Executive Equity Compensation and Tax Avoidance:

The Effect of Firm Size

I. INTRODUCTION

Economic theory predicts a significant relationship between executive equity compensation incentives and corporate outcomes (e.g., Core, Guay, and Larcker 2003; Flor, Frimor, and Munk 2014). In line with this theory, a limited stream of research seeks to document a relation between executive compensation attributes and tax avoidance. Furthermore, prior research documents considerable differences in executive compensation incentives between larger and smaller firms (Cadman, Klasa, and Matsunaga 2010). In this study, we seek to bring together these areas of research to study the relationship between executive compensation incentives and tax avoidance, while focusing on the direct effect of firm size on this relationship.

Firm size has important implications for a firm's compensation and tax avoidance. First, prior studies examining compensation largely ignore small companies, given that the majority of these studies use the ExecuComp database which is made up of the firms within the S&P 1500 index. Cadman, Klasa, and Matsunaga (2010) find that ExecuComp firms are larger and that their CEOs have higher levels of total compensation and higher proportion of equity compensation (restricted stock and stock options) relative to total compensation than non-ExecuComp firms. While prior studies that examine the relationship between equity compensation and tax avoidance typically control for firm size, Cadman et al. (2010) demonstrate that the differences between large firms and small firms relating to their differing contracting environments and are not replicable within a sample of only ExecuComp firms. Furthermore, other studies have shown more generally the importance in distinguishing large firms from smaller firms, especially in empirical research. Bamber, Christensen, and Gaver (2000) discuss how research design can significantly affect

research results, and specifically, that empirical research can present an overgeneralization of results found in smaller firms. Similarly, Givoly, Hayn, and Lourie (2016) argue that large samples used in accounting and finance empirical research may "lead to inferences that are tainted by a 'small-firm' bias. This bias refers to the disproportionate weight assigned to the large number of small cap companies present in the examined samples." Both of these studies illustrate the importance of analyzing anomalies in firms without discounting the importance of firm size.

Second, both economic theory and the extant empirical evidence provide conflicting insights on the relation between equity compensation and tax avoidance. On the one hand, to the extent that tax avoidance minimizes cash payments to tax authorities, it enhances shareholder value. Agency theory therefore predicts that aligning managers' incentives with shareholders' using equity compensation should incentivize managers to engage in tax avoidance (Crocker and Slemrod 2005). On the other hand, tax exhaustion theory predicts as firms make use of the tax shield of equity compensation, their demand for additional tax avoidance declines (Seidman and Stomberg 2017). Hence larger firms that pay significantly more in equity compensation than smaller firms (both in dollar amounts and as a proportion of total compensation) should approach tax exhaustion sooner than smaller firms. This theory predicts a negative relation between equity compensation and tax avoidance, especially within large firms. We seek to contribute to this stream of literature by adding an additional insight using the effect of firm size on the relationship between compensation and tax avoidance.

We posit that smaller firms do not have access to a robust capital market and may thus need to more strongly rely on an effective incentive and compensation structure. Evidence in existing literature supports this idea in that pay-for-performance sensitivity is decreasing in firm size (Schaefer 1998; Murphy 1999; and Dicks 2012). Hence, we expect executives in smaller firms to

be more motivated to engage in tax avoidance than executives in larger firms. We predict that the association between equity compensation and tax avoidance is more positive (less positive) in smaller (larger) firms.

To test our hypothesis, we examine the relation between executive equity compensation incentives and tax avoidance by firm size quartile using a large sample comprised of compensation information for executives of companies included in the S&P Capital IQ database. Our final sample consists of 22,804 firm-year observations with CEO and CFO compensation data over the period 2006 to 2017. We follow prior literature in measuring tax avoidance as the three-year cash effective tax rate (ETR) and three-year GAAP ETR (e.g., Dyreng, Hanlon, and Maydew 2010), as well as industry-adjusted measures of each. We measure equity incentives as the ratio of annual stock and option awards to total annual compensation (e.g., Armstrong, Blouin, and Larcker 2012). We focus on this measure of compensation incentives for three reasons: First, it is simple and compared to delta and vega, can more easily be adjusted by directors to influence manager behavior. Second, compensation mix is commonly used by compensation consulting companies who heavily influence compensation structure (e.g., Conyon, Peck, and Sadler 2009). Finally, because the measure is readily available for more companies, we can examine a more complete sample of large and small firms, which is crucial for testing our hypothesis.

Consistent with our hypothesis, we find that CEO equity compensation incentives negatively relate to both Cash ETR and GAAP ETR, but only in smaller firms. Specifically, a significant negative association between equity compensation and tax avoidance does not exist in firms within the top size quartile but is prominent in the bottom three quartiles representing 75 percent of total assets. Similarly, after controlling for financial constraints and the tax deductibility of equity compensation, we continue to find a negative association between CEO equity

compensation incentives and both Cash ETR and GAAP ETR, but only within smaller firms. Using the ending balance of unrecognized tax benefits or increases to this balance due to uncertain tax positions taken in the current year, we continue to find that only smaller companies avoid more taxes when they compensate their executives with equity compensation. These results suggest that firm size can substantially affect insights into the relation between executive compensation and corporate tax planning. The results highlight size as a boundary condition that reconciles the seemingly conflicting agency and tax exhaustion theories with respect to tax avoidance. Specifically, our results are consistent with agency theory which suggests equity compensation aligns managers' interests with shareholders' fostering tax savings. The results are also consistent with tax exhaustion theory which suggests the marginal benefits of tax savings become smaller as large firms pay more equity compensation.

The primary contribution of this study is that we extend the emerging literature exploring the relationship between executive incentives and tax avoidance (e.g. Armstrong, Blouin, and Larcker 2012; Gaertner 2014; Armstrong, Blouin, Jagolinzer, and Larcker 2015). For example, Armstrong, Blouin, and Larcker (2012) explore variation in executive responsibility for tax avoidance. Relying on the knowledge that tax directors are highly responsible for tax planning, they use proprietary compensation data for a sample of large firms and find a negative relation between tax director compensation incentives and GAAP ETR, but perhaps due to the unique contracting environment of large firms, they do not find evidence of a relation between CEO (CFO) compensation incentives and either GAAP or Cash ETR.

We extend these studies by exploring differences in the relation between executives' equity compensation and tax avoidance, conditioning on firm size. Although, on average, we find no evidence of a relation between CEO (CFO) equity compensation and tax avoidance within large

firms, there is a strong positive relation between these constructs within smaller firms. These results suggest that the differences in contracting environment across firms that have been documented in prior research partially explain why some empirical tests based on a sample of large firms fail to corroborate economic theory. Moreover, we demonstrate that in testing the link between tax avoidance and equity compensation incentives, tests comparing groups within large firm samples and controlling for size are not substitutes for tests directly comparing large- and small-firm samples.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Executive Incentives, Corporate Outcomes, and Tax Avoidance

Economic theory predicts a significant relationship between executive incentives and corporate outcomes. Jensen and Meckling (1976) and Holmstrom (1979) helped lay the foundation of optimal contracting by modeling compensation contracts as solutions to the traditional agency problem of the firm. More specifically related to tax avoidance, Crocker and Slemrod (2005) provide a model of the contractual relationship between a firm's directors and a firm's shareholders, and state that it is in the shareholders' interests to align executive incentives with the effective tax rate of the firm, such that the directors reduce the firm's tax liabilities. Desai and Dharmapala (2006) also provide a theoretical foundation for the relationship between compensation and tax avoidance and explore this relationship in conjunction with managerial rent-extraction and corporate governance. These theories predict a positive relationship between executive compensation and tax avoidance.

In line with theory, a vast stream of research has attempted to empirically document the relationship between top executives and outcomes of the firm. A limited number of studies,

however, have examined the relationship between compensation and tax avoidance, without finding the expected relationship. Phillips (2003) is one of the first studies to examine compensation and tax-specific outcomes of a firm. He uses a proprietary data set to study the tax-specific performance measures of CEOs and business unit managers and finds no relationship between tax performance measures for CEOs and GAAP ETR. Dyreng, Hanlon, and Maydew (2010) find a general executive effect on ExecuComp firms' effective tax rate, that is, tax avoidance that cannot be explained by characteristics of the firm and can be attributed to individual executives. However, the results of the study do not specifically attribute the effects on tax avoidance to the wealth sensitivity of the executives. Using proprietary data of large firms, Armstrong, Blouin, and Larcker (2012) find a similar result that the compensation mix of executives of the firm (CEO, CFO, and General Counsel) does not have a significant relationship with GAAP or Cash ETR.

Another group of studies *do* find an effect of CEO compensation on tax avoidance. Rego and Wilson (2012) posit that tax avoidance is a risky activity, and as such, relates to the equity risk incentives given to executives. In their ExecuComp sample, they find that option vega, or wealth sensitivity of the CEO to changes in stock return volatility, positively relates to tax avoidance using several different measures of tax avoidance. Armstrong, Blouin, Jagolinzer, and Larcker (2015) find a similar result in their sample from Equilar by looking not only at the mean tax avoidance but at extreme levels as well. They find that CEO equity incentives are positively related to tax avoidance and that the relation is stronger at higher levels of tax avoidance. Gaertner (2014) finds that the existence of tax performance measures in a CEOs contract is, indeed, positively related to tax avoidance, as measured by GAAP ETR. However, the study does not find a significant relationship between CEO delta or vega and tax avoidance.

Finally, there is a group of studies that find a negative relationship between executive incentives and tax avoidance. Desai and Dharmapala (2006) find results that are initially counter-intuitive, i.e., increasing incentives for top executives actually decreases tax avoidance, as measured by the book-tax gap. They explain this relationship by arguing that complex tax sheltering provides opportunities for rent-extraction by managers. Increases in compensation better align managers' interests with shareholders, thus reducing private rent-extraction by managers, and as a result, reducing the tax sheltering mechanisms that help obfuscate rent-extracting activities. Similarly, Seidman and Stomberg (2017) find a negative relationship between equity compensation mix of top executives and tax avoidance. They attribute the relationship to tax exhaustion theory and show that firms substitute between tax minimization activities such that when a firm has significant equity compensation and takes the related tax deductions to benefit the firm, the firm will use less tax shelters, especially when the marginal benefit of an additional tax avoidance activity is low.

Firm Size

Cadman, Klasa, and Matsunaga (2010) find significant differences in the contracting environments between firms found in Standard & Poors's (S&P) ExecuComp database (ExecuComp firms), which covers firms within the S&P 1500 indices, and firms not covered by the ExecuComp database (non-ExecuComp firms). They find that ExecuComp firms are larger, more profitable, more highly levered, have higher complexity, greater analyst following, greater (but less concentrated) institutional ownership, greater stock liquidity, and generally, a healthier financial outlook. Furthermore, executives of ExecuComp firms are found to have significantly greater levels of total compensation and a greater proportion of their compensation packets in the

form of non-cash compensation. These differences lead them to predict and show three main results: ExecuComp firms rely more heavily on earnings and stock returns as performance measures; the weight on earnings is less sensitive to a firm's growth opportunities for non-ExecuComp firms; and the positive relationship between institutional ownership concentration and stock option grants is less likely to hold in non-ExecuComp firms. Broadly, the study shows that differences in the contracting environment lead to differences in the design of incentive contracts, and as such, "expanding samples to include non-ExecuComp firms can substantially influence empirical results and provide researchers with additional insights into executive compensation and corporate governance issues (p. 1514-1515)." The systematic differences between ExecuComp and non-ExecuComp firms and their executive compensation structures documented in Cadman, Klasa, and Matsunaga (2010) and discussed above have larger implications for the effect of firm size on the relationship between executive compensation and tax avoidance.

Smaller firms do not have access to a robust capital market, which can have compensation and tax-avoidance implications. Opler, Pinkowitz, Stulz, and Williamson (1999) study the determinants of cash holdings and find that cash holdings decrease significantly with firm size. They explain that firms with the greatest access to the capital market, such as large firms, hold less cash. Because small firms do not have the same access to a robust capital markets environment, they hold cash for internal financing purposes, which could in turn mean that less cash is available for executive compensation. Thus, smaller firms may need to more strongly rely on an effective incentive and compensation structure. Evidence in existing literature supports this idea. Research has shown that pay-for-performance sensitivity is decreasing in firm size. Schaefer (1998) develops an agency theory model to determine that pay-performance sensitivity and firm size are inversely related, implying that executives in smaller firms have a higher reservation utility. In his

review of theoretical and empirical compensation literature, Murphy (1999) also states that pay-performance sensitivity varies monotonically and inversely with firm size. Dicks (2012) also develops a theoretical model that predicts and shows that while executive compensation levels increase in firm size, pay-for-performance sensitivity decreases in firm size. Furthermore, the size of a firm may also impact the tax avoidance opportunities presented to the firm. Several studies examine the effect of firm size on tax avoidance measures (Zimmerman 1983; Porcano 1986; Rego 2003). While earlier studies found mixed results on the relationship, Rego 2003 provides more comprehensive modeling and sample selection, and concludes that there is evidence of economies of scale in tax planning. Together, these studies emphasize the importance of firm size in the firm's equity incentive structure and tax avoidance strategies, and as such, in the relationship between the two.

More generally, studies have shown biases can exist in empirical studies due to size effects of sample firms. Bamber, Christensen, and Gaver (2000) analyze two design choices made in empirical research, one of which is the sample selection criteria. Specifically, the authors highlight that results in seminal work by Beaver (1968) were based on a set of relatively small firms, and that those results are often overgeneralized in subsequent research. Similarly, Givoly, Hayn, and Lourie (2016) stress the importance of considering firm size in the weighting of sample firms when analyzing market anomalies, such that "small-firm bias" is avoided. They argue that the bias results from a "disproportionate weight assigned to the large number of small cap companies present in the examined samples relative to their market capitalization."

While some may argue that the studies discussed above promote or encourage the exclusion of small firms in empirical studies, we argue that the studies support our examination of the direct effect of size on the relationship between compensation and tax avoidance and highlight the

importance of examining the relationship between equity compensation and tax avoidance for large and small firms separately. We expect pay-for-performance sensitivity to be higher in smaller firms, and thus, we expect executives in these firms to be more motivated to engage in more tax avoidance than executives in larger firms.

Other firm attributes, such as profitability, liquidity, and total levels of executive compensation also play a role in our expectation of the relationship between equity compensation and tax avoidance. Edwards, Schwab, and Shevlin (2015) examine the relationship between financial constraints and tax planning activities. They find that firms facing increases in financial constraints, specifically firms with low cash reserves, exhibit declines in their effective tax rates, indicating more tax planning in these firms. As discussed above, smaller, non-Execucomp firms tend to be less profitable, more financially constrained, and have lower stock liquidity than ExecuComp firms, indicating that smaller firms may rely more-strongly on tax planning activities.

Desai and Dharmapala (2006) explore the relationship between managerial incentives and tax avoidance, and while they focus on managerial rent extraction being the cause of the negative relationship between incentives and tax avoidance, they do not dismiss the possibility that the results may be due to tax-exhaustion theory. Later, Seidman and Stomberg (2017) find a similar result in the relationship between managerial incentives and tax avoidance but attribute their findings to tax exhaustion theory and the marginal benefit of tax avoidance. They argue that firms have a variety of tax-shield options, one of which is the tax benefits provided by equity compensation (equity compensation deductions) and that the tax benefits related to having more equity compensation will reduce a firm's demand for *additional* tax avoidance. Their results imply that firms with more total equity compensation, such as larger firms, are less likely to engage in other tax avoidance activities.

All together, the studies above provide insight into why prior research on the relationship between executive equity compensation and tax avoidance may be mixed. Because smaller firms have higher pay-performance sensitivity, are generally less profitable, more financially constrained, and have less total compensation, we posit that the relationship between equity compensation and tax avoidance is stronger in smaller firms than in larger firms. Formally stated, our hypothesis is as follows:

Hypothesis: The association between equity compensation and tax avoidance is more positive (less positive) in smaller (larger) firms.

III. SAMPLE SELECTION AND RESEARCH DESIGN

Sample selection

We obtain compensation data from the S&P Capital IQ (CIQ) Compensation database. CIQ is more comprehensive than Compustat's ExecuComp database, which is widely used in compensation empirical research and covers only the S&P 1500. The CIQ universe of firms not only includes public firms, but also private companies and other non-standard types of firms, such as unions and educational institutions, from all major markets. The sample provides us with a much broader range of firms, where we may better understand the relationship between equity compensation and tax avoidance based on firm size.

We match fiscal year *t* equity compensation incentives to tax avoidance measures computed over fiscal years *t* through fiscal year *t+1*. We obtain data to compute the tax outcome avoidance and control variables from the Compustat database. In line with prior literature, we delete financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) in order to eliminate the effect of regulatory and institutional differences between these firms and other firms.

Our final sample consists of 22,804 firm-year observations for firms with CEO compensation data over the period 2006 to 2017. The sample for our tests of CFO compensation incentives consists of 16,708 firm-year observations.

Research design

We predict a more positive relationship between tax avoidance and executive equity compensation incentives for smaller firms relative to larger firms. To test this prediction, we estimate the following ordinary least squares (OLS) regression model at the firm-year level by size quartile:

$$TaxAvoidance_{i,t} = \alpha_0 + \alpha_1 EQUITY_{i,t} + \beta_n Controls_{n,i,t} + \varepsilon_{i,t} \quad (1)$$

In our main tests, we measure firm size by the natural log of assets[1]. Consistent with prior literature (e.g., Dyreng, Hanlon, and Maydew 2010), we use two proxies to measure tax avoidance. The first proxy, Cash ETR (*CASHETR3*) is the sum of cash taxes paid (TXPD) for year *t* through year *t+1*, divided by the sum of adjusted pre-tax income (PI-SPI) over the same period. The second proxy, GAAP ETR (*GAAPETR3*) is the sum of total tax expense (TXT) for year *t* through year *t+1*, divided by the sum of adjusted pre-tax income over the same period.[2] Consistent with prior literature (e.g., Armstrong, Blouin, and Larcker 2012; Seidman and Stomberg 2017), equity compensation incentives (*EQUITY*) is the ratio of annual stock and option awards to total annual compensation for the CEO. We focus on this measure of compensation incentives for three reasons:

[1] In untabulated results, we also measure size as market value, finding similar inferences.

[2] Consistent with prior literature, we require each firm to have positive adjusted pre-tax income in each of the three years over which we compute the tax avoidance measures. We also censor that ETR measures to be between 0 and 1.

First, given its simplicity, this measure can more easily be manipulated by directors to influence manager behavior than, for example, calculating risk in order to manipulate delta and vega. Second, compensation mix is commonly used by compensation consulting companies, which influence how directors set compensation levels (e.g., Conyon, Peck, and Sadler 2009). Finally, from a research design perspective, this measure is more readily available for more companies.

The control variables consist of tax avoidance determinants as well as other variables that might affect equity compensation incentives. Specifically, we control for firm leverage (*LEV*), firm size (*LOGASSET*), market-to-book (*MTB*), capital intensity (*CAPINT*), investments in inventory (*INV*), advertising expense (*AD*), research & development expense (*RD*), pre-tax return on assets (*PROA*), intangibles (*INTAN*), equity in subsidiaries (*EQINC*), net operating loss carried forward (*NOL*), audit quality (*BIG4*), foreign operations (*FORINCD*), cash held (*CASH*). Furthermore, we control for other tax benefits of compensation to account for prior research that has found that firms may exhaust all opportunities to avoid taxes because of their larger equity compensation payments, thus leaving fewer opportunities or incentives for their managers to save additional taxes (Seidman and Stomberg 2017). We control for stock compensation expense and cash tax benefit of stock options using stock compensation expense (*STCKEXP*) and excess tax benefit of stock options (*OPTBEN*). We also control for year and industry fixed effects. See Appendix A for variable measurements.

IV. EMPIRICAL RESULTS

Descriptive statistics

Table 1 presents the industry distribution of our full sample. Generally, our sample reflects similar industry patterns as do other, more commonly used databases. Table 2 presents descriptive

statistics for our sample. Table 3 shows the mean and median of our main variables of interest by firm size quartile, with quartile 1 being the smallest firms and quartile 4 being the largest firms. Based on Table 3, we see that *CASHETR3*, *CASHETR3_ADJ*, *GAAPETR3*, and *GAAPETR3_ADJ* all increase with firm size, that is, smaller firms have lower tax avoidance (higher ETR). Consistent with prior research, we also see that equity compensation increases with larger firms.

Executive Equity Compensation and Tax Avoidance

Our hypothesis predicts a stronger positive relation between executive equity compensation and tax avoidance within smaller firms relative to larger firms. Table 4, Panel A presents OLS regression results for the association between tax avoidance (*CASHETR*) and CEO equity compensation incentives (*EQUITY*). We run regressions within our size quartiles, split by log of assets. We see the coefficient on *EQUITY* is significantly negative only within the bottom three size quartiles. The significant relationship between equity compensation and tax avoidance goes away in the largest firm quartile (column 4). Panel B shows results for the same regression analysis, using industry adjusted Cash ETR as the tax avoidance measure. Here again we see that in the bottom two size quartiles (columns 1 and 2), we see the significant relationship between compensation and tax avoidance. In the third size quartile, this relationship goes away, and in the fourth column, the relationship actually flips, showing us a significant *negative* relationship between equity compensation and tax avoidance (higher ETR). Panels C and D mirror Panels A and B, but use GAAP ETR and industry-adjusted GAAP ETR, respectively, as the measure of tax avoidance. The results in these panels are consistent with Panels A and B. Panel D also shows the reversal of the relationship between equity incentives and tax avoidance in larger firms. Overall, consistent with our hypothesis, the positive relation between CEO equity compensation incentives

and tax avoidance is stronger within smaller firms, and goes away or becomes negative in larger firms. The reversal of results for the largest firms is consistent with tax exhaustion theory in that opportunities and incentives for tax avoidance declines as equity compensation increases for these firms with large equity compensation tax shield (Seidman and Stomberg 2017).

In Table 5, we explore whether any particular piece of equity incentives drives our main result. We split up our independent variable of interest into *STOCK* and *OPTIONS*. Panel A uses industry-adjusted Cash ETR as the dependent variable, while Panel B uses industry-adjusted GAAP ETR. In Panel A, we see that the positive relationship between stock incentives and tax avoidance only exists in the smallest firm quartile. For stock options, we see the same result in the bottom two size quartiles. Furthermore, with options, we see the same result as in Table 4, that the positive relationship flips, such that the relationship between options and tax avoidance is negative in the largest size quartile. Panel B results mirror those in Panel A. Table 5 tells us that both stock and options affect the relationship between equity incentives and tax avoidance, but that the flip in the direction of the relationship happens only with stock options, which indicate that options are the primary driver of our main results. We find the same result for the unadjusted measures of Cash ETR and GAAP ETR (untabulated).

Overall, our results imply that equity compensation motivates tax avoidance but this incentive effect depends on the size of the firm. For the largest of firms, equity compensation no longer encourages tax avoidance. The results are both in line with agency theory and tax exhaustion theory and highlight a clear boundary condition that reconciles these seemingly conflicting theories. Specifically, our results are consistent with agency theory which suggests equity compensation aligns managers' interests with shareholders' yielding tax savings. The results are

also consistent with tax exhaustion theory which suggests the marginal benefits of tax savings become smaller as large firms pay more equity compensation.

Additional Analyses and Robustness Tests

CEO and CFO Compensation

Our main test examines CEO compensation. The CFO of a firm also has incentives and opportunities to influence corporate tax planning and thus, we also examine the effect of CFO equity compensation. Table 6 shows our main results from Table 4, but adds the variable of interest, *EQUITY_CFO*, which is the same equity measure as above, but for the CFO. Panel A uses industry-adjusted Cash ETR as our dependent variable. We see in this panel that there are no significant coefficients for the CFO's equity incentives, and that our main results hold for the CEO's equity incentives (positive relationship between equity incentives and tax avoidance in smaller firms, and a negative relationship in larger firms). Using industry-adjusted GAAP ETR in Panel B, we see the same general result, but see no significant coefficient in the largest size quartile. We find consistent results for the unadjusted measures of Cash ETR and GAAP ETR (untabulated). This result emphasizes the CEOs primary role in influencing firm outcomes and specifically tax avoidance strategies.

Controlling for Highest Paid Executive, Total Wealth, and Other Variable Pay

To further ensure that the CEO's equity incentives influence tax avoidance, in subsequent tests, we examine the equity incentives of the highest paid executive. While it is true that the CEO is often the highest paid executive of a firm, there are instances in which this is not the case. In such instances, one may argue that the CEO does not have the same incentives to influence a firm's outcomes as when he or she is the highest paid individual. One may also argue that the highest

paid executive should be more concerned about generating tax savings. In Table 7, we present our main regression analysis but include the equity incentives for the highest paid executive (*EQUITY_TOP*). In both Panels A and B (adjusted Cash ETR and adjusted GAAP ETR, respectively) we see that our main results hold for our CEO Equity variable of interest but find no consistent results for the highest paid executive. The results suggest the executives' equity compensation association with tax avoidance is driven by the CEO and not by any top executive, highest paid executive, or the CFO.

Prior literature shows that total wealth of a CEO affects their wealth sensitivity. That is, a wealthier CEO will have a lower marginal value of wealth. Therefore, it may be the case that total wealth affects how strongly a CEO is incentivized by his or her annual equity incentives. In untabulated tests, we include total wealth of a CEO (*TOT_EQ_VAL*) in our main regression, which we measure following prior literature as the total value of a CEOs stock and options portfolio, and find that our results hold. Using our adjusted Cash ETR measure as the dependent variable, we find a negative and significant coefficient on *EQUITY* in the smallest firm quartile (-0.038, t-stat of -1.764) and a positive significant coefficient in the largest quartile (0.034, t-stat 3.002). With GAAP ETR as our dependent variable, we find a negative and significant coefficient on EQUITY in the smaller two quartiles (-0.066, t-stat -2.352 in the smallest; -0.040, t-stat -2.982 in the second smallest), and again, a positive and significant coefficient in the largest quartile (0.034, t-stat 2.933). We find consistent results using the unadjusted measures of Cash and GAAP ETR.

In our main tests, we examine the effects of equity compensation on tax avoidance for different sized firms. One may argue that this relation applies to a pay that is contingent on performance. In additional tests, we also examine whether other performance-contingent pay, namely bonuses, relate to tax avoidance in a similar manner as does equity compensation. In

untabulated tests, we add a CEO's bonus amount (*BONUS)* to our main regression analysis as a control variable. Our main results do not change. More importantly, we do not find a significant positive relation between the CEO's bonus and tax avoidance. The results might relate to the idea that cash bonuses represent an ex-post settlement based on prior years' performance whereas the value of equity compensation improves with better current and future performance.

Other Tax Avoidance Proxies

In our final set of robustness tests, we examine whether our result holds using a different proxy for tax avoidance, Unrecognized Tax Benefits (UTB). Our first UTB measure is the ending balance in a firm's UTB (*UTBENDS*) scaled by total assets. Table 8 Panel A shows results for this regression, which are consistent with our ETR results (UTB increases with tax avoidance). We see that the coefficient for *EQUITY* is positive and significant in the three smallest firm quartiles, but the sign flips and is not significant in the largest quartile. In Panel B, we use additions to UTB (*UTBADDS*) for the year scaled by total assets and see the same results, i.e., a significant relationship between equity incentives and tax avoidance, but only in the smaller firm quartiles and not in the largest quartile. Hence our main results using both adjusted and unadjusted cash and GAAP ETR are robust to measuring tax avoidance using uncertain tax benefits.

V. CONCLUSION

Economic theory predicts that aligning managerial and shareholder incentives through stock compensation creates value for the firm, and that tax avoidance is generally value-adding. Overall, and indeed consistent with the recommendation in Cadman, Klasa, and Matsunaga (2010), by using a broader sample that includes firms of all sizes, we document substantially different insights into the relation between executive compensation and corporate tax planning. We see our

results as complementary to prior research that may be perceived as having "mixed" results when examining this relationship.

Recent literature has shown significant contracting environment differences between firms found in the ExecuComp database and firms not in that database (Cadman, Klasa, and Matsunaga 2010), such as firm size, firm profitability, firm liquidity, pay-for-performance sensitivity, and total equity compensation. Cadman, Klasa, and Matsunaga (2010) stress that expanding samples to include non-ExecuComp firms can significantly influence empirical results. Further, other studies stress the importance of taking into account the sample and specifically firm size when interpreting empirical results (Bamber, Christensen, Gaver 2000; Givoly, Hayn, Lourie 2016).

We attempt to do just that by exploring the compensation and tax avoidance relationship for a broad sample of firms of a larger size variation than most previous studies. Most of the studies referenced above use ExecuComp or proprietary data of firms very similar to ExecuComp firms. Given that larger firms have lower pay-for-performance sensitivity, are generally more profitable and more liquid, and have more total and equity compensation, we predict and find that the relationship between executive equity compensation and tax avoidance is less important in these firms, if significant at all and that it is smaller firms where we are more likely to see the positive relationship between managerial equity incentives and tax avoidance.

Our study contributes broadly to the existing literature that explores the relationship between executive compensation and corporate outcomes. Specifically, we add to the more limited research that examines executive compensation and its effect on tax avoidance. We show that sample selection, and specifically firm size, contributes to this relationship. We provide the novel insight that size is a boundary condition that reconciles the seemingly conflicting agency and tax exhaustion theories with respect to tax avoidance. Our study also contributes to the literature in

that it demonstrates the importance of data source in empirical compensation research given that most prior studies use the ExecuComp database or proprietary datasets with large companies very similar to those in the ExecuComp database.

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Appendix A
Main Variable Definitions

Dependent Variables	
CASHETR3	= The sum of cash taxes paid (TXPD) for year *t* through year *t+2*, divided by the sum of adjusted pre-tax income (PI-SPI) for year *t* through year *t+2*.
GAAPETR3	= The sum of tax expense (TXT) for year *t* through year *t+2*, divided by the sum of adjusted pre-tax income (PI-SPI) for year *t* through year *t+2*.
CASHETR3_ADJ	= Industry-adjusted *CASHETR3*
GAAPETR3_ADJ	= Industry-adjusted *GAAPETR3*
UTBENDS	= Ending unrecognized tax benefits (TXTUBEND) divided by total assets (AT) in year *t* multiplied by 100.
UTBADDS	=Additions to unrecognized tax benefits for the current year's uncertain tax positions (TXTUBPOSINC) divided by total assets (AT) for year *t* multiplied by 100.
Independent Variable	
EQUITY	= The ratio of annual stock and options awards to total annual compensation for the CEO.
STOCK	= The ratio of annual stock awards to total annual compensation for the CEO.
OPTIONS	= The ratio of annual options to total annual compensation for the CEO.
EQUITY_CFO	= The ratio of annual stock and options awards to total annual compensation for the CFO.
EQUITY_TOP	= The ratio of annual stock and options awards to total annual compensation for the highest paid executive.
TOT_EQ_VAL	=The ratio of the total value of stock and options portfolio to total annual compensation for the CEO.
Control Variables	
LEV	= Long-term debt (DLTT) divided by total assets (AT) in year *t*.
MTB	= Market value of equity (CSHO * PRCC_F) divided by book value of equity (CEQ) in year t.
CAPINT	= Gross property, plant, and equipment (PPEGT) divided by lagged total assets in year *t*.
INV	= Inventory (INVT) divided by lagged total assets in year *t*.
AD	= Advertising expense (XAD) divided by lagged total assets in year *t*.
RD	= Research and development expense (XRD) divided by lagged total assets in year *t*.
PROA	= Pre-tax return income (PI) divided by total assets (AT) in year *t*.
INTAN	= Intangible assets (INTAN) divided by lagged total assets in year *t*.
EQINC	= Equity in subsidiaries (ESUB) divided by lagged total assets in year *t*.
NOL	=1 (0 otherwise) if tax loss carry forward (TLCF) is negative at the beginning of year *t*.

Appendix A, continued
Main Variable Definitions

BIG4	=1 (0 otherwise) if the company is audited by a top four accounting firm in year *t*.
FORINCD	=1 (0 otherwise) if foreign pre-tax income (PIFO) is non-missing in year *t*.
CASH	= Cash (CHE) divided by total assets (AT) in year *t*.
STCKEXP	= Stock compensation expense (STKCO) divided by pre-tax income (PI) in year *t*.
OPTBEN	= Excess tax benefit of stock options (TXBCOF) divided by pre-tax income (PI) in year *t*.

Table 1
Industry Distribution of Observations

Description	Observations
Communication Services	1,418
Consumer Discretionary	4,021
Consumer Staples	1,296
Energy	2,071
Health Care	3,156
Industrials	4,420
Information Technology	4,971
Materials	1,451
Total	22,804

The table presents the distribution of firm-years observations by industry.

Table 2
Descriptive Statistics of Main Variables

Variables	N	Mean	S.D.	Min	0.25	Mdn	0.75	Max
CASHETR3	22,804	0.20	0.21	0.00	0.00	0.17	0.30	1.00
CASHETR3_ADJ	22,804	0.02	0.21	-0.42	-0.13	-0.01	0.11	0.96
GAAPETR3	22,804	0.22	0.23	0.00	0.00	0.22	0.34	1.00
GAAPETR3_AD	22,804	0.01	0.22	-0.63	-0.17	0.00	0.11	0.96
EQUITY	22,804	0.39	0.28	0.00	0.13	0.42	0.61	1.00
STOCK	22,804	0.24	0.25	0.00	0.00	0.19	0.41	0.99
OPTIONS	22,804	0.15	0.21	0.00	0.00	0.05	0.25	0.92
LEV	22,804	0.21	0.24	0.00	0.00	0.16	0.33	1.36
MTB	22,804	4.54	14.3	-37.84	0.00	1.37	4.71	106.22
CAPINT	22,804	0.53	0.51	0.00	0.17	0.38	0.76	3.86
INV	22,804	0.12	0.15	0.00	0.00	0.06	0.17	0.77
AD	22,804	0.01	0.03	0.00	0.00	0.00	0.01	0.16
RD	22,804	0.06	0.13	0.00	0.00	0.00	0.05	1.21
PROA	22,804	-0.05	1.11	-23.09	0.00	0.06	0.11	0.44
INTAN	22,804	0.24	0.28	0.00	0.02	0.15	0.38	1.56
EQINC	22,804	0.01	0.03	-0.01	0.00	0.00	0.00	0.26
NOL	22,804	0.66	0.47	0.00	0.00	1.00	1.00	1.00
BIG4	22,804	0.72	0.45	0.00	0.00	1.00	1.00	1.00
FORINCD	22,804	0.60	0.49	0.00	0.00	1.00	1.00	1.00
CASH	22,804	0.17	0.19	0.00	0.03	0.10	0.25	0.99
STKEXP	22,804	0.06	0.34	-1.05	0.00	0.05	0.13	1.03
OPTBEN	22,804	0.00	0.01	-0.03	0.00	0.00	0.00	0.00

Table 2 provides descriptive statistics for firm-year observations. The sample period is from 2006 to 2017 for observations that have S&P Capital IQ data to compute *CASHETR3* and *GAAPETR3*. Dependent variables, independent variables, and control variables are defined in Appendix A.

Table 3
Variables of Interest by Size Quartile

	Size Qrt 1		Size Qrt 2		Size Qrt 3		Size Qrt 4	
Variables	**Mean**	**Mdn**	**Mean**	**Mdn**	**Mean**	**Mdn**	**Mean**	**Mdn**
CASHETR3	0.10	0.00	0.19	0.14	0.22	0.21	0.23	0.21
CASHETR3_ADJ	-0.07	-0.14	0.01	-0.04	0.04	0.01	0.05	0.03
GAAPETR3	0.12	0.00	0.22	0.20	0.25	0.26	0.24	0.24
GAAPETR3_ADJ	-0.07	-0.17	0.01	-0.01	0.03	0.03	0.02	0.02
EQUITY	0.17	0.05	0.33	0.31	0.43	0.46	0.51	0.55
STOCK	0.06	0.00	0.16	0.01	0.28	0.25	0.34	0.34
OPTIONS	0.12	0.00	0.16	0.02	0.15	0.03	0.17	0.13

Table 3 presents descriptive statistics for our main variables of interest by size quartile. Size is measured by log of total assets, with quartile 1 being the smallest firms and quartile 4 being the largest firms. Refer to Appendix A for variable definitions.

Table 4
Tax Avoidance and CEO Equity Compensation Incentives by Size Quartile

Panel A: *TAXAVOID = CASHETR3*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.037***	-0.028***	-0.016*	0.016
	(-2.649)	(-2.765)	(-1.704)	(1.530)
LEV	-0.007	-0.033**	-0.103***	-0.115***
	(-0.480)	(-2.546)	(-9.630)	(-8.840)
MTB	0.000	-0.000	-0.000**	-0.000**
	(1.473)	(-1.481)	(-2.255)	(-2.167)
CAPINT	0.002	-0.035***	-0.037***	-0.045***
	(0.418)	(-5.667)	(-6.464)	(-7.993)
INV	0.076***	0.041**	0.075***	0.098***
	(3.765)	(2.228)	(3.915)	(4.943)
AD	-0.027	0.208***	0.463***	0.070
	(-0.272)	(2.688)	(5.521)	(0.630)
RD	-0.063***	-0.204***	-0.304***	-0.348***
	(-4.355)	(-8.631)	(-6.648)	(-6.237)
PROA	0.001	0.176***	0.109***	0.032
	(1.155)	(11.952)	(5.839)	(1.233)
INTAN	0.022*	0.016	0.026**	0.055***
	(1.702)	(1.337)	(2.394)	(5.884)
EQINC	0.024	-0.381***	-0.270***	-0.254***
	(0.201)	(-3.877)	(-3.367)	(-3.998)
NOL	-0.170***	-0.076***	-0.033***	-0.020***
	(-20.726)	(-12.690)	(-6.269)	(-4.153)
BIG4	0.021*	0.018***	0.030***	-0.010
	(1.731)	(3.244)	(4.171)	(-0.763)
FORINCD	0.029***	0.033***	0.053***	0.029***
	(3.308)	(6.013)	(9.652)	(5.086)
CASH	-0.003	-0.036**	-0.013	-0.028
	(-0.176)	(-2.149)	(-0.586)	(-1.144)
STCKEXP	0.055***	0.028***	0.002	-0.027***
	(5.751)	(4.326)	(0.265)	(-2.845)
OPTBEN	-5.601***	-1.132***	-0.734***	-0.306
	(-5.848)	(-4.032)	(-3.176)	(-1.185)
Constant	0.222***	0.256***	0.218***	0.264***
	(20.823)	(25.015)	(17.971)	(16.472)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.21	0.14	0.09	0.06

Table 4

Panel B: *TAXAVOID = CASHETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.044***	-0.019*	-0.003	0.033***
	(-3.054)	(-1.896)	(-0.296)	(3.237)
LEV	-0.006	-0.009	-0.072***	-0.089***
	(-0.398)	(-0.716)	(-6.817)	(-6.893)
MTB	0.000*	-0.000	-0.001***	-0.000*
	(1.906)	(-1.389)	(-3.308)	(-1.710)
CAPINT	0.009	-0.018***	-0.015***	-0.017***
	(1.524)	(-2.989)	(-2.599)	(-3.068)
INV	0.038*	-0.020	-0.023	-0.047**
	(1.860)	(-1.087)	(-1.223)	(-2.392)
AD	-0.031	0.024	0.272***	-0.205*
	(-0.310)	(0.309)	(3.295)	(-1.875)
RD	-0.059***	-0.161***	-0.168***	-0.191***
	(-4.000)	(-6.884)	(-3.723)	(-3.476)
PROA	0.001	0.160***	0.086***	0.004
	(0.899)	(10.950)	(4.674)	(0.170)
INTAN	0.020	0.022*	0.021**	0.046***
	(1.491)	(1.850)	(2.038)	(4.978)
EQINC	0.098	-0.262***	-0.125	-0.084
	(0.819)	(-2.680)	(-1.584)	(-1.340)
NOL	-0.165***	-0.066***	-0.027***	-0.018***
	(-19.743)	(-11.169)	(-5.181)	(-3.643)
BIG4	0.015	0.003	0.020***	-0.010
	(1.260)	(0.578)	(2.860)	(-0.746)
FORINCD	0.023***	0.037***	0.050***	0.021***
	(2.596)	(6.905)	(9.202)	(3.598)
CASH	0.019	-0.009	0.001	-0.036
	(1.180)	(-0.575)	(0.055)	(-1.480)
STCKEXP	0.055***	0.028***	0.009	-0.024**
	(5.593)	(4.278)	(1.197)	(-2.570)
OPTBEN	-5.387***	-0.921***	-0.601***	-0.104
	(-5.528)	(-3.297)	(-2.637)	(-0.406)
Constant	0.052***	0.060***	0.025**	0.077***
	(4.810)	(5.935)	(2.119)	(4.861)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.19	0.10	0.05	0.02

Table 4

Panel C: *TAXAVOID = GAAPETR3*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.050***	-0.037***	-0.029***	0.012
	(-2.981)	(-3.303)	(-2.801)	(1.195)
LEV	-0.016	-0.025*	-0.057***	-0.026**
	(-1.004)	(-1.722)	(-4.911)	(-1.985)
MTB	0.000	0.000	-0.000	0.000
	(1.440)	(1.307)	(-1.175)	(0.861)
CAPINT	0.010	-0.027***	-0.024***	-0.029***
	(1.494)	(-3.917)	(-3.860)	(-5.060)
INV	-0.001	-0.036*	0.015	0.047**
	(-0.061)	(-1.745)	(0.720)	(2.338)
AD	-0.066	0.254***	0.181**	-0.130
	(-0.557)	(2.963)	(1.982)	(-1.155)
RD	-0.072***	-0.216***	-0.273***	-0.480***
	(-4.162)	(-8.260)	(-5.482)	(-8.488)
PROA	0.004***	0.222***	0.197***	0.251***
	(2.747)	(13.665)	(9.719)	(9.659)
INTAN	-0.043***	-0.029**	-0.018	-0.022**
	(-2.774)	(-2.130)	(-1.557)	(-2.300)
EQINC	-0.036	-0.174	-0.442***	-0.420***
	(-0.262)	(-1.600)	(-5.059)	(-6.523)
NOL	-0.137***	-0.035***	0.001	0.004
	(-14.049)	(-5.329)	(0.218)	(0.857)
BIG4	-0.008	0.013**	0.017**	0.011
	(-0.557)	(2.133)	(2.125)	(0.793)
FORINCD	-0.005	0.018***	0.027***	-0.007
	(-0.433)	(2.949)	(4.439)	(-1.271)
CASH	-0.075***	-0.094***	-0.043*	0.048*
	(-3.942)	(-5.117)	(-1.858)	(1.900)
STCKEXP	0.053***	0.025***	0.005	-0.009
	(4.619)	(3.520)	(0.632)	(-0.963)
OPTBEN	-3.222***	-1.843***	-1.412***	-0.427
	(-2.842)	(-5.928)	(-5.606)	(-1.632)
Constant	0.276***	0.288***	0.257***	0.241***
	(21.926)	(25.440)	(19.475)	(14.856)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.14	0.11	0.05	0.05

Table 4

Panel D: *TAXAVOID = GAAPETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.057***	-0.029***	-0.019*	0.028***
	(-3.345)	(-2.607)	(-1.920)	(2.697)
LEV	-0.017	-0.003	-0.038***	-0.013
	(-1.030)	(-0.215)	(-3.353)	(-0.986)
MTB	0.000	0.000	-0.000**	0.000
	(1.507)	(1.385)	(-2.051)	(1.017)
CAPINT	0.008	-0.023***	-0.016**	-0.016***
	(1.133)	(-3.396)	(-2.550)	(-2.819)
INV	-0.003	-0.049**	-0.028	-0.026
	(-0.103)	(-2.406)	(-1.366)	(-1.322)
AD	-0.077	0.104	0.084	-0.302***
	(-0.643)	(1.221)	(0.932)	(-2.720)
RD	-0.056***	-0.164***	-0.116**	-0.288***
	(-3.211)	(-6.334)	(-2.377)	(-5.158)
PROA	0.004**	0.212***	0.172***	0.238***
	(2.506)	(13.146)	(8.619)	(9.262)
INTAN	-0.041***	-0.027**	-0.019*	-0.011
	(-2.610)	(-2.009)	(-1.676)	(-1.135)
EQINC	-0.002	-0.112	-0.333***	-0.360***
	(-0.011)	(-1.044)	(-3.879)	(-5.658)
NOL	-0.136***	-0.031***	0.002	0.006
	(-13.691)	(-4.726)	(0.363)	(1.250)
BIG4	-0.012	0.001	0.010	0.008
	(-0.827)	(0.124)	(1.286)	(0.610)
FORINCD	-0.006	0.027***	0.035***	-0.000
	(-0.585)	(4.502)	(5.927)	(-0.062)
CASH	-0.046**	-0.057***	-0.020	0.070***
	(-2.382)	(-3.147)	(-0.870)	(2.816)
STCKEXP	0.051***	0.023***	0.009	-0.007
	(4.413)	(3.176)	(1.090)	(-0.751)
OPTBEN	-2.513**	-1.742***	-1.323***	-0.255
	(-2.180)	(-5.657)	(-5.341)	(-0.985)
Constant	0.072***	0.060***	0.026**	0.001
	(5.579)	(5.344)	(1.994)	(0.077)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.12	0.09	0.04	0.03

This table presents results from estimating model (1) using 22,804 firm-year observations from 2006 to 2017, by size quartile, with quartile 1 being the smallest size, and quartile 4 being the largest. Panels A through D depict *CASHETR3*, *CASHETR3_ADJ*, *GAAPETR3*, and *GAAPETR3_ADJ* as the dependent variable, respectively. For each independent variable, estimated coefficients are presented in the top row and the two-sided t-statistics are in the bottom row. Refer to Appendix A for variable definitions. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 5
Tax Avoidance and CEO Stock and Option Compensation Incentives by Size Quartile

Panel A: *TAXAVOID = CASHETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
STOCK	-0.053**	-0.017	-0.004	0.015
	(-2.392)	(-1.344)	(-0.426)	(1.398)
OPTIONS	-0.039**	-0.023*	0.001	0.076***
	(-2.248)	(-1.798)	(0.060)	(5.536)
LEV	-0.006	-0.009	-0.072***	-0.089***
	(-0.418)	(-0.717)	(-6.824)	(-6.920)
MTB	0.000*	-0.000	-0.001***	-0.000*
	(1.903)	(-1.396)	(-3.322)	(-1.799)
CAPINT	0.009	-0.018***	-0.015***	-0.015***
	(1.491)	(-2.999)	(-2.577)	(-2.769)
INV	0.038*	-0.020	-0.023	-0.047**
	(1.826)	(-1.079)	(-1.227)	(-2.392)
AD	-0.030	0.024	0.271***	-0.252**
	(-0.300)	(0.313)	(3.271)	(-2.295)
RD	-0.060***	-0.160***	-0.169***	-0.211***
	(-4.042)	(-6.811)	(-3.741)	(-3.821)
PROA	0.001	0.159***	0.086***	-0.001
	(0.864)	(10.875)	(4.670)	(-0.021)
INTAN	0.020	0.023*	0.021**	0.044***
	(1.475)	(1.855)	(2.018)	(4.816)
EQINC	0.100	-0.262***	-0.125	-0.074
	(0.833)	(-2.681)	(-1.578)	(-1.182)
NOL	-0.165***	-0.066***	-0.027***	-0.017***
	(-19.747)	(-11.157)	(-5.163)	(-3.569)
BIG4	0.015	0.003	0.020***	-0.012
	(1.234)	(0.583)	(2.841)	(-0.925)
FORINCD	0.023***	0.037***	0.050***	0.020***
	(2.595)	(6.880)	(9.202)	(3.427)
CASH	0.019	-0.009	0.001	-0.031
	(1.168)	(-0.528)	(0.033)	(-1.280)
STCKEXP	0.055***	0.028***	0.009	-0.023**
	(5.593)	(4.289)	(1.214)	(-2.515)
OPTBEN	-5.395***	-0.924***	-0.592***	-0.057
	(-5.535)	(-3.308)	(-2.587)	(-0.225)
Constant	0.052***	0.060***	0.025**	0.079***
	(4.833)	(5.930)	(2.132)	(4.979)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.19	0.10	0.05	0.03

Table 5

Panel B: *TAXAVOID = GAAPETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
STOCK	-0.056**	-0.029**	-0.018	0.013
	(-2.128)	(-2.153)	(-1.638)	(1.191)
OPTIONS	-0.058***	-0.029**	-0.021	0.063***
	(-2.839)	(-2.050)	(-1.486)	(4.552)
LEV	-0.017	-0.003	-0.038***	-0.013
	(-1.030)	(-0.216)	(-3.344)	(-1.000)
MTB	0.000	0.000	-0.000**	0.000
	(1.506)	(1.386)	(-2.039)	(0.948)
CAPINT	0.008	-0.023***	-0.016**	-0.015**
	(1.128)	(-3.393)	(-2.561)	(-2.574)
INV	-0.003	-0.049**	-0.028	-0.026
	(-0.104)	(-2.406)	(-1.361)	(-1.321)
AD	-0.077	0.104	0.085	-0.340***
	(-0.645)	(1.220)	(0.940)	(-3.058)
RD	-0.056***	-0.164***	-0.116**	-0.304***
	(-3.196)	(-6.309)	(-2.357)	(-5.433)
PROA	0.004**	0.212***	0.172***	0.234***
	(2.506)	(13.103)	(8.620)	(9.107)
INTAN	-0.042***	-0.027**	-0.019*	-0.012
	(-2.612)	(-2.007)	(-1.666)	(-1.271)
EQINC	0.001	-0.113	-0.334***	-0.351***
	(0.010)	(-1.045)	(-3.882)	(-5.530)
NOL	-0.136***	-0.031***	0.002	0.006
	(-13.681)	(-4.724)	(0.353)	(1.316)
BIG4	-0.012	0.001	0.010	0.006
	(-0.821)	(0.127)	(1.292)	(0.465)
FORINCD	-0.006	0.027***	0.035***	-0.001
	(-0.587)	(4.499)	(5.925)	(-0.203)
CASH	-0.046**	-0.057***	-0.020	0.074***
	(-2.379)	(-3.133)	(-0.859)	(2.981)
STCKEXP	0.051***	0.023***	0.009	-0.007
	(4.404)	(3.174)	(1.076)	(-0.704)
OPTBEN	-2.513**	-1.742***	-1.328***	-0.217
	(-2.179)	(-5.657)	(-5.335)	(-0.838)
Constant	0.072***	0.060***	0.026**	0.003
	(5.568)	(5.344)	(1.979)	(0.172)
N	2,714	6,518	6,902	6,670
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.12	0.09	0.04	0.03

This table presents results from estimating model (1) by size quartile, with quartile 1 being the smallest size, and quartile 4 being the largest. Panels A and B depict *CASHETR3_ADJ* and *GAAPETR3_ADJ* as the dependent variable, respectively. For each independent variable, estimated coefficients are presented in the top row and the two-sided t-statistics are in the bottom row. Refer to Appendix A for variable definitions. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 6
Tax Avoidance and CEO/CFO Equity Compensation Incentives by Size Quartile

Panel A: *TAXAVOID = CASHETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.040**	-0.013	0.005	0.031**
	(-2.222)	(-0.889)	(0.408)	(2.391)
EQUITY_CFO	0.002	0.005	0.004	0.013
	(0.292)	(0.277)	(0.289)	(1.428)
LEV	-0.001	0.005	-0.067***	-0.085***
	(-0.054)	(0.318)	(-5.412)	(-5.715)
MTB	0.000	-0.000	-0.001**	-0.000
	(0.069)	(-1.352)	(-2.517)	(-1.143)
CAPINT	0.013*	-0.016**	-0.013**	-0.028***
	(1.725)	(-2.185)	(-2.007)	(-4.368)
INV	0.058**	-0.016	-0.036*	-0.039*
	(2.362)	(-0.738)	(-1.659)	(-1.703)
AD	-0.024	0.023	0.211**	-0.319**
	(-0.205)	(0.273)	(2.170)	(-2.322)
RD	-0.066***	-0.170***	-0.233***	-0.168***
	(-3.757)	(-5.917)	(-4.261)	(-2.620)
PROA	0.001	0.170***	0.057***	0.005
	(0.668)	(10.056)	(2.776)	(0.173)
INTAN	0.034**	0.026*	0.021*	0.030***
	(2.129)	(1.889)	(1.684)	(2.809)
EQINC	0.074	-0.183	-0.074	-0.044
	(0.566)	(-1.538)	(-0.807)	(-0.600)
NOL	-0.166***	-0.067***	-0.032***	-0.013**
	(-16.473)	(-9.842)	(-5.341)	(-2.341)
BIG4	0.010	0.004	0.015*	-0.018
	(0.655)	(0.672)	(1.895)	(-1.217)
FORINCD	0.008	0.034***	0.056***	0.017***
	(0.782)	(5.524)	(8.984)	(2.614)
CASH	0.051***	0.001	0.022	-0.060**
	(2.636)	(0.034)	(0.895)	(-2.141)
STCKEXP	0.056***	0.030***	0.015*	-0.021**
	(4.874)	(4.060)	(1.869)	(-1.983)
OPTBEN	-5.320***	-1.219***	-0.675**	-0.235
	(-4.746)	(-3.805)	(-2.576)	(-0.785)
Constant	0.041***	0.048***	0.025*	0.088***
	(3.178)	(4.057)	(1.820)	(4.733)
N	1,804	4,814	5,223	4,867
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.20	0.10	0.05	0.02

Table 6

Panel B: *TAXAVOID = GAAPETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.076***	-0.012	-0.034**	0.017
	(-3.406)	(-0.757)	(-2.291)	(1.265)
EQUITY_CFO	0.000	-0.023	0.019	0.009
	(0.045)	(-1.264)	(1.195)	(0.950)
LEV	-0.004	-0.023	-0.034**	-0.008
	(-0.199)	(-1.383)	(-2.541)	(-0.493)
MTB	0.000	0.000	-0.000*	0.000
	(0.482)	(1.109)	(-1.829)	(1.541)
CAPINT	0.014	-0.022***	-0.021***	-0.019***
	(1.526)	(-2.684)	(-2.924)	(-2.847)
INV	-0.044	-0.054**	-0.038	-0.032
	(-1.465)	(-2.191)	(-1.611)	(-1.338)
AD	-0.059	0.056	0.076	-0.302**
	(-0.410)	(0.576)	(0.710)	(-2.113)
RD	-0.071***	-0.193***	-0.150**	-0.307***
	(-3.247)	(-5.950)	(-2.499)	(-4.588)
PROA	0.003*	0.223***	0.150***	0.200***
	(1.844)	(11.717)	(6.658)	(6.509)
INTAN	-0.031	-0.029*	-0.018	-0.025**
	(-1.564)	(-1.846)	(-1.336)	(-2.258)
EQINC	0.002	-0.028	-0.297***	-0.278***
	(0.012)	(-0.206)	(-2.959)	(-3.676)
NOL	-0.132***	-0.023***	0.004	0.008
	(-10.625)	(-2.946)	(0.598)	(1.364)
BIG4	-0.024	0.009	0.003	0.010
	(-1.291)	(1.302)	(0.296)	(0.652)
FORINCD	-0.019	0.034***	0.035***	-0.006
	(-1.420)	(4.845)	(5.184)	(-0.911)
CASH	-0.033	-0.051**	-0.005	0.071**
	(-1.372)	(-2.437)	(-0.174)	(2.442)
STCKEXP	0.052***	0.027***	0.009	-0.007
	(3.632)	(3.304)	(0.972)	(-0.612)
OPTBEN	-3.490**	-1.576***	-1.426***	-0.463
	(-2.522)	(-4.360)	(-4.977)	(-1.482)
Constant	0.080***	0.052***	0.034**	0.011
	(4.965)	(3.959)	(2.224)	(0.568)
N	1,804	4,814	5,223	4,867
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.12	0.09	0.03	0.02

This table presents results from estimating model (1) by size quartile, with quartile 1 being the smallest size, and quartile 4 being the largest. Panels A and B depict *CASHETR3_ADJ* and G*AAPETR3_ADJ* as the dependent variable, respectively. For each independent variable, estimated coefficients are presented in the top row and the two-sided t-statistics are in the bottom row. Refer to Appendix A for variable definitions. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 7
Tax Avoidance and Equity Compensation Incentives by Size Quartile

Panel A: ***TAXAVOID = CASHETR3_ADJ***

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.045**	-0.026*	0.021*	0.003
	(-2.237)	(-1.844)	(1.685)	(0.189)
EQUITY_TOP	0.014*	-0.007***	-0.001	-0.003*
	(1.903)	(-3.067)	(-0.817)	(-1.939)
LEV	0.007	-0.016	-0.068***	-0.119***
	(0.333)	(-0.925)	(-4.701)	(-6.220)
MTB	0.000	-0.000	-0.001**	-0.000
	(0.123)	(-1.077)	(-2.331)	(-1.492)
CAPINT	0.009	-0.033***	-0.020**	-0.016**
	(1.034)	(-3.803)	(-2.564)	(-2.086)
INV	0.112***	-0.055**	0.016	-0.047*
	(4.161)	(-2.182)	(0.645)	(-1.878)
AD	0.060	0.350***	0.083	-0.278*
	(0.447)	(3.070)	(0.689)	(-1.775)
RD	-0.077***	-0.120***	-0.190***	-0.162*
	(-3.662)	(-3.217)	(-3.187)	(-1.865)
PROA	0.001	0.166***	0.098***	0.035
	(0.506)	(7.159)	(3.476)	(0.864)
INTAN	0.015	0.022	0.042***	0.064***
	(0.750)	(1.237)	(2.903)	(4.917)
EQINC	0.123	-0.167	-0.113	-0.024
	(0.790)	(-1.155)	(-1.186)	(-0.292)
NOL	-0.173***	-0.050***	-0.029***	-0.021***
	(-16.250)	(-6.099)	(-4.068)	(-3.009)
BIG4	0.030*	-0.000	0.009	-0.009
	(1.785)	(-0.055)	(0.970)	(-0.493)
FORINCD	0.027**	0.050***	0.039***	0.026***
	(2.355)	(6.487)	(5.372)	(3.192)
CASH	0.025	-0.034	0.023	-0.037
	(1.081)	(-1.417)	(0.803)	(-1.091)
STCKEXP	0.051***	0.044***	0.010	-0.024*
	(3.954)	(4.587)	(1.020)	(-1.867)
OPTBEN	-3.300***	-1.004**	-0.696**	-1.008***
	(-2.637)	(-2.520)	(-2.098)	(-2.615)
Constant	0.048***	0.076***	0.023	0.083***
	(3.319)	(5.216)	(1.452)	(3.780)
N	1,405	3,224	3,264	2,801
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.23	0.09	0.05	0.04

Table 7

Panel B: *TAXAVOID = GAAPETR3_ADJ*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	-0.051**	-0.022	-0.013	0.011
	(-2.065)	(-1.426)	(-0.896)	(0.743)
EQUITY_TOP	0.018**	-0.004*	0.001	-0.001
	(2.107)	(-1.885)	(0.608)	(-0.637)
LEV	-0.027	-0.001	-0.042***	-0.071***
	(-1.097)	(-0.041)	(-2.587)	(-3.418)
MTB	-0.000	0.000	-0.001***	0.000
	(-0.538)	(0.411)	(-3.065)	(1.111)
CAPINT	-0.017*	-0.017*	-0.025***	0.001
	(-1.714)	(-1.849)	(-2.837)	(0.121)
INV	-0.002	-0.024	-0.044	-0.036
	(-0.061)	(-0.876)	(-1.540)	(-1.326)
AD	-0.034	0.374***	0.143	-0.444***
	(-0.204)	(3.083)	(1.058)	(-2.597)
RD	-0.033	-0.151***	-0.088	-0.334***
	(-1.289)	(-3.811)	(-1.319)	(-3.519)
PROA	0.006***	0.257***	0.199***	0.274***
	(2.677)	(10.422)	(6.269)	(6.289)
INTAN	-0.065***	-0.005	-0.040**	-0.012
	(-2.632)	(-0.265)	(-2.410)	(-0.820)
EQINC	0.390**	0.245	-0.320***	-0.237***
	(2.048)	(1.591)	(-2.988)	(-2.686)
NOL	-0.118***	-0.015*	0.006	0.001
	(-9.016)	(-1.759)	(0.767)	(0.183)
BIG4	-0.018	-0.012	-0.004	0.025
	(-0.887)	(-1.502)	(-0.367)	(1.281)
FORINCD	-0.005	0.051***	0.028***	0.026***
	(-0.356)	(6.205)	(3.380)	(2.877)
CASH	-0.102***	-0.021	-0.030	0.093**
	(-3.602)	(-0.839)	(-0.926)	(2.515)
STCKEXP	0.044***	0.038***	-0.003	-0.009
	(2.801)	(3.771)	(-0.280)	(-0.628)
OPTBEN	-2.405	-1.849***	-1.418***	-0.363
	(-1.567)	(-4.359)	(-3.804)	(-0.863)
Constant	0.092***	0.026*	0.045**	-0.024
	(5.215)	(1.668)	(2.561)	(-1.014)
N	1,405	3,224	3,264	2,801
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.12	0.10	0.04	0.04

This table presents results from estimating model (1) by size quartile, with quartile 1 being the smallest size, and quartile 4 being the largest. Panels A and B depict *CASHETR3_ADJ* and G*AAPETR3_ADJ* as the dependent variable, respectively. For each independent variable, estimated coefficients are presented in the top row and the two-sided t-statistics are in the bottom row. Refer to Appendix A for variable definitions. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.

Table 8
Tax Avoidance and CEO Equity Compensation Incentives by Size Quartile

Panel A: *TAXAVOID = UTBENDS*

Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	0.292***	0.164***	0.161***	-0.015
	(5.160)	(3.352)	(3.577)	(-0.283)
LEV	-0.047	0.097	-0.069	0.001
	(-0.851)	(1.538)	(-1.347)	(0.018)
MTB	0.000	-0.001	-0.003***	-0.002*
	(0.151)	(-1.547)	(-2.615)	(-1.867)
CAPINT	-0.002	-0.094***	-0.055**	-0.107***
	(-0.097)	(-3.194)	(-2.021)	(-3.632)
INV	0.078	0.228**	-0.118	0.203*
	(0.956)	(2.525)	(-1.276)	(1.953)
AD	-0.088	-0.215	0.252	2.724***
	(-0.224)	(-0.569)	(0.605)	(4.568)
RD	0.283***	1.329***	2.633***	4.694***
	(4.944)	(11.469)	(11.890)	(14.003)
PROA	0.010**	0.163**	-0.261***	0.206
	(2.067)	(2.173)	(-2.793)	(1.450)
INTAN	-0.112**	-0.320***	-0.052	-0.014
	(-2.150)	(-5.220)	(-0.992)	(-0.290)
EQINC	-0.521	-0.950**	-1.022***	-0.400
	(-1.130)	(-2.056)	(-2.824)	(-1.231)
NOL	0.122***	0.162***	0.135***	-0.047*
	(3.685)	(5.477)	(5.329)	(-1.825)
BIG4	0.276***	0.111***	0.174***	0.204***
	(5.701)	(4.066)	(4.989)	(2.903)
FORINCD	0.245***	0.362***	0.228***	0.275***
	(7.074)	(13.183)	(8.649)	(8.967)
CASH	0.063	0.181**	0.697***	1.192***
	(0.971)	(2.163)	(6.727)	(9.165)
STCKEXP	0.058	0.002	0.007	0.052
	(1.483)	(0.049)	(0.216)	(1.085)
OPTBEN	-3.871	2.456*	-0.802	9.618***
	(-0.902)	(1.712)	(-0.705)	(6.928)
Constant	-0.071*	0.024	0.018	0.174**
	(-1.654)	(0.463)	(0.304)	(2.034)
N	2,168	4,814	5,103	5,013
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.09	0.14	0.15	0.16

Table 8

Panel B: *TAXAVOID = UTBADDS*				
Variables	**Size Qrt 1**	**Size Qrt 2**	**Size Qrt 3**	**Size Qrt 4**
EQUITY	0.047***	0.027**	0.034***	-0.002
	(3.812)	(2.287)	(3.221)	(-0.193)
LEV	-0.015	0.005	-0.030**	-0.022
	(-1.229)	(0.348)	(-2.486)	(-1.403)
MTB	-0.000	0.000	-0.000	-0.000
	(-0.419)	(0.170)	(-0.773)	(-0.359)
CAPINT	0.006	-0.006	-0.006	-0.007
	(1.136)	(-0.795)	(-0.978)	(-1.008)
INV	0.024	0.044**	0.009	0.017
	(1.329)	(2.019)	(0.399)	(0.699)
AD	-0.025	0.082	0.161*	0.770***
	(-0.290)	(0.899)	(1.656)	(5.530)
RD	0.072***	0.530***	0.696***	1.266***
	(5.798)	(18.906)	(13.466)	(16.184)
PROA	0.002	0.015	-0.016	0.118***
	(1.565)	(0.827)	(-0.743)	(3.539)
INTAN	-0.016	-0.027*	0.027**	0.041***
	(-1.420)	(-1.835)	(2.208)	(3.568)
EQINC	-0.048	-0.053	-0.077	0.011
	(-0.477)	(-0.473)	(-0.907)	(0.146)
NOL	0.013*	0.003	0.014**	-0.013**
	(1.781)	(0.401)	(2.380)	(-2.170)
BIG4	0.044***	0.023***	0.019**	0.032**
	(4.179)	(3.540)	(2.295)	(1.962)
FORINCD	0.036***	0.055***	0.027***	0.019***
	(4.830)	(8.301)	(4.406)	(2.720)
CASH	0.018	0.047**	0.208***	0.319***
	(1.302)	(2.299)	(8.609)	(10.503)
STCKEXP	0.008	-0.011	-0.021***	-0.000
	(0.982)	(-1.361)	(-2.679)	(-0.027)
OPTBEN	0.960	-0.321	-0.609**	1.482***
	(1.027)	(-0.923)	(-2.295)	(4.574)
Constant	-0.018*	-0.021*	-0.022	0.002
	(-1.914)	(-1.716)	(-1.613)	(0.095)
N	2,168	4,814	5,103	5,013
Yr. & Ind. FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.06	0.16	0.15	0.17

This table presents results from estimating model (1) by size quartile, with quartile 1 being the smallest size, and quartile 4 being the largest. Panels A and B depict *UTBENDS* and *UTBADDS* as the dependent variable, respectively. For each independent variable, estimated coefficients are presented in the top row and the two-sided t-statistics are in the bottom row. Refer to Appendix A for variable definitions. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively.