014; Healy 1985; Phillips 2003; Shalev et al., 2013).[13] Short-term incentive compensation is often paid in cash on a quarterly or annual basis and is thus less uncertain than long-term incentives paid in equity that vest over extended periods. Executives also tend to discount deferred compensation by as much as 50 % over a 5-year period (PricewaterhouseCoopers 2012), thereby reducing dispersion in the relative magnitude between short-term cash and long-term equity compensation.

[11] If the CEO does not achieve his or her bonus, it is difficult to generate clear predictions about how accounting metrics affected taxes in nonbonus years. For example, if the CEO anticipates missing a target, he or she could be incentivized to take a pre-tax big bath or engage in other forms of downward pre-tax earnings management, which would introduce a denominator effect into our ETR measures. Eliminating firms with nonbonus years allows us to retain 75 % of otherwise includable sample firms. We therefore believe our results are broadly generalizable. Additionally, in an untabulated analysis, we relax this restriction for a sample of S&P 500 firms, and the results remain unchanged.

[12] Companies often modify disclosed performance targets to reflect non-GAAP adjustments. For example, a firm can list EPS as the performance target, but a detailed examination of the metric's calculation reveals that the actual target adjusts GAAP EPS to exclude income tax expense. We evaluate how each metric is defined in the proxy to ensure our classification reflects the actual characteristics of the performance target.

[13] Because our sample period encompasses three years after the financial crisis of 2007–2008, short-term bonuses paid during our sample may not represent bonuses in other periods. For all firms with nonmissing data on CEO incentive compensation in Execucomp, bonuses were 40 % of incentive compensation during our sample (2009–2011) and 37 % during 2012–2013. Additionally, 88 % of Execucomp firms awarded CEO bonuses during our sample and 91 % awarded bonuses during 2012–2013. Therefore, during the two years since the end of our sample period, we see no substantial changes in CEO bonuses that would cause us to believe our results have limited generalizability.

Additionally, companies have shifted from stock options to performance- and service-based restricted stock in recent years (e.g., Brown and Lee 2011; Carter et al. 2007). The receipt of service-based restricted stock is contingent solely on tenure and not on accounting performance and therefore potentially dilutes the effect of some equity-based incentives on reported amounts.[14]

3.2 Regression methodology

Because ETRs are often highly skewed, influential observations can be problematic in tax research. Therefore, following the recommendations of Leone et al. (2014), we estimate all coefficients using robust regressions employing the MM methodology. We test H1 and H2 by estimating pooled cross-sectional regressions with control variables shown to affect tax rates and include year fixed-effects and industry fixed-effects calculated at the one-digit SIC level.

$$RATE_{it} = \beta_0 + \beta_1 CFLOW_{it} + \beta_k X_{kit} + YearFE + IndustryFE + \varepsilon_i. \quad (1)$$

$RATE_{it}$ is the effective tax rate for firm i in year t, estimated alternatively by dividing total tax expense by pre-tax income (*ETR*) or cash taxes paid by pre-tax income (*CETR*). $CFLOW_{it}$ is a binary variable that equals one for firm-years where the CEO annual incentive is determined using a cash-flow performance target and zero otherwise. X_{kit} represents a vector of k control variables capturing other ETR determinants for firm i in year t. The estimated coefficient on *CFLOW* captures the differential effect of including a cash-flow performance metric. Consistent with H1, we expect $\beta_1 < 0$ when *RATE* equals *CETR*. Consistent with H2, we make no prediction for the sign of β_1 when *RATE* equals *ETR*. Finally, because some firms include both cash flow and after-tax earnings incentives in their CEO bonus contracts, we include a control for the presence of after-tax earnings metrics (*ATAX*) in our final specification of Eq. (1) to ensure that any relation we attribute to cash flow metrics is robust to the presence of an after-tax earnings metrics.

Control variables include firm size (*SIZE*), profitability (*ROA*), leverage (*LEV*), the existence of foreign operations (*FOR*), capital intensity (*CAP*), research and development activity (*RD*), the level of intangible assets (*INTAN*), the book-to-market ratio (*BM*), sales growth (*GROW*), tax loss carryovers (*NOL*), changes in tax loss carryovers (*NOLC*), and liquidity (*LIQ*). In some specifications, we also include controls for equity incentives including the CEOs' wealth sensitivity to changes in firm value (*DELTA*) and to firm risk (*VEGA*) to verify whether we are capturing the incremental effect of short-term bonus incentives. Finally, in some specifications, we control for tax avoidance opportunities with *L.CETR3* (3-year average *CETR* from $t-3$ to $t-1$). This variable addresses the possibility that firms with

[14] The receipt of performance-based restricted stock is also often calculated using multi-year averages of the same metrics used for annual bonuses, which increases the salience of these metrics to the CEO. For example, in 2012 Priceline's compensation committee established adjusted EBITDA as the performance metric to judge performance over both the annual (1-year) and long-term (3-year) periods. In this case, a 3-year average of annual EBITDA determines the long-term incentive, and this compensation is paid in equity rather than cash.

relatively more tax planning opportunities could be more likely to evaluate the CEO using after-tax performance metrics (Atwood et al. 1998; Newman 1989).[15] Hence we use *CETR* because it captures all forms of tax planning including both permanent and deferral strategies. Prior performance is a well-established proxy for unobservable characteristics (e.g., Campa and Kedia 2002; Tate and Yang 2015), and Shevlin et al. (2013) suggest that tax avoidance measures from previous years can be used to address endogeneity.[16] We define all control variables in detail in "Appendix".

To test H3 and H4, we focus on the subsample of firms that use only earnings metrics (i.e., $CFLOW = 0$) and estimate a pooled cross-sectional regression where we substitute *ATAX* for *CFLOW*:

$$RATE_{it} = \beta_0 + \beta_1 ATAX_{it} + \beta_k X_{kit} + YearFE + IndustryFE + \varepsilon_i, \quad (2)$$

where $ATAX_{it}$ is a binary variable equal to one for firm-years where the CEO annual incentive is determined using an after-tax earnings performance metric and zero otherwise. All other variables are the same as in Eq. (1). The estimated coefficient on *ATAX* captures the differential effect of including after-tax earnings metrics on *ETR* and *CETR*. To test H3, we set *RATE* equal to *ETR* and predict $\beta_1 < 0$. To test H4, we set *RATE* equal to *CETR*. We make no prediction as to the sign of β_1.

4 Empirical results

4.1 Descriptive statistics

Table 1, Panel A, presents the distribution of our sample firm-years classified by the number and type of accounting performance metrics. A majority of firm-years disclose one or two performance metrics. Earnings-related metrics are most common (47 %), followed by sales (29 %) and cash flow (18.3 %) metrics. In Panel B, we present the distribution of firm-years classified by the presence of a cash flow metric and the use of pre-tax versus after-tax earnings metrics. At least one after-tax earnings metric is disclosed in roughly half of our sample (717 firm-years or 51.4 % of observations). Both an after-tax earnings metric and a cash flow metric are disclosed in 149 firm-years (10.7 %).

Panel A of Table 2 presents descriptive statistics for the full sample partitioned based on the disclosure of a cash flow performance metric.[17] The cash flow subsample reports *ETR*s that are 3.4 % points lower at the median and *CETR*s that

[15] Although some studies suggest that firms with more tax avoidance opportunities are more likely to use after-tax metrics, Huang et al. (2015) present evidence that firms with *higher* GAAP ETRs are more likely to choose EPS, an after-tax metric, as a performance measure in CEO bonus contracts. Therefore it is not obvious how tax planning opportunities are associated with firms' choice of performance metrics.

[16] Greene (2003) argues that lagged values can also address measurement error.

[17] Because we use robust regressions, we do not winsorize our variables. This design choice significantly affects the mean and standard deviation of variables presented. We therefore focus on median comparisons.

Table 1 Sample composition

Panel A: Distribution of performance metrics by number of CEO performance metrics

Number of performance metrics	Earnings related metrics	Cash flow metrics	Sales metrics	Other	Total
1	510	9	11	4	534
	(36.6)	(0.6)	(0.8)	(0.3)	(38.3)
2	111	129	308	34	582
	(8.0)	(9.3)	(22.1)	(2.4)	(41.8)
3 or more	34	117	85	42	278
	(2.4)	(8.4)	(6.1)	(3.0)	(19.9)
Total	655	255	404	80	1394
	(47.0)	(18.3)	(29.0)	(5.7)	(100)

Panel B: Distribution of firm-years by tax status of performance metrics

Earnings performance metrics	Cash flow performance metrics		Total
	No	Yes	
Pre-tax (expense)	571	106	677
	(41.0)	(7.6)	(48.6)
After-tax (expense)	568	149	717
	(40.7)	(10.7)	(51.4)
Total	1139	255	1394
	(81.7)	(18.3)	(100)

Panel A presents the count (percentage) of firms-years using each type of CEO annual performance metric. The sample consists of 1394 firm-years from a panel of firms that paid annual incentives (bonus) to the CEO from 2009 to 2011 as reported by Execucomp. The sample is limited to firms with no change in CEO throughout the period, a cumulative profit during the period, and complete data for regression variables. We retain all firm-year observations with nonmissing data to calculate *ETR*. There are 10 observations missing data for *CETR*. In Panel B, we classify each firm-year metric as pre-tax or after-tax using information from the Compensation Discussion and Analysis section of annual proxy statements. We classify firm-years as after-tax ($ATAX = 1$) if the proxy discloses an earnings metric reduced by tax expense. All other firm-years are classified as pre-tax ($ATAX = 0$). We classify firm-years disclosing multiple performance metrics as after-tax if the metrics include at least one after-tax earnings metric. We classify firm-years disclosing a cash-flow performance metric as after-tax because all cash flow metrics in our sample are reduced by tax payments ($CFLOW = 1$). All other firm-years are classified as pre-tax ($CFLOW = 0$)

are 5.0 % points lower. These univariate differences are consistent with the conjecture that cash flow metrics motivate tax planning that results in both a cash flow and financial reporting benefit. Compared to the remainder of the sample, firms in the cash flow subsample are larger, less profitable, more levered, and report more R&D expense and intangible assets, smaller sales growth, and less liquidity.

Panel B presents descriptive statistics relating to pre-tax and after-tax earnings metrics among the subsample using only earnings metrics (i.e., where $CFLOW = 0$). The after-tax earnings group reports *ETR*s that are 1.1 % points lower than the pre-tax group at the median. In contrast, the after-tax earnings group

Table 2 Descriptive statistics for regression variables by tax classification of performance metrics

Panel A: Sample by earnings versus cash flow performance metric

Variables	Earnings only (N = 1139)			Cash flow metric (N = 255)			Median difference
	(*CFLOW* = 0)			(*CFLOW* = 1)			
	P25	Median	P75	P25	Median	P75	
ETR	0.253	0.326	0.375	0.202	0.291	0.350	0.034*
CETR	0.129	0.249	0.337	0.073	0.199	0.270	0.050*
CETR3	0.164	0.268	0.344	0.123	0.234	0.306	0.034*
SIZE	6.519	7.482	8.543	7.233	8.007	9.201	−0.524*
ROA	0.063	0.106	0.169	0.051	0.087	0.138	0.020*
LEV	0.021	0.163	0.292	0.133	0.230	0.325	−0.067*
FOR	0.000	1.000	1.000	1.000	1.000	1.000	0.000*
CAP	0.083	0.174	0.350	0.093	0.162	0.289	0.013
RD	0.000	0.001	0.062	0.000	0.013	0.049	−0.012*
INTAN	0.057	0.187	0.391	0.133	0.263	0.444	−0.076*
BM	0.266	0.408	0.589	0.275	0.433	0.581	−0.024
GROW	−0.008	0.082	0.176	−0.036	0.056	0.138	0.025*
NOLC	0.000	0.000	0.001	0.000	0.000	0.003	0.000
LIQ	0.050	0.132	0.269	0.042	0.086	0.175	0.046*

Table 2 countiuned

Panel B: Sample by tax status of earnings performance metric

Variables	Pre-tax (N = 571)			After-tax (N = 568)			Median difference
	(*ATAX* = 0)			(*ATAX* = 1)			
	P25	Median	P75	P25	Median	P75	
ETR	0.242	0.333	0.380	0.264	0.322	0.365	0.011*
CETR	0.085	0.230	0.339	0.164	0.258	0.336	−0.028*
CETR3	0.117	0.256	0.348	0.195	0.278	0.342	−0.022*
SIZE	6.437	7.239	8.224	6.635	7.718	8.815	−0.479*
ROA	0.060	0.107	0.182	0.068	0.106	0.160	0.002
LEV	0.002	0.115	0.268	0.077	0.189	0.306	−0.074*
FOR	0.000	1.000	1.000	0.000	1.000	1.000	0.000*
CAP	0.066	0.144	0.356	0.096	0.203	0.342	−0.059*
RD	0.000	0.003	0.116	0.000	0.001	0.029	0.002
INTAN	0.041	0.169	0.402	0.084	0.197	0.380	−0.028
BM	0.253	0.412	0.600	0.274	0.407	0.586	0.005
GROW	−0.004	0.088	0.198	−0.009	0.073	0.153	0.016
NOLC	0.000	0.000	0.001	0.000	0.000	0.001	0.000
LIQ	0.074	0.172	0.337	0.040	0.100	0.202	0.072

Table 2 countiuned

Panel C: Full sample compensation statistics

Variables	P25	Median	P75
SALARY$	600.0	831.0	1023
SALARY%	0.108	0.156	0.236
BONUS$	573.8	1149	2112
BONUS %	0.159	0.224	0.341
STOCK$	1282	2922	5903
STOCK %	0.438	0.584	0.701
DELTA	171.9	365.4	792.3
VEGA	24.21	88.07	234.9

Panel D: Compensation statistics based on cash flow performance metrics

Variables	Earnings only (N = 1139) (*CFLOW* = 0)			Cash flow metric (N = 255) (*CFLOW* = 1)			Median difference
	P25	Median	P75	P25	Median	P75	
SALARY$	585.6	806.9	1000	700.0	930.0	1117	−123.1*
SALARY%	0.112	0.162	0.244	0.091	0.133	0.200	0.029*
BONUS$	557.0	1072	2008	736	1425	2640	−353.1*
BONUS %	0.159	0.228	0.349	0.158	0.211	0.296	0.017*
STOCK$	1137	2733	5448	1884	3928	8093	−1195*
STOCK %	0.418	0.569	0.694	0.517	0.637	0.721	−0.068*
DELTA	167.1	353.6	792.9	193.3	420.6	791.8	−67.08*
VEGA	19.68	82.20	202.4	39.1	141.7	359.3	−59.54*

Panel E: Compensation statistics based on earnings performance metrics

Variables	Pre-tax (N = 571) (*ATAX* = 0)			After-tax (N = 568) (*ATAX* = 1)			Median difference
	P25	Median	P75	P25	Median	P75	
SALARY	550.0	735.0	950.0	659.2	891.1	1040	−156.1*
SALARY%	0.112	0.164	0.249	0.112	0.160	0.239	0.004
BONUS	520.3	950	1863	580	1243	2215	−293.1*
BONUS %	0.155	0.226	0.344	0.166	0.228	0.349	−0.002
STOCK	1052	2491	4688	1261	2956	6017	−464.6*
STOCK %	0.418	0.562	0.693	0.417	0.580	0.696	−0.017
DELTA	149.5	308.7	632.7	202.6	412.5	932.1	−103.8*
VEGA	15.46	67.93	159.1	24.50	101.6	274.6	−33.64*

Panel A: * Median difference is significant with $p < 0.10$ using median test to compare observations where no after-tax cash flow metric is included in the CEO's annual short-term bonus contract (*CFLOW* = 0) to those observations where an after-tax cash flow metric is included (*CFLOW* = 1). The sample is described in Table 1, and all variables are defined in "Appendix". The number of observations for each variable changes based on data availability. Note that 10 observations are missing data required to calculate *CETR*

Panel B: * Median difference is significant with $p < 0.10$ using a median test to compare observations where no after-tax earnings metrics are included in the CEO's annual short-term bonus contract (*ATAX* = 0) to those observations where at least one after-tax earnings metric is included (*ATAX* = 1). The sample is described in Table 1, and all variables are defined in "Appendix". The number of observations for each variable changes based on data availability. Dollar amounts are in thousands USD. Note that 10 observations are missing data required to calculate *CETR*

Panel D and E: * Difference is significant with $p < 0.10$. Panel D compares observations where no after-tax cash flow metric is included in the CEO's annual short-term bonus contract (*CFLOW* = 0) to those where an after-tax cash flow metric is included (*CFLOW* = 1). Panel E compares observations where no after-tax earnings metrics are included in the CEO's annual short-term bonus contract (*ATAX* = 0) to those observations where at least one after-tax earnings metric is included (*ATAX* = 1). The sample is described in Table 1, and all variables are defined in "Appendix". Dollar amounts are in thousands USD

reports *CETR*s that are 2.8 % points *higher* at the median. This difference persists using 3- and 5-year (untabulated) *CETR*s. Also, at the median, the after-tax earnings subsample is larger, more highly levered, and reports greater capital expenditures than the pre-tax subsample.

Finally, we present descriptive statistics relating to CEO compensation. Panel C presents statistics for the full sample. At the median, short-term bonuses are just over $1 million and represent 22.4 % of total compensation and roughly 28 % of incentive compensation for CEOs in our sample. The median salary of $0.8 million comprises 15.6 % of total compensation and grants of equity-based compensation, valued at almost $3 million, make up the remaining 58.4 %. Panel D reveals that compared to equity awards, salary, and short-term bonuses are a less significant component of total compensation in the subsample of firms using cash flow metrics. CEOs compensated with cash flow metrics receive larger salaries, cash bonuses, and stock-based compensation at the median, however. Thus, despite the relative magnitude of short-term compensation, these payments are sufficiently significant to influence managers' behavior on the margin. In Panel E, we report that, among CEOs incentivized solely with earnings metrics, CEOs compensated on after-tax earnings metrics receive larger values of each component of compensation at the median and report higher values of *DELTA*. We observe significantly larger values of *VEGA* among firms using cash flow metrics and those using after-tax earnings metrics, which reinforces the importance of considering CEO risk incentives when examining the impact of CEOs on corporate taxes (Rego and Wilson 2012).

4.2 Regression results

4.2.1 Cash flow metrics

We present regression results for the test of H1 in Panel A of Table 3. Model 1 presents a baseline regression estimating *CETR* as a function of standard control variables from the literature. Model 2 includes *CFLOW*, which is our variable of interest. Model 3 includes controls for equity incentives, *DELTA* and *VEGA*, and Model 4 includes *L.CETR3* as our control for tax planning opportunities. For completeness, Model 5 includes *ATAX* to ensure the relation between *CETR* and *CFLOW* is robust to the presence of after-tax earnings metrics in the same compensation contract.[18] As predicted, the estimated coefficient for *CFLOW* is negative and statistically significant in all specifications. The coefficient estimates in Panel A suggest that, on average, firms using cash flow performance metrics will have *CETR*s that are 2–4 % points lower than firms that do not include cash flow

[18] We use robust regressions to deal with influential observations. However, all inferences remain unchanged if we (1) retain all observations and winsorize all variables at 1 and 99 %, (2) eliminate observations where ETR or CETR is outside of [0, 1] before winsorizing at 1 and 99 %, or (3) eliminate observations where ETR or CETR is outside of [0, 1] before estimating robust regression.

Table 3 Regression results for cash-flow performance target on tax avoidance

Panel A: Determinants of cash effective tax rate (*CETR*)

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
CFLOW		−0.042***	−0.041***	−0.022**	−0.022**
		(0.010)	(0.010)	(0.009)	(0.009)
ATAX					−0.003
					(0.007)
L.CETR3				0.461***	0.461***
				(0.029)	(0.029)
LOGDELTA			0.005	0.006	0.006
			(0.004)	(0.004)	(0.004)
LOGVEGA			0.002	0.004*	0.004*
			(0.002)	(0.002)	(0.002)
SIZE	−0.006**	−0.004	−0.007**	−0.008***	−0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
ROA	0.357***	0.346***	0.349***	0.167***	0.167***
	(0.052)	(0.051)	(0.052)	(0.052)	(0.053)
LEV	−0.064***	−0.063***	−0.056**	−0.019	−0.020
	(0.023)	(0.023)	(0.024)	(0.021)	(0.021)
FOR	0.007	0.007	0.006	0.003	0.003
	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
CAP	−0.115***	−0.120***	−0.124***	−0.090***	−0.089***
	(0.031)	(0.031)	(0.030)	(0.025)	(0.025)
RD	−0.421***	−0.434***	−0.441***	−0.238***	−0.240***
	(0.097)	(0.096)	(0.099)	(0.073)	(0.073)
INTAN	0.083***	0.086***	0.078**	0.015	0.015
	(0.032)	(0.031)	(0.031)	(0.028)	(0.028)
BM	0.015	0.014	0.021	0.009	0.009
	(0.019)	(0.019)	(0.019)	(0.017)	(0.017)
GROW	−0.090**	−0.092**	−0.093**	−0.037	−0.038
	(0.036)	(0.036)	(0.037)	(0.029)	(0.030)
NOL	−0.036***	−0.036***	−0.036***	−0.006	−0.006
	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)
NOLC	0.147***	0.135***	0.131***	0.290***	0.290***
	(0.049)	(0.045)	(0.045)	(0.094)	(0.099)
LIQ	−0.069*	−0.076*	−0.086**	−0.042	−0.044
	(0.042)	(0.041)	(0.041)	(0.035)	(0.035)
Observations	1384	1384	1370	1355	1355

Panel B: Determinants of GAAP effective tax rate (*ETR*)

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
CFLOW		−0.014**	−0.014**	−0.014**	−0.013**
		(0.005)	(0.006)	(0.006)	(0.006)
ATAX					−0.015***
					(0.004)
L.CETR3				−0.001	−0.001**
				(0.000)	(0.000)
LOGDELTA			0.001	0.001	0.001
			(0.002)	(0.002)	(0.002)
LOGVEGA			−0.002***	−0.002**	−0.002**
			(0.001)	(0.001)	(0.001)
SIZE	−0.013***	−0.013***	−0.011***	−0.011***	−0.011***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
ROA	0.008	0.001	−0.003	−0.004	−0.005
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
LEV	0.032***	0.031***	0.029**	0.027**	0.026**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
FOR	−0.025***	−0.025***	−0.025***	−0.024***	−0.024***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
CAP	−0.033**	−0.035**	−0.033**	−0.033**	−0.036**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
RD	−0.278***	−0.283***	−0.276***	−0.298***	−0.310***
	(0.055)	(0.054)	(0.055)	(0.057)	(0.058)
INTAN	−0.035**	−0.033**	−0.029**	−0.030**	−0.034**
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)
BM	0.023**	0.021**	0.020**	0.020**	0.021**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
GROW	−0.007	−0.007	−0.010	−0.010	−0.015
	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)
NOL	−0.002	−0.003	−0.002	−0.002	−0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
NOLC	−0.039	−0.036	−0.033	−0.040	−0.041
	(0.079)	(0.085)	(0.090)	(0.075)	(0.080)
LIQ	−0.043**	−0.044**	−0.041**	−0.040**	−0.053***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Observations	1394	1394	1380	1357	1357

This table estimates *CETR* and *ETR* as a function of cash-flow performance metrics. All specifications are estimated using robust regression (MM estimation method) to address influential observations. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry (one-digit SIC), and year fixed effects that are not tabulated. "Appendix" defines the variables

performance metrics. This economic magnitude is consistent with that reported in prior literature (e.g., Gaertner 2014; Rego and Wilson 2012; Robinson et al. 2010).

We present the regression results from testing H2 in Panel B. The dependent variable in these regressions is *ETR*, and the models present a stepwise inclusion of variables similar to Panel A. The estimated coefficient for *CFLOW* is negative and statistically significant in all specifications, indicating that, on average, firms using cash flow performance metrics have *ETR*s that are 1.4 % point lower than firms that do not include cash flow performance metrics. In Model 5, where we include *ATAX*, we continue to find significance on *CFLOW*, suggesting that cash-flow performance metrics provide an incentive to decrease the *ETR* incremental to the incentive provided by after-tax earnings metrics. We also estimate a negative and significant coefficient on *ATAX*, which provides evidence consistent with H3. In untabulated F-tests, we find no significant difference in the magnitude of the coefficients on *ATAX* and *CFLOW*. These results are consistent with our conjecture and support the conclusion in Graham et al. (2014) that executives prefer tax strategies that simultaneously reduce cash taxes and reported tax expense.

4.2.2 Earnings metrics

To test H3 and H4, we limit our sample to firms that use only earnings metrics to evaluate CEOs (i.e., $CFLOW = 0$). We present regression results of these tests in Table 4, introducing variables in the same stepwise manner as in Table 3. In Panel A, where *ETR* is the dependent variable, the estimated coefficient for *ATAX* is negative and statistically significant in all specifications, suggesting that firms using after-tax earnings metrics report *ETR*s that are approximately one-and-a-half percentage points lower than firms using exclusively pre-tax earnings metrics.

In contrast, the estimated coefficient for *ATAX* is not significant in any specification in Panel B, where the dependent variable is *CETR*. Referring to Exhibit 1, the pattern of results in Table 4 is consistent with after-tax earnings firms favoring tax planning strategies that provide opportunities to report a lower ETR, perhaps to the exclusion of strategies that do not. This interpretation is again consistent with survey evidence from Graham et al. (2014) that managers favor tax planning strategies that benefit reported earnings. However, this pattern of results is also consistent with after-tax firms and pre-tax firms realizing the same *level* of cash tax savings but making different financial reporting choices. We explore this conjecture in Sect. 5.

Our finding that after-tax earnings metrics are not associated with lower *CETR*s directly contradicts Gaertner (2014), who reports that firms using after-tax earnings metrics report CETRs that are 5 % points lower, on average, than firms using pre-tax earnings metrics. This is a critical difference because our results suggest that the lower *ETR*s reported by after-tax earnings firms do not reflect higher levels of tax planning but rather different financial reporting decisions. Given our broader sample, different sample selection criteria, and our separate analysis of cash flow metrics, the difference between our results and those of Gaertner (2014) could

Table 4 Regression results for after-tax earnings performance target on tax avoidance

Panel A: Determinants of effective tax rate (*ETR*)				
Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
ATAX		−0.016***	−0.015***	−0.015***
		(0.004)	(0.004)	(0.004)
L.CETR3				0.039***
				(0.007)
LOGDELTA			0.003	0.003*
			(0.002)	(0.002)
LOGVEGA			−0.002**	−0.002*
			(0.001)	(0.001)
SIZE	−0.011***	−0.011***	−0.011***	−0.011***
	(0.001)	(0.001)	(0.002)	(0.002)
ROA	−0.009	−0.013	−0.016	−0.017
	(0.028)	(0.028)	(0.028)	(0.027)
LEV	0.031***	0.029***	0.030***	0.031***
	(0.011)	(0.010)	(0.011)	(0.011)
FOR	−0.027***	−0.026***	−0.025***	−0.023***
	(0.004)	(0.004)	(0.004)	(0.004)
CAP	−0.050***	−0.054***	−0.052***	−0.050***
	(0.015)	(0.015)	(0.015)	(0.015)
RD	−0.288***	−0.304***	−0.297***	−0.320***
	(0.053)	(0.054)	(0.056)	(0.055)
INTAN	−0.048***	−0.049***	−0.046***	−0.045***
	(0.015)	(0.015)	(0.014)	(0.015)
BM	0.015	0.016*	0.017*	0.018**
	(0.009)	(0.009)	(0.009)	(0.009)
GROW	−0.003	−0.008	−0.010	−0.005
	(0.013)	(0.012)	(0.012)	(0.013)
NOL	−0.002	−0.003	−0.003	−0.003
	(0.004)	(0.004)	(0.004)	(0.004)
NOLC	−0.059	−0.066	−0.063	−0.084*
	(0.065)	(0.059)	(0.060)	(0.043)
LIQ	−0.045**	−0.056***	−0.054***	−0.052**
	(0.020)	(0.020)	(0.020)	(0.021)
Observations	1139	1139	1129	1112

Panel B: Determinants of cash effective tax rate (*CETR*)

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
ATAX		0.003	0.003	−0.002
		(0.009)	(0.009)	(0.008)
L.CETR3				0.472***
				(0.014)
LOGDELTA			0.001	0.004
			(0.004)	(0.004)
LOGVEGA			−0.001	0.003
			(0.002)	(0.002)
SIZE	−0.006*	−0.006*	−0.005	−0.008**
	(0.003)	(0.003)	(0.004)	(0.003)
ROA	0.350***	0.349***	0.358***	0.179***
	(0.057)	(0.057)	(0.057)	(0.054)
LEV	−0.052**	−0.051**	−0.048*	−0.031
	(0.025)	(0.025)	(0.026)	(0.022)
FOR	−0.004	−0.004	−0.005	0.000
	(0.012)	(0.012)	(0.012)	(0.010)
CAP	−0.115***	−0.115***	−0.116***	−0.069***
	(0.032)	(0.032)	(0.032)	(0.026)
RD	−0.395***	−0.392***	−0.370***	−0.198**
	(0.096)	(0.095)	(0.098)	(0.078)
INTAN	0.059*	0.059*	0.057*	0.009
	(0.034)	(0.034)	(0.034)	(0.030)
BM	0.024	0.024	0.024	0.009
	(0.022)	(0.022)	(0.023)	(0.018)
GROW	−0.113***	−0.112***	−0.112***	−0.062**
	(0.037)	(0.037)	(0.037)	(0.031)
NOL	−0.032***	−0.032***	−0.033***	−0.005
	(0.010)	(0.010)	(0.010)	(0.009)
NOLC	0.136	0.136	0.137	0.019
	(0.096)	(0.096)	(0.096)	(0.045)
LIQ	−0.086**	−0.084*	−0.092**	−0.053
	(0.043)	(0.043)	(0.043)	(0.036)
Observations	1134	1134	1124	1110

This table estimates *CETR* and *ETR* as a function of after-tax earnings performance metrics. All specifications estimated using robust regression (MM estimation method) to address influential observations. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry (one-digit SIC), and year fixed effects that are not tabulated. "Appendix" defines the variables

reflect idiosyncrasy in Gaertner's (2014) sample or an unexamined correlation between cash flow and after-tax earnings metrics in his design.[19]

4.3 Endogeneity analysis

Because we are unable to observe how boards select CEO performance metrics, our empirical model may suffer from selection bias or other model misspecifications. In our main analysis, we attempt to control for existing tax planning opportunities that could jointly affect firms' ETRs and their decision to include after-tax performance metrics in the CEO's bonus contract (e.g., Atwood et al. 1998; Newman 1989). In this section, we utilize various techniques to further allay concerns of possible misspecification in our estimation.

We begin with a propensity score match (PSM) design. Following prior literature (e.g., Armstrong et al. 2010; Larcker and Rusticus 2010), we separately analyze firms' propensity to use cash-flow metrics ($CFLOW = 1$) and after-tax earnings metrics ($ATAX = 1$). We first estimate a logit regression developed from Huang et al. (2013) to predict the likelihood a firm uses a cash flow metric ($CFLOW = 1$). We include industry fixed effects at the one-digit-SIC level to account for potential differences in compensation practices across industries. The results from estimating this regression are presented in Panel A of Table 5. We conclude that this model fits the data reasonably well based on the Hosmer–Lemeshow statistic of $p = 0.69$ and find that it demonstrates substantial predictive accuracy based on the area under the ROC curve of 0.75.

Using the propensity scores from this logit regression, we construct a sample by matching each treatment observation to a unique control observation in the same one-digit-SIC industry-year, and require matches within a caliper of 0.01 to ensure that we have identified the best matches for our treatment firms. As shown in Table 5, Panel B, we continue to find a negative significant coefficient on *CLFOW* when either *CETR* or *ETR* is the dependent variable, consistent with our main analysis. In all models, the coefficients on *CFLOW* are slightly larger than in our main analysis but remain economically plausible.

We perform a similar analysis for firms using after-tax earnings metrics. We use the model of Atwood et al. (1998) to predict the likelihood a firm uses an after-tax earnings metric ($ATAX = 1$) and include industry fixed effects. As described in

[19] Gaertner (2014) conducts his analysis using a sample of S&P 500 firms in 2010. He does not separately identify or control for the presence of after-tax cash flow metrics, and his sample includes firms frequently excluded from tax avoidance research including financial firms, utilities and those reporting losses. We exclude these firms, consistent with prior literature, because the CEO's incentives to engage in tax avoidance are either limited or unclear. For example, managers of REITs have very little incentive to commit resources to tax avoidance (Manzon and Plesko 2001), and in 2010, managers of banks subject to TARP restrictions were not eligible to receive cash bonuses regardless of firm performance. In an untabulated analysis, we attempt to reconcile our findings to Gaertner's (2014) and conclude that the difference in *CETR* results likely stems from differences in sample composition. When we re-estimate Model (4) from Table 4, Panel B, using a sample of 498 observations from S&P 500 firms from 2009 to 2011, including financial firms and utilities, we find a negative coefficient estimate of −0.03 on *ATAX* (two-tailed p value = 0.03). However, when we eliminate 71 observations from financial firms and utilities, we find an insignificant coefficient estimate on *ATAX* (−0.015, two-tailed p valued = 0.28).

Table 5 Results from propensity-score match analysis

Panel A: *CFLOW* metrics: first-stage logit regression results

Variables	(1) Model 2
AGE	−0.056***
	(0.02)
SIZE	0.437
	(0.18)
LEV	1.059
	(0.70)
CFVOL	−8.945*
	(4.63)
CFPERSIST	0.195
	(0.64)
WWRANK	0.108
	(0.09)
TRADECY	0.002
	(0.00)
Pseudo R^2	0.1169
Observations	1170
Area under the ROC	0.7511
Hosmer–Lemeshow p value	$p = 0.69$

Panel B: CETR and ETR regression results for *CFLOW*

Variables	*CETR* regressions		*ETR* regressions	
	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
CFLOW	−0.050***	−0.051***	−0.020**	−0.019**
	(0.01)	(0.02)	(0.01)	(0.01)
ATAX		0.018		−0.005
		(0.02)		(0.01)
LOGDELTA	0.000	0.000***	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
LOGVEGA	0.000***	0.000***	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
SIZE	−0.022***	−0.023***	−0.016***	−0.016***
	(0.01)	(0.01)	(0.00)	(0.00)
ROA	0.134	0.110	−0.127	−0.121
	(0.12)	(0.12)	(0.08)	(0.08)
LEV	0.011	0.016	−0.008	−0.008
	(0.05)	(0.05)	(0.04)	(0.04)
FOR	0.059***	0.058***	0.006	0.005
	(0.02)	(0.02)	(0.01)	(0.01)

Table 5 continued

Panel B: CETR and ETR regression results for *CFLOW*

Variables	*CETR* regressions		*ETR* regressions	
	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
CAP	−0.188***	−0.207***	0.059	0.060
	(0.07)	(0.07)	(0.05)	(0.05)
RD	−0.805***	−0.795***	−0.528***	−0.525***
	(0.19)	(0.19)	(0.12)	(0.12)
INTAN	0.025	0.018	−0.015	−0.015
	(0.06)	(0.06)	(0.04)	(0.04)
BM	0.019	0.025	−0.003	−0.003
	(0.03)	(0.03)	(0.02)	(0.02)
GROW	0.003	0.003	−0.003	−0.005
	(0.04)	(0.04)	(0.03)	(0.03)
NOL	−0.020	−0.023	−0.025*	−0.026*
	(0.02)	(0.02)	(0.01)	(0.01)
NOLC	0.112	0.101	−0.093*	−0.093*
	(0.09)	(0.09)	(0.05)	(0.05)
LIQ	0.040	0.055	−0.029	−0.026
	(0.09)	(0.10)	(0.06)	(0.06)
Adjusted R^2	0.1798	0.1754	0.2303	0.2303

Panel C: *ATAX* metrics: first-stage logit regression results

Variables	(1) Model 2
SALEAVE	0.307***
	(0.04)
MNE	0.423***
	(0.16)
CAPAVE	0.513
	(0.33)
INVAVE	1.971***
	(0.60)
LEVAVE	−0.284
	(0.34)
GSEG	−0.034
	(0.02)
BONINTAVE	1.756
	(2.74)
Pseudo R^2	0.0646
Observations	1266

Table 5 continued

Panel C: *ATAX* metrics: first-stage logit regression results	
Variables	(1) Model 2
Area under the ROC	0.6531
Hosmer–Lemeshore p value	$p = 0.43$

Panel D: ETR and CETR regression results for *ATAX*

Variables	*ETR* regressions		*CETR* regressions	
	Model 1	Model 2	Model 3	Model 4
ATAX	−0.021***	−0.021***	0.017	0.017
	(0.01)	(0.01)	(0.01)	(0.01)
CFLOW		−0.004		−0.059***
		(0.01)		(0.01)
LOGDELTA	0.000*	0.000*	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
LOGVEGA	0.000	0.001	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
SIZE	−0.011***	−0.011***	−0.010*	−0.008
	(0.00)	(0.00)	(0.01)	(0.00)
ROA	0.088**	0.087**	0.389***	0.358***
	(0.04)	(0.04)	(0.08)	(0.08)
LEV	0.038**	0.038**	−0.031	−0.031
	(0.02)	(0.02)	(0.04)	(0.04)
FOR	−0.037***	−0.037***	0.008	0.007
	(0.01)	(0.01)	(0.01)	(0.01)
CAP	−0.053**	−0.055**	−0.111**	−0.113**
	(0.02)	(0.02)	(0.05)	(0.04)
RD	−0.311***	−0.312***	−0.480***	−0.516***
	(0.07)	(0.07)	(0.13)	(0.12)
INTAN	−0.031	−0.031	0.055	0.060
	(0.02)	(0.02)	(0.04)	(0.04)
BM	0.023**	0.023**	0.007	0.004
	(0.01)	(0.01)	(0.02)	(0.02)
GROW	−0.009	−0.009	−0.054*	−0.052*
	(0.02)	(0.02)	(0.03)	(0.03)
NOL	−0.001	−0.001	−0.033**	−0.030**
	(0.00)	(0.00)	(0.01)	(0.01)
NOLC	−0.101**	−0.101**	0.097	0.078
	(0.05)	(0.05)	(0.08)	(0.07)
LIQ	−0.093***	−0.094***	−0.070	−0.072

Table 5 continued

Panel D: ETR and CETR regression results for *ATAX*				
Variables	*ETR* regressions		*CETR* regressions	
	Model 1	Model 2	Model 3	Model 4
	(0.03)	(0.03)	(0.06)	(0.06)
Adjusted R^2	0.1727	0.1727	0.1425	0.1425

Panel A: This table reports Logit coefficient estimates where the dependent variable is *CFLOW*. The model is derived from Huang et al. (2013) who estimate the selection of a cash flow performance metric. The propensity scores from this model are used to derive a matched sample for OLS regressions in Panel B. To limit the effect of influential *CETR* observations, the logit sample is limited to firms with CETR within [0, 1]. Industry fixed effects at the one-digit SIC level are included. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept and year fixed effects that are not tabulated. "Appendix" defines the variables

Panel B: This table reports the results of OLS regressions on a propensity matched sample of 366 observations derived from the logit regressions estimated in Panel A. The dependent variable in columns (1) and (2) is *CETR*, and *ETR* is the dependent variable in columns (3) and (4). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry, and year fixed effects that are not tabulated. "Appendix" defines the variables

Panel C: This table reports logit coefficient estimates for each fiscal year where the dependent variable is *ATAX*. The model is derived from Atwood et al. (1998), who estimate the selection of an after-tax earnings performance metric. The propensity scores from this model are used to derive a matched sample for the OLS regressions in Panel D. To limit the effect of influential *ETR* observations, the logit sample is limited to firms with *ETR* within [0, 1]. Industry fixed effects at the one-digit SIC level are included. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept that is not tabulated. "Appendix" defines the variables

Panel D: This table reports the results of OLS regressions on a propensity-matched sample of 684 *ETR* (676 *CETR*) firms derived from the logit regressions estimated in Panel C. The dependent variable in columns (1) and (2) is ETR, and CETR is the dependent variable in columns (3) and (4). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry, and year fixed effects that are not tabulated. "Appendix" defines the variables

Table 5, Panel C, we find that this model also fits the data reasonably well based on a Hosmer–Lemeshow statistic of $p = 0.43$ and that it demonstrates acceptable predictive accuracy based on the area under the ROC curve of 0.65. We re-estimate Eq. (2) for our matched sample and present these results in Panel D of Table 5. We continue to find a negative significant coefficient on *ATAX* when *ETR* is the dependent variable (columns 1 and 2) but find no significance when *CETR* is the dependent variable (columns 3 and 4). Similar to our *CFLOW* analysis, the coefficients on *ATAX* in Table 5 are slightly larger than the coefficient in our main analysis (−0.021 vs. −0.015) but not unreasonable. In sum, the results of this propensity-score matching analysis corroborate our main results, but we acknowledge that this approach does not completely resolve endogeneity concerns.

In addition to the PSM analysis, we conduct a battery of robustness tests. We identify firms that changed their CEO performance metrics during our sample period. Because of our short-time series, the samples for this analysis are limited to 33 firms changing from $ATAX = 1$ to $ATAX = 0$ or vice versa and 31 firms changing from $CFLOW = 1$ to $CFLOW = 0$ or vice versa. Because the changes in

Table 6 Median difference in differences for firms switching targets

Panel A: Firms switching to or from *ATAX*

	Firms switching from *ATAX* to *PTAX* (N = 20)	Firms switching from *PTAX* to *ATAX* (N = 13)	Difference in differences
ΔETR	0.001	−0.024	0.025
	(0.71)	(0.46)	(0.28)
ΔCETR	0.010	−0.008	0.018
	(.070)	(0.35)	(0.56)

Panel B: Firms switching to or from *CFLOW*

	Firms switching from *CFLOW* (N = 17)	Firms switching to *CFLOW* (N = 14)	Difference in differences
ΔETR	0.038	0.018	0.020
	(0.03)	(0.22)	(0.84)
ΔCETR	0.044	−0.001	0.045
	(0.02)	(0.97)	(0.101)

This table reports median changes in *ETR* and *CETR* for firms that changed their CEO performance metrics during our sample period. Panel A presents changes for firms switching to or from *ATAX,* and Panel B presents changes for firms switching to or from *CFLOW.* We test for a significant difference in differences using a nonparametric Fisher's exact test and report *p* values from a rank-sum test in parentheses below medians

ETR and *CETR* include influential observations (unwinsorized) in small samples, we test for a significant difference in median differences using a nonparametric Fisher's exact test. Changes are reported in Table 6. Our hypotheses suggest that firms switching from *ATAX* report larger increases (or smaller decreases) in *ETR* and that firms switching from *CFLOW* report larger increases (or smaller decreases) in both *ETR* and *CETR.* We observe some patterns consistent with predictions. Specifically we observe larger reductions in *ETR*s for firms switching to *ATAX* and greater increases in *CETR*s for firms switching from *CFLOW.* However, the small sample size limits statistical power (Fisher's exact $p = 0.284$ and $p = 0.101$, respectively). Moreover, we observe no consistent pattern for the differences in median *ETR* changes for firms switching to or from *CFLOW.*

We also employ instrumental variables (IV) to address model specification issues including tax avoidance opportunities (Atwood et al. 1998), CEO bonus intensity and age (Shalev et al. 2013), the classification of the tax department as a profit center (Robinson et al. 2010), and internal information quality (Gallemore and Labro 2015). We also considered the choice of after-tax earnings metrics based on the findings of Huang et al. (2015) regarding firms' propensity to use EPS as a performance metric. The results from these analyses corroborated our findings. Unfortunately, after assessing the strength of the IVs using the techniques suggested by Larcker and Rusticus (2010), we concluded that none of the instruments (individually or collectively) were sufficiently strong to produce more reliable coefficient estimates than those produced by OLS estimation. We therefore believe that results from our OLS estimation present the most reliable evidence of the

relation between CEO performance metrics and effective tax rates but caution readers when interpreting our results that bias due to endogeneity or other misspecification may still exist.[20]

5 Supplemental analyses

Our results indicate that after-tax earnings performance targets motivate different tax expense reporting choices rather than incremental tax planning. In this section, we investigate two potential channels that allow CEOs evaluated with after-tax earnings metrics to make opportunistic financial reporting choices that reduce *ETR*s without simultaneously reducing *CETR*s: (1) designating foreign earnings as permanently reinvested (PRE) in accordance with APB 23 and (2) limiting discretionary reserves for uncertain tax benefits (UTB).

5.1 Permanently reinvested earnings (PRE)

Holding the level of worldwide taxes paid constant, a firm can report a lower *ETR* if management asserts its intention to permanently reinvest foreign earnings. This assertion allows the firm to defer accruing incremental U.S. tax until these earnings are repatriated. Krull (2004) finds evidence that managers manipulate PRE designations in response to capital market incentives. Similarly, CEOs incentivized with after-tax earnings metrics can influence PRE designations in response to their own compensation incentives. We test this conjecture by estimating the following pooled OLS regression.

$$\begin{aligned}\Delta PRE_{it} = {} & \beta_0 + \beta_1 ATAX_{it} + \beta_2 ROSDiff_{it} + \beta_3 CH\_FSALES_{it} + \beta_4 FTR_{it} \\ & + \beta_5 DIVYIELD_{it} + \beta_6 LEV_{it} + \beta_7 NONBIND_{it} + \beta_8 FTR * NONBIND_{it} + \varepsilon_i. \end{aligned} \quad (3)$$

We estimate this regression using all observations from our sample with nonmissing PRE in the Audit Analytics database during our sample period. The dependent variable is the change in PRE from $t-1$ to t scaled by total sales. Our variable of interest is *ATAX*, and β_1 captures the differential change in PRE between firms using after-tax earnings metrics and those using pre-tax earnings metrics, controlling for other factors influencing PRE.

Our control variables are similar to Krull (2004). We calculate differences in domestic and foreign return on sales (*ROSDiff*) to capture differences in foreign and domestic investment opportunities. We expect firms earning a greater return on sales in foreign jurisdictions than domestically to designate a greater portion of foreign earnings as PRE ($\beta_2 > 0$). We control for the year-over-year difference in foreign sales (*CH_FSALES*) to control for changes in the scope of foreign

[20] We also re-estimate our main analysis after dividing the sample into foreign and domestic firms, because Newman (1989) suggests that firms with foreign operations are more likely to use after-tax incentives. Our results (untabulated) hold within both domestic and multinational subsamples, suggesting that foreign operations are not driving our results.

operations ($\beta_3 > 0$). We also include controls for tax incentives associated with foreign earnings. *FTR* captures the firm's average foreign tax rate. Lower foreign tax rates decrease the tax benefit of having foreign subsidiaries make deductible repatriations to the U.S. parent (e.g., intercompany interest payments). Thus PRE is expected to be higher for firms with lower foreign tax rates ($\beta_4 < 0$). Additionally, firms with excess foreign tax credit limitations potentially face incremental U.S. tax on repatriation, further reducing the likelihood of repatriation from low-tax jurisdictions. We set *NONBIND* equal to one if the firm is estimated to have excess foreign tax credits and expect the coefficient on the interaction between *FTR* and *NONBIND* (β_6) to be greater than zero. Finally, we control for the cash needs of the U.S. parent by including *DIVYIELD* and *LEV*. Because *NONBIND* requires 5 years of data to calculate and is a noisy measure of firms' foreign tax credit positions, we estimate Eq. (3) both with and without this variable to maximize the sample.

We present the results from this analysis in Table 7. Panel A of Table 7 presents descriptive statistics for regression variables not tabulated elsewhere. We estimate that firms compensating CEOs with after-tax earnings incentives report greater 1-year increases in PRE, all else equal. Based on average assets of approximately $8 billion in the subsample of firms reporting PRE, our coefficient estimates in Panel B of Table 7 are associated with an additional $40 million to $56 million in PRE designations for firms using after-tax earnings metrics. This finding should matter to shareholders, given the finding in Graham et al. (2011) that managers consider the financial reporting implications of repatriating cash to be as important as the tax consequences.

5.2 Reserves for uncertain tax positions

ASC 740 requires firms to accrue reserves for claimed tax benefits that are not more likely than not to be sustained upon audit by tax authorities. Holding the nature of tax avoidance constant, these reserves therefore provide managers with an opportunity to report lower *ETR*s without changing cash taxes paid. For example, De Simone et al. (2014) show disparity in how firms in the same industry accounted for tax uncertainty surrounding identical tax positions claimed. CEOs compensated on after-tax earnings metrics can take advantage of the flexibility and discretion afforded by ASC 740 to opportunistically account for tax uncertainty.

Using a research design similar to Rego and Wilson (2012), we estimate whether *ATAX* affects firms' reserves for unrecognized tax benefits (*UTB*) after controlling for known determinants of the reserve.[21]

$$UTB_{it} = \beta_0 + \beta_1 ATAX_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 FORSALES_{it} + \beta_5 RD_{it} + \beta_6 SGA_{it} + \beta_7 DISC\_ACC_{it} + \beta_8 LEV_{it} + \beta_9 BM_{it} + \beta_{10} GROW_{it} + \varepsilon_i. \quad (4)$$

All variables are defined in "Appendix". Panel A of Table 8 presents descriptive statistics for regression variables not tabulated elsewhere. We estimate that the

[21] Results are robust to estimating UTBs using the methodology of Lisowsky et al. (2013) and Nesbitt (2014), who measure some control variables over multi-year horizons.

Table 7 Permanently reinvested earnings (PRE) analysis

Panel A: Descriptive statistics for PRE regressions

Variables	Pre-tax (ATAX = 0)			After-tax (ATAX = 1)			Median difference
	P25	Median	P75	P25	Median	P75	
PRE	0.000	41.10	303.0	22.20	300.5	960.7	−259.4*
PRE_AT	0.000	0.033	0.129	0.023	0.123	0.260	−0.090*
CH_PRE	0.000	0.004	0.034	0.000	0.013	0.050	−0.008*
DELTA	148.6	332.1	679.2	222.2	452.0	930.0	−119.8*
VEGA	10.41	63.38	158.9	39.46	147.6	332.6	−84.27*
ROSDIFF	−0.108	−0.030	0.037	−0.044	0.015	0.089	−0.045*
FORSALES	0.212	0.406	0.596	0.245	0.388	0.544	0.017
CH_FSALES	−0.002	0.104	0.201	−0.045	0.081	0.165	0.023*
FTR	0.131	0.256	0.371	0.154	0.245	0.322	0.011*
DIVYIELD	0.000	0.000	0.012	0.000	0.011	0.021	−0.011*
LEV	0.003	0.114	0.258	0.094	0.190	0.277	−0.075*
NONBIND	0.000	1.000	1.000	1.000	1.000	1.000	0.000

Panel B: Determinants of PRE

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
ATAX	0.007***	0.007***	0.006**	0.006***	0.006***	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CFLOW		0.005*	0.004		0.005*	0.004
		(0.003)	(0.003)		(0.003)	(0.003)
LOGDELTA			0.001			0.001
			(0.001)			(0.001)
LOGVEGA			0.001			0.001
			(0.001)			(0.001)
ROS_DIFF	−0.002	−0.002	−0.000	−0.004	−0.004	−0.003
	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
CH_FSALES	0.011**	0.013**	0.012**	0.006	0.007*	0.007
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
FTR	−0.002***	−0.002***	−0.002***	−0.001**	−0.001**	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DIVYIELD	−0.109	−0.105	−0.083	−0.077	−0.074	−0.051
	(0.078)	(0.078)	(0.088)	(0.074)	(0.074)	(0.085)
LEV	0.001	−0.002	−0.005	0.003	0.000	−0.002
	(0.007)	(0.007)	(0.008)	(0.006)	(0.006)	(0.007)
NONBIND	0.003	0.004	0.004			
	(0.002)	(0.002)	(0.003)			
*FTR*NONBIND*	0.002***	0.002***	0.002***			
	(0.000)	(0.000)	(0.000)			

Table 7 continued

Panel B: Determinants of PRE						
Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Observations	580	580	574	638	638	632

Panel A: * Median difference is significant with $p < 0.10$ using a two-tailed median test to compare observations where no after-tax earnings metrics are included in the CEO's annual short-term bonus contract ($ATAX = 0$) to those observations where at least one after-tax earnings metric is included ($ATAX = 1$). The sample is described in Table 1, and all variables are defined in "Appendix". The number of observations for each variable varies based on data availability

Panel B: This table estimates the change in *PRE* as a function of after-tax earnings performance metrics. All specifications estimated using robust regression (MM estimation method) to address influential observations. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry, (one-digit SIC) and year fixed effects that are not tabulated. "Appendix" defines the variables

inclusion of after-tax earnings metrics is associated with a significantly lower value of *UTB*, all else equal. Our coefficient estimates in Columns (1) through (3) of Table 8, Panel B, indicate that *UTB*s are approximately $8 million lower when the CEO's incentives include at least one after-tax earnings metric. These results are consistent with CEOs in the after-tax subsample accruing smaller discretionary reserves for the uncertain tax avoidance they pursue. However, these results may suggest that CEOs in the after-tax sample pursue fewer uncertain tax avoidance strategies to avoid having to accrue reserves altogether. To disentangle these explanations, we include *L.CETR3* as an additional explanatory variable in Column (4) to control for the level of tax planning. We continue to estimate a negative coefficient on *ATAX*, which highlights that firms with CEOs who are compensated using after-tax earnings metrics report smaller reserves for tax uncertainty for a given level of tax planning.

6 Summary

We examine how different accounting metrics in CEO short-term cash compensation affect the level of corporate tax planning and financial reporting for income taxes. Using a sample of profitable firms from 2009 through 2011, we find that CEOs incentivized with cash flow metrics report lower ETRs and cash ETRs than firms using only earnings metrics. We also find that, among firms using only earnings-based metrics to incentivize their CEOs, firms using after-tax earnings metrics report lower ETRs but similar cash ETRs as firms using pre-tax earnings metrics. These results suggest that firms evaluating CEOs using after-tax earnings metrics have similar levels of cash tax savings but make different financial reporting decisions. Consistent with this conjecture, we provide evidence that firms using after-tax earnings metrics are more likely to designate foreign earnings as permanently reinvested and report lower discretionary reserves for tax uncertainty,

Table 8 Tax reserve analysis

Panel A: Descriptive statistics for UTB regressions

Variables	Pre-tax (N = 520) (*ATAX* = 0)			After-tax (N = 619) (*ATAX* = 1)			Median difference
	P25	Median	P75	P25	Median	P75	
UTB	4.064	14.21	64.59	5.075	19.99	97.00	−5.781*
UTB_AT	0.004	0.008	0.016	0.003	0.007	0.015	0.001
FORSALES	0.000	0.277	0.500	0.093	0.312	0.516	−0.036*
SGA	0.093	0.193	0.322	0.108	0.183	0.300	0.010
DISC_ACC	0.013	0.026	0.050	0.013	0.028	0.052	−0.003

Panel B: UTB determinants

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
ATAX	−0.001	−0.001**	−0.001**	−0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
L.CETR3				−0.000*
				(0.000)
CFLOW			0.001	0.001
			(0.001)	(0.001)
DELTA		0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)
VEGA		0.001***	0.001***	0.001***
		(0.000)	(0.000)	(0.000)
ROA	−0.005*	−0.005*	−0.004*	−0.004*
	(0.003)	(0.003)	(0.003)	(0.003)
SIZE	0.002***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
FORSALES	0.005***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
RD	0.019***	0.016***	0.015***	0.017***
	(0.004)	(0.004)	(0.004)	(0.004)
SGA	0.006***	0.006***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
DISC_ACC	−0.001	0.001	0.000	0.000
	(0.005)	(0.004)	(0.004)	(0.004)
LEV	−0.003**	−0.002*	−0.002**	−0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
BM	−0.003***	−0.003***	−0.003***	−0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
GROW	−0.003**	−0.002*	−0.002*	−0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
CONSTANT	−0.005***	−0.004**	−0.004**	−0.004**
	(0.002)	(0.002)	(0.002)	(0.002)

Table 8 continued

Panel B: UTB determinants				
Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
Observations	1139	1132	1132	1115

Panel A: * Median difference is significant with $p < 0.10$ using a two-tailed median test to compare observations where no after-tax earnings metrics are included in the CEO's annual short-term bonus contract ($ATAX = 0$) to those observations where at least one after-tax earnings metric is included ($ATAX = 1$). The sample is described in Table 1, and all variables are defined in "Appendix". The number of observations for each variable varies based on data availability

Panel B presents results of estimating the reserve for uncertain tax benefits calculated in accordance with FIN 48 (*UTB*) as a function of after-tax performance metrics based on the methodology from Rego and Wilson (2012). All specifications are estimated using robust regression (MM estimation method) to address influential observations. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, using two-tailed tests. All specifications include an intercept, industry (one-digit SIC), and year fixed effects that are not tabulated. "Appendix" defines the variables

all else equal. Both of these actions can result in lower reported tax expense without reducing cash taxes paid.

We note several implications of our findings. First, our results suggest that cash flow metrics may more efficiently incentivize tax planning that generates additional cash tax savings. This finding is consistent with survey evidence documenting that managers prefer tax planning that provides a financial reporting benefit to tax planning that provides only a cash flow benefit (Graham et al. 2014) and should be of interest to shareholders and compensation committees when designing CEO compensation contracts. We also find that, within our sample, the characteristics of CEOs' stock-based compensation vary with performance metrics. We observe significantly higher values of *VEGA* among firms using cash flow performance metrics or after-tax earnings metrics to evaluate CEO performance. These statistics underscore the importance of controlling for CEO risk incentives when evaluating the effect of CEOs on corporate taxes. Finally, we show that, despite its smaller relative magnitude, annual cash incentives influence corporate tax planning decisions even after controlling for equity compensation. This is important because the literature has largely focused on the role of equity incentives. Our findings suggest CEOs also respond to annual cash performance metrics.

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Appendix: Variable definitions

Tax rate variables

ETR = Tax expense (TXT) in year *t* divided by pre-tax income (PI) in year *t*

CETR = Cash taxes paid (TXPD) in year *t* divided by pre-tax income (PI) in year *t*

Performance metrics

ATAX = A binary variable that equals one for firm-years where the CEO annual incentive is determined using an after-tax earnings performance metric and zero otherwise

CFLOW = A binary variable that equals one for firm-years where the CEO annual incentive is determined using a cash flow performance metric and zero otherwise

Compensation variables

DELTA = The change in CEO wealth from stock and option holdings given a 1 % change in stock price. Calculated following Core and Guay (1999)

VEGA = The sensitivity of the CEO's wealth to a 1 % change in stock return volatility. Calculated following Guay (1999)

SALARY = CEO salary in thousands of US$ as reported in Execucomp

%SALARY = *SALARY* as a percentage of total compensation as reported in Execucomp

BONUS = CEO discretionary and non-equity plan bonus in thousands of US$ as reported in Execucomp

%BONUS = *BONUS* as a percentage of total compensation as reported in Execucomp

STOCK = The value of all stock-based compensation (restricted stock and options) in thousands of US$ granted to the CEO as reported in Execucomp

%STOCK = *STOCK* as a percentage of total compensation as reported in Execucomp

Control variables

SIZE = Natural log of total assets (AT) at the beginning of year *t*

ROA = Pre-tax income (PI) divided by total assets (AT) at the beginning of year *t*

LEV = Total debt divided by total assets (AT) at the beginning of year *t*

FOR = A binary variable that equals one if foreign pre-tax income (PIFO) is not missing or zero and zero otherwise

CAP = Property, plant, and equipment (PPENT) divided by total assets (AT) at the beginning of year *t*

RD = Research and development expense (XRD set to zero if missing) divided by sales (SALE) in year *t*

INTAN = Intangible assets divided by total assets (AT) at the beginning of year *t*

BM = Common equity (CEQ) divided by market value of equity (PRCC_F × CSHO)

GROW = The change in sales (SALE) from year $t - 1$ to year *t* deflated by sales in year $t - 1$

NOL = A binary variable that equals one if tax carryovers (TLCF) are greater than zero and zero otherwise

NOLC = The change in tax carryovers (TLCF) from year $t - 1$ to year *t* deflated by total assets (AT) at the beginning of year *t*

LIQ = Cash and investments (CHE) divided by total assets (AT) at the beginning of year *t*

L.CETR3 = Cash taxes paid (TXPD) aggregated from year $t - 3$ to year $t - 1$ divided by pre-tax income (PI) aggregated from year $t - 3$ to year $t - 1$

Variables related to propensity matching

AGE = The number of years since a firm entered Compustat

CFVOL = The time-series standard deviation of the ratio of operating cash flows to average assets, calculated using the previous 10 years of data

CFPERSIST = The estimate of θ for the following AR(1) process using the previous 10 years of data, $X_t = \mu_t \Phi X_{t-1} + \mu t$, where X_t is the ratio of operating cash flows to average assets in year *t*

WERANK = The decile ranking of the Whited–Wu Index

TRADECY = The sum of average accounts receivable, inventory, and accounts payable, deflated by average daily sales, cost of goods sold, and purchases of inventory, respectively

SALEAVE = The natural log of average sales from year $t - 4$ through year *t*

MNE = An indicator variable equal to one if the firm has nonmissing, nonzero foreign income in year *t* and zero otherwise

CAPAVE = the average ratio of gross property, plant, and equipment to total assets from year $t - 4$ through year *t*

INVAVE = The average ratio of inventory to total assets from year $t - 4$ through year *t*

LEVAVE = The average ratio of long-term and current debt to total assets from year $t - 4$ through year *t*

GSEG = The natural log of the number of operating or geographic segments reported in the Compustat Segments database in year *t*

BONINTAVE = The average industry (one-digit SIC) bonus intensity for year *t* computed by each firm by dividing the bonus paid to the CEO by the CEO's total compensation

Variables related to permanently reinvested foreign earnings

PRE = Amount of foreign earnings asserted to be permanently reinvested in accordance with APB 23 as reported in Audit Analytics in millions USD

PRE_AT = PRE scaled by total asset (AT) at the beginning of year *t*

CH_PRE = Change in foreign earnings designated as permanently reinvested from year $t - 1$ to year *t* deflated by total sales in year *t*

ROS_Diff = Difference between the foreign and domestic return on sales for firm *i* in year *t,* where foreign return on sales is calculated as foreign net income divided by foreign sales and domestic return on sales is domestic net income divided by domestic sales

FORSALES = Total foreign sales reported in the Compustat Geographic Segment file for firm *i* in fiscal year *t* divided by total sales in year *t*

CH_FSALES = The change in foreign sales reported in the Compustat Geographic Segment file from year $t - 1$ to year *t* deflated by total foreign sales in year *t*

FTR = Average current foreign tax rate for firm *i* in fiscal year *t*, where current foreign income tax expense (TXFO) is divided by foreign pre-tax income (PIFO)

DIVYIELD = Total dividends paid by firm *i* in fiscal year *t* divided by the market value of equity (PRCC_F × CSHO)

NONBIND = A binary variable that equals one for firm-years where the 5-year *FTR* is less than the U.S. statutory tax rate of 35 % and zero otherwise

Variables related to reserves for unrecognized tax benefits

UTB = Reserve for unrecognized tax benefits recorded in accordance with ASC 740 at the end of year *t,* in millions USD

UTB_AT = UTB scaled by total assets (AT) at the end of year *t*

SGA = Selling, general, and administrative expense (XGA set to zero if missing) divided by sales (SALE) in year *t*

DISC_ACC = Discretionary accruals calculated using performance-adjusted modified Jones model

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