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ABSTRACT

This study examines the relation between executives' inside debt holdings and corporate tax risk. As executives' inside debt holdings are unsecured and unfunded, they should align executives' interests with those of outside debtholders and incentivize executives to act more conservatively toward risk. Hence, inside debt should also reduce the risk of tax avoidance activities. Consistent with this prediction, we find that executive inside debt holdings are negatively related to tax risk. Further, this relation becomes stronger at higher levels of tax risk. We also find that the relation between insider debt and tax risk is stronger for firms that are not facing liquidity constraints and among well-governed firms. The latter result implies that institutional ownership and inside debt compensation are substitutes in reducing tax risk. Overall, our results suggest that part of the observed cross-sectional difference in tax avoidance can be explained by a reduction in tax risk that is related to executive inside debt holdings.

JEL Classifications: M41; M52; H26; G34

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1. Introduction

In contrast to the international debate on tax base erosion and profit shifting and to the public perception of excessively aggressive corporate tax avoidance behavior, empirical evidence shows that not all firms that choose to exploit avoidance opportunities fully utilize all available tax avoidance strategies. The degree of aggressive tax planning is not homogeneous, even after controlling for firm-level characteristics such as profitability, foreign operations, research and development (R&D) expenditures, leverage, and earnings quality (Rego, 2003; Graham and Tucker, 2006; Frank et al., 2009; Wilson, 2009; Dyreng et al., 2010). The puzzling observation that not all firms utilize all tax avoidance opportunities, the so-called tax undersheltering puzzle, is still not well understood, despite extensive research (Weisbach, 2002; Desai and Dharmapala, 2006; Hanlon and Heitzman, 2010).

Previous studies on tax avoidance have investigated the role of corporate governance and executive compensation (Phillips, 2003; Desai and Dharmapala, 2006; Hanlon et al., 2007; Armstrong et al., 2012; Rego and Wilson, 2012); however, the results are mixed. For example, Gaertner (2014) finds a negative relation between the use of CEO after-tax incentives and effective tax rates (ETRs). This contrasts with the results of Phillips (2003) that provide evidence for business unit managers but not for CEOs. Armstrong et al. (2012) show a positive association only between the compensation of tax directors and ETRs, while Rego and Wilson (2012) find that greater CEO and chief financial officer (CFO) equity risk compensation is associated with more tax avoidance but their results do not vary with corporate governance strength. In this study, we examine corporate governance and, in particular, executive inside debt holdings as a possible source of the heterogeneity in corporate tax avoidance across firms. Specifically, we examine how inside debt is related to tax risk.

We show that part of the relation between executive compensation and tax avoidance is related to tax risk. In addition to cash and equity compensation, we complement the controversial discussion on the role of executive compensation in tax avoidance by examining the role of inside debt (i.e., pension plans and deferred compensation), which is an important fraction of executive compensation. The average CEO inside debt compensation consists of around \$4.6 million and represents 11% of overall executive compensation. Since this component of the executive compensation package is mostly unsecured and unfunded, agency theory predicts that managers should act more conservatively toward risk (Jensen and Meckling, 1976). Consistent with the argument that inside debt holdings provide managers with incentives to act more conservatively toward risk, previous studies show that inside debt holdings are negatively associated with a comprehensive set of measures that capture investor reactions and the overall riskiness of a firm's investment and financial policies (Edmans and Liu, 2010; Wei and Yermack, 2011; Cassell et al., 2012).

Since a firm's tax policy is set at the level of top management (Dyreng et al., 2010), we would expect that firms with high levels of inside debt also act more conservatively with respect to taxes. While more aggressive or riskier tax avoidance lowers the tax burden and increases current after-tax cash flows, such risky tax avoidance comes with several costs. Aggressive tax positions might not be sustainable in the future and lead to uncertainty about future tax positions. This tax risk increase the uncertainty of future after-tax cash flows, even if uncertainty about pre-tax cash flows is held constant. Previous studies suggest that the association between tax avoidance and firm value could depend upon the degree of risk involved in the tax strategy implemented (Desai and Dharmapala 2009, Hutchens and Rego 2015, Drake et al. 2015, and Hutchens and Rego 2015). As mentioned, Jensen and Meckling (1976) predict that inside debt compensation should mitigate the risk-shifting issue. We argue that the level of corporate tax avoidance does not represent the actual risk embedded in the tax

positions (Guenther et al., 2016). Moreover, in contrast to concurrent working papers by Kubick et al. (2014) and Chi et al. (2014) that examine whether inside debt held by executives is associated with the level of tax avoidance, we analyze the risk associated with tax planning and its relation to inside debt holdings.

In our empirical research design, we measure tax risk with unrecognized tax benefits (UTBs), defined in FIN 48, which capture executives' assessments of the riskiness of a firm's tax planning strategies. Our main sample consists of 2,876 CEO-year observations and 2,710 CFO-year observations with complete compensation and financial data from 2006 through 2012. The data on inside debt holdings are available from ExecuComp since 2006, when the U.S. Securities and Exchange Commission (SEC) disclosure reform increased the transparency of inside debt, that is, pensions and deferred compensation. We measure inside debt holdings as the ratio of the present value of accumulated pension plans and deferred compensation to total compensation (i.e., the sum of salary, bonus, stock and option compensation, and inside debt).

Our research design faces the major challenge that managerial incentives are set through executive compensation and that firm policies are likely to be jointly determined, particularly when examining tax planning (Coles et al., 2006; Rego and Wilson, 2012). Tax concerns are likely to be a determinant of how the executive compensation contract is structured. Hence, establishing causality in this framework is highly difficult. Therefore, following both Cassell et al. (2012) and Rego and Wilson (2012), we use a simultaneous equation approach as well as a lagged specification with compensation variables set the previous year. In all our tests, we control for the level of equity-based incentives as well as for other firm-level proxies of corporate tax avoidance.

Our results are consistent with the expectation that inside debt aligns managers' risk incentives with debtholders' risk preferences. We observe lower tax risk in firms whose

managers have higher inside debt compensation. This relation is not only statistically but also economically significant. A one standard deviation increase in inside debt holdings over total compensation is associated with a 20% decrease in UTBs. In a second step, we examine whether this relation is stronger at higher levels of tax risk. We argue that, at higher levels of tax risk, the uncertainty about future tax payoffs is higher and thus the alignment of managers' and debtholders' interests through inside debt could be more effective. Thus, since inside debt aligns executives' and debtholders' interests, we would expect a stronger association between inside debt and tax risk when the riskiness of the tax positions is greater. Using a quantile regression approach, we find a concave relation between inside debt holdings and tax risk; that is, the coefficient estimates become increasingly negative for higher quantiles of tax risk.

Next, we turn to two cross-sectional tests. Finding the association between inside debt and tax risk to be stronger when expected also sheds light on a potential causal link between the two. In the first cross-sectional analysis, we examine differences in the need for internal cash. In firms with low cash availability, managers as well as debtholders may prefer a short-term cash increase from tax planning to a potential increase in future tax uncertainty. We therefore expect that debtholders of firms with liquidity constraints favor tax planning strategies that decrease the current tax burden and increase current cash flow. In contrast, we expect a negative association between inside debt and tax risk in firms without liquidity constraints, where the tax risk argument should still dominate. To this end, we interact our proxy for inside debt with a measure of high cash surplus. We find the tax risk-reducing role of inside debt compensation to be stronger when firms are not bound by liquidity constraints. In firms with high levels of surplus cash, the relation between inside debt and tax risk increases by over 200% relative to that for all other firms.

Our second cross-sectional test analyzes whether the relation between inside debt holdings and tax risk varies with the strength of corporate governance. We use the level of

institutional shareholdings as a proxy for corporate governance (McConnell and Servaes, 1990; Fernando et al., 2012). We find that the monitoring of institutional owners acts as a substitute for inside debt in reducing tax risk. Namely, in firms with strong corporate governance, inside debt compensation is no longer associated with decreased tax risk. The association of tax risk and inside debt is significant only for firms that are not in the top quartile of institutional shareholdings.

We subject our results to an extensive set of robustness tests. First, we look at both CEO and CFO compensation, since corporate tax departments are viewed as profit centers (Crocker and Slemrod, 2005; Robinson et al., 2010). The results are consistently similar for the two executives. Our results also hold when examining the level of tax avoidance through cash ETRs and when using an alternative measure of inside debt. Generally, firms with a high level of executive inside debt appear to reduce their tax risk at the cost of the foregone short-term benefits of tax avoidance.

We contribute to the tax literature on the determinants of tax avoidance (e.g., Rego, 2003; Dyreng et al., 2008, 2010, or the literature overview of Hanlon and Heitzman, 2010). We complement prior studies that limit the analysis to the link between equity risk incentives and tax aggressive strategies (e.g., Rego and Wilson, 2012) by examining the link between inside debt and tax risk. Instead of reducing their tax burden through aggressive tax planning, firms with higher inside debt holdings appear to be more concerned about tax risk and thus reduce the riskiness of their tax positions. Concurrent working papers on inside debt and tax avoidance (Kubick et al. 2014; Chi et al., 2014) do not capture the risk of tax avoidance and focus on the level of tax avoidance with mixed results. We also contribute to the discussion on the role of corporate governance. Previous research has found generally mixed results (Desai and Dharmapala, 2006; Rego and Wilson, 2012) when examining how the strength of corporate governance affects the relation between tax avoidance and compensation incentives.

Our results on a potential determinant of tax risk also have broader implications for firm decisions. Recent research highlights how tax uncertainty adversely affects the level and timing of investments (Blouin et al., 2012; Jacob et al., 2015), firms' cash holdings for precautionary reasons (Hanlon et al., 2014), earnings persistence (Hanlon, 2005; Blaylock et al., 2012), and firm valuation (Hutchens and Rego, 2015). On a broader, macroeconomic level, tax risk and the resulting variation of firms' tax payments could translate into more volatile and less predictable government tax revenues, a concern for several countries that try to reduce the volatility of tax revenues by setting specific tax accounting rules (Goncharov and Jacob, 2014).

The remainder of the paper proceeds as follows. We discuss the theoretical background and develop the hypothesis in Section 2. We describe our variable measurement and empirical design in Section 3. We discuss the data in Section 4 and the empirical results in Section 5. We conclude the paper in Section 6.

2. Theoretical background and hypothesis development

According to Jensen and Meckling (1976), incentives are needed to mitigate the shareholder–manager conflict and to reduce the risk-shifting problem. Therefore, the authors suggest that firms need an incentive structure under which the manager's personal holdings of the firm's debt and equity should mimic the firm's overall external capital structure. Consequently, managers should be granted not only equity-based but also debt compensation, namely, inside debt. While a large body of research studies the use of pay for performance and equity incentives in aligning managers' interests with those of shareholders (Guay, 1999; Rajgopal and Shevlin, 2002; Coles et al., 2006; Rego and Wilson, 2012), Edmans and Liu (2010) argue that inside debt (i.e., pension benefits and deferred compensation) is a superior solution to the risk-shifting problem than cash compensation is because it exposes managers to the same

default risk as outside creditors. Because the inside debt obligations of the top management team are unsecured, unfunded, and payable at a future date, they are characterized by an asymmetric payoff function with respect to the firm's net assets (Watts, 2003). Therefore, the value of inside debt holdings is sensitive to both the probability of bankruptcy and the liquidation value of the firm in the event of bankruptcy or reorganization (Edmans and Liu, 2010).

Due to limited reporting requirements, empirical research on inside debt compensation has been rather scant, until an SEC disclosure reform in 2006 greatly increased the transparency of pensions and deferred compensation. Although tax research has examined the connection between cash-based and equity compensation and tax avoidance (Phillips, 2003; Desai and Dharmapala 2006; Rego and Wilson, 2012), the effect of inside debt compensation on tax avoidance is still not well understood. Following prior studies that show a negative association between CEO inside debt holdings and the riskiness of firm investment, financial policies, and future stock returns (e.g., Edmans and Liu, 2011; Wei and Yermack, 2011; Cassell et al., 2012), we argue that inside debt compensation is a plausible determinant of tax avoidance. From the shareholders' perspective, tax avoidance can be viewed as value increasing since it reduces tax liabilities and, thus, increases after-tax cash flows (Rego and Wilson, 2012). Similarly, for debtholders, tax avoidance has positive effects: In the short run, tax planning could reduce current tax payments and, thereby, increase a firm's liquidity. Assuming that tax-induced liquidity translates into lower default probability, debtholders might prefer greater tax avoidance. Since inside debt holdings align the interests of managers and debtholders, greater inside debt could be associated with more aggressive tax avoidance.

However, a tax benefit today might not be sustainable and could reverse in the future. In other words, today's aggressive tax planning could negatively impact future tax outcomes (e.g., Dyreng et al., 2008). The increased variance of the payoffs from tax avoidance strategies

translates into the lower predictability of future tax outflows, even for constant pre-tax cash flows (e.g., Guenther et al., 2016). From the debtholders' perspective, uncertainty about future tax outcomes is valued negatively, since overall firm risk comprises not only operational or financial risk but also tax risk. If managers with high inside debt holdings act more conservatively, that is, if their preferences are more aligned with those of debtholders, we would expect executives with high inside debt holdings to lower tax risk. We thus formulate our first hypothesis as follows.

H1: Executive inside debt holdings are negatively associated with corporate tax risk.

We also argue that the risk-shifting problem is more severe at higher levels of risk. If inside debt does mitigate the agency cost of debt, we would expect this mechanism to be more effective for greater risk (i.e., tax risk). Put differently, do inside debt holdings relate to tax risk differently for firms with high tax risk than for those with average tax risk? We argue that, at higher levels of tax risk, the uncertainty about future tax payoffs is higher. In this scenario, the bondholders' and managers' interests are aligned against taking additional risky tax positions that could reverse in the future. Thus, since inside debt aligns executives' and debtholders' interests, we would expect a stronger association when inside debt is more in demand. On the other hand, at low levels of tax risk, that is, when the firm does not expect its tax positions to be challenged and eventually reversed, inside debt might not matter for tax risk. As a result, we formulate our second hypothesis as follows.

H2: The negative association between executive inside debt holdings and tax risk is stronger at higher levels of tax risk.

Moreover, we expect the association between inside debt holdings and tax risk to behave differently not only across quantiles of tax risk, but also across firms. Edwards et al. (2015) document a negative impact of firm-level and macroeconomic financial constraints on the cash ETR (i.e., greater tax avoidance). Law and Mills (2015) have developed a new

measure of financial constraint from firms' qualitative disclosures and provide evidence of a positive association with tax risk. Combined, these two papers support the idea that financially constrained firms could have strong incentives to pursue aggressive tax strategies to decrease their tax burden and have more available cash. Related to our research question, firms with liquidity constraints appear to take on more tax risk. Hence, inside debt holdings do not provide incentives that can effectively decrease tax risk.

In contrast, firms without liquidity constraints require less cash from risky tax avoidance activities. Therefore, inside debt can act in its purported risk-reducing way. In other words, we expect that the use of inside debt compensation in mitigating tax risk is more effective if a firm is not subject to liquidity constraints. We therefore formulate our third hypothesis as follows.

H3: The negative association between executive inside debt holdings and tax risk is stronger when firms are not cash constrained.

Another source of cross-sectional variation that we examine is the strength of corporate governance. Previous studies on tax avoidance have investigated the interaction between corporate governance measures and compensation incentives. However, the findings are mixed. Desai and Dharmapala (2006) argue that managerial rent extraction is higher in firms with weak governance. Thus, aligning managers' and shareholders' interests through equity incentives should result in lower rent extraction and tax avoidance. The authors interpret this result as a complementary relation between tax avoidance and diversion. In contrast, Rego and Wilson (2012) examine whether other governance mechanisms affect the relation between tax avoidance and equity risk compensation but do not find significant results. Armstrong et al. (2015) argue that the impact of corporate governance on tax avoidance is stronger at the lower and upper tails of the tax avoidance distribution. Complementing this research, we examine whether the relation between inside debt holdings

and tax varies with governance strength. If inside debt holdings moderate tax risk, we would assume them to do so in the same direction as strong monitoring. Hence, the resulting association between inside debt and tax risk could be strengthened in those firms with strong corporate governance. In this case, inside debt and strong governance would be complements. On the other hand, in strong governance environments, inside debt compensation might not be a necessary tool for moderating tax risk, since other mechanisms are already in place to mitigate executives' risky strategies. To be more precise, in such environments, institutional ownership could act as a monitoring mechanism beyond inside debt compensation; both the become substitutes. Since we lean toward the substitution argument, we state our fourth hypothesis as follows.

H4: The negative association between executive inside debt holdings and tax risk is weaker in strong corporate governance environments.

3. Variable measurement and empirical research design

3.1 Tax risk measurement

To test our hypotheses, we need a proxy of tax risk. Tax risk cannot be captured by the level of tax avoidance measured by ETRs. If a firm's tax planning strategies result in a low ETR that is sustainable in the long run, ETR-based measures would capture the level of the tax avoidance pursued by the corporation but not its tax uncertainty (Guenther et al., 2016). Moreover, we want to examine how a portion of executive compensation is associated with what managers perceive as tax risk, that is, tax positions that may or may not reverse in the future and result in tax payments. To this end, we use UTBs mandated by FIN 48 (now ASC 740-10-25), because they represent a measure of managers' assessment of firm tax risk. UTBs are contingent liabilities that represent the dollar amount of estimated tax benefits that the firm expects will not be recognized by tax authorities in the future. This measure has been

used by previous studies in relation to tax uncertainty (Lisowsky, 2010; Blouin et al., 2012; Rego and Wilson, 2012; Beck and Lisowsky, 2013; Lisowsky et al., 2013; Hanlon et al., 2014; Ciconte et al., 2016) to investigate the riskier end of tax avoidance continuum outcomes and tax sheltering.

Another advantage of using UTBs is that this measure is subject to a truncation bias, as ETRs measures are, because loss years are included in the analysis and there are no problems in interpreting negative denominators, as with ETR-based proxies of tax uncertainty. However, this measure presents some limitations, since UTBs are associated with a certain degree of discretion. FIN 48 requires a two-step procedure according to which tax positions undergo a “more likely than not” recognition test. Nevertheless, there is evidence (Ciconte et al., 2016) of UTBs being an unbiased measure of the potential for future tax cash outflows, since it appears that there is no systematic under- or overstatement of tax uncertainty. Moreover, since we are interested in managers’ assessment of risky tax positions, we confidently choose UTBs as our main variable to capture tax risk.

3.2 Inside debt variables

Since corporate tax departments are viewed as profit centers (Crocker and Slemrod, 2005; Robinson et al., 2010), we expect both the CEO and CFO to have a high level of sophistication and thus a strong impact on the firm’s tax planning strategy and tax avoidance activities. We therefore limit our analysis to the inside debt compensation held by these two executives. This approach is also consistent with the observation that tax avoidance strategies are set at the top executive level (Dyreng et al., 2010).

Our measure of CEO and CFO inside debt is thus the sum of the present value of accumulated deferred compensation and pension plans scaled by total compensation. Total compensation includes salary, bonus, the value of stock and option compensation, and inside debt holdings. We choose this proxy because it takes into account all the different components

of the compensation package. We are interested in examining inside debt incentives in combination with risk and performance-based incentives. We calculate stock value by multiplying the number of shares owned by the stock price at the firm's fiscal year-end. The value of options is computed applying the Black–Scholes (1973) option model (Core and Guay 1999, 2002). We use this measure instead of the natural log of inside debt holdings to avoid losing many observations with zero reported inside debt. Our results are not sensitive to this research design choice. Appendix B presents regression results that demonstrate the robustness of our results to this choice; it also presents the results using the natural logarithm of inside debt holdings as the inside debt proxy.

3.3 Empirical research design

Managerial incentives set through executive compensation and firm policies are likely to be jointly determined (Coles et al., 2006; Rego and Wilson, 2012). Tax concerns are likely to be a determinant of how the executive compensation contract is structured. Therefore, establishing causality in this framework is very difficult. OLS estimates will be biased if the independent variables are endogenously determined together with the dependent variable. To deal with this issue, the previous literature uses different approaches. Coles et al. (2006) address the issue by using lagged specifications with lagged (equity) compensation variables, fixed effects, and predicted values of compensation variables as instruments. They also use simultaneous equations models to isolate the effect of incentives on firm investment and financial policy and vice versa. Nevertheless, to implement the model through two-stage least squares estimation, one needs at least one exogenous variable per equation. The problem arises because all of the observable variables potentially affect both the executive compensation and the firm's policies.

In our setting, instrumental variables are not easy to find due to the difficulties in finding exogenous variations in the contracting variable, which is likely to be uncorrelated

with tax implications. Rego and Wilson (2012) recognize that it is challenging to identify firm characteristics that are significantly associated with tax avoidance but not with risk taking incentives. Nevertheless, for our simultaneous equation model and in line with Rego and Wilson (2012), we select ΔNOL (the change in tax loss carryforward) as the exogenous variable when estimating tax avoidance outcomes and AGE as the exogenous variable when estimating inside debt holdings. We expect these variables to be uncorrelated with the other endogenous variables in our system of equations. Untabulated correlation analyses show that ΔNOL is correlated with the tax avoidance variables but not with *INSIDE DEBT*. Similarly, AGE is correlated with the inside debt holdings variables but not with tax risk. This assumption is consistent with the findings of Dyreng et al. (2010). While the tone is set “at the top,” that is, CEOs and CFOs drive tax avoidance decisions, individual CEO and CFO characteristics, such as age and tenure, do not explain the executives’ effect on corporate tax avoidance.

Based on this discussion, we test H1 by adapting the model of Rego and Wilson (2012) for equity risk incentives. We implement the following simultaneous system of equations, where *TAX RISK* and *INSIDE DEBT* are the endogenous dependent variables. We use UTBs (*UTB*) as a measure of tax risk. We use the ratio of inside debt compensation to total compensation to measure *INSIDE DEBT*. We estimate the parameters for our system of equations using two-stage least squares, as follows:

$$\begin{aligned}
TAX\ RISK_{i,t} = & \alpha_0 + \alpha_1\ INSIDE\ DEBT_{i,t} + \alpha_2\ DELTA_{i,t} + \alpha_3\ VEGA_{i,t} + \alpha_3\ SIZE_{i,t} \\
& + \alpha_4\ Pre\text{-}Tax\ ROA_{i,t} + \alpha_5\ NOL_{i,t} + \alpha_5\ \Delta NOL_{i,t} + \alpha_6\ FCF_{i,t} + \alpha_7\ \sigma(CF)_{i,t} \\
& + \alpha_9\ FOREIGN_{i,t} + \alpha_{10}\ LEVERAGE_{i,t} + \alpha_{11}\ INTANGIBLES_{i,t} \\
& + \alpha_{11}\ R\&D_{i,t} + \alpha_{12}\ CAPX_{i,t} + \alpha_{14}\ DA_{i,t} + \alpha_{15}\ \sigma(ROA)_{i,t} \\
& + \alpha_{16}\ Industry\ FE + \alpha_{17}\ Year\ FE + \varepsilon
\end{aligned} \tag{1}$$

$$\begin{aligned}
INSIDE\ DEBT_{i,t} = & \beta_0 + \beta_1 TAX\ RISK_{i,t} + \beta_2 DELTA_{i,t} + \beta_3 VEGA_{i,t} + \beta_3 AGE_{i,t} \\
& + \beta_4 TENURE_{i,t} + \beta_4 TURNOVER_{i,t} + \beta_4 CHAIRMAN_{i,t} \\
& + \beta_5 SURPLUS\ CASH_{i,t} + \beta_5 INVESTMENT_{i,t} + \beta_9 MtB_{i,t} + \beta_8 SIZE_{i,t} \\
& + \beta_{10} LOSS_{i,t} + \beta_{11} \sigma(RET)_{i,t} + \beta_{12} Industry\ FE + \beta_{13} Year\ FE + \mu \quad (2)
\end{aligned}$$

In line with H1, we expect α_1 to be negative, since inside debt holdings motivate managers to act more conservatively and therefore take less risky tax positions. Following prior literature on executive compensation (e.g., Cassell et al., 2012), we control for equity risk incentives. The variable *DELTA* is computed as $1\% \times (\text{share price}) \times (\text{number of stocks held}) + 1\% \times (\text{option delta}) \times (\text{number of options held})$ and *VEGA* is the sensitivity of the change in the Black–Scholes option value for a 1% change in stock option volatility, multiplied by the number of options granted to the CEO. In our regressions, we use the natural logarithm of delta and vega.

According to Rego and Wilson’s (2012) model, equation (1) also controls for the natural log of total assets (*SIZE*), pre-tax returns on assets (*ROA*, *Pre Tax ROA*), an indicator variable for net operating loss carryforwards (*NOL*), the change in net operating loss carryforwards (ΔNOL), foreign pre-tax income (*FOREIGN*), leverage (*LEVERAGE*), intangibles (*INTANGIBLES*), *R&D*, capital expenditures (*CAPX*), discretionary accruals (*DA*), and the standard deviation of pre-tax ROAs ($\sigma(ROA)$). In equation (2), we also include executive characteristics, such as *AGE* and *TENURE*, a dummy variable that indicates a change in CEO (*TURNOVER*), a dummy variable denoting whether the CEO is also the chairperson of the board (*CHAIRMAN*), and other firm-level control variables, such as *SIZE*, growth opportunities (*MtB*), an indicator variable for a loss in the given year (*LOSS*), and stock return volatility ($\sigma(RET)$). Moreover, we include liquidity constraints measures such as free cash flow (*FCF*), cash flow volatility ($\sigma(CF)$) in equation (1) and *SURPLUS CASH* in equation (2), since we expect constrained firms to react differently from unconstrained ones.

All the variables are described in Appendix A. We also include industry and year fixed effects in both equations.

Our second hypothesis argues that there might be a stronger negative relation between inside debt and tax risk at higher levels of tax risk. To test this idea, we build on the lagged specification model based on equation (1) and estimate the following specification using quantile regressions:

$$\begin{aligned}
 TAX\ RISK_{i,t} = & \gamma_0 + \gamma_1^q High\ INSIDE\ DEBT_{i,t-1} + \gamma_2 DELTA_{i,t-1} + \gamma_3 VEGA_{i,t-1} \\
 & + \gamma_4 \Sigma\ Controls_{i,t} + \gamma_5 Industry\ FE + \gamma_6 Year\ FE + \psi
 \end{aligned} \tag{3}$$

where *High INSIDE DEBT* is an indicator variable equal to one when the executive's inside debt holdings are above the median. We use lagged compensation variables and include all the control variables from equation (1). If the relation between inside debt holdings and tax risk is similar across all quantiles of tax risk, we would observe γ_1 to be the same through all the quantiles and a flat distribution of coefficients across the different levels (quantiles) of tax risk. On the other hand, we argue that the association is non-linear and inside debt is more strongly associated with tax risk at higher levels of tax risk. Therefore, we expect γ_1^q to become more negative at higher quantiles of tax risk.

In the final step, we examine the cross-sectional prediction from H3 and H4. Hypotheses H3 and H4 argue that cash availability and strong corporate governance have an impact on the association between inside debt holdings and tax risk. To test this, we build on the lagged specification model including industry and year fixed effects.¹ We thus estimate the following equations (4) and (5):

¹ We do not include firm fixed effects mainly because of the short time horizon in our analysis. The UTB data are only available since 2006 and we are left with a limited number of observations.

$$\begin{aligned}
TAX\ RISK_{i,t} = & \lambda_0 + \lambda_1 High\ INSIDE\ DEBT_{i,t-1} + \lambda_2 High\ SURPLUS\ CASH_{i,t-1} \\
& + \lambda_3 High\ INSIDE\ DEBT_{i,t-1} \times High\ SURPLUS\ CASH_{i,t-1} \\
& + \lambda_4 \Sigma Controls_{i,t} + \lambda_5 Industry\ FE + \lambda_6 Year\ FE + \psi
\end{aligned} \tag{4}$$

$$\begin{aligned}
TAX\ RISK_{i,t} = & \phi_0 + \phi_1 High\ INSIDE\ DEBT_{i,t-1} + \phi_2 High\ INSTITUTIONAL \\
& HOLD_{i,t} \\
& + \phi_3 High\ INSIDE\ DEBT_{i,t-1} \times High\ INSTITUTIONAL\ HOLD_{i,t} \\
& + \phi_4 \Sigma Controls_{i,t} + \phi_5 Industry\ FE + \phi_6 Year\ FE + \pi
\end{aligned} \tag{5}$$

where *High INSIDE DEBT* is a dummy variable equal to one when inside debt is above the median (75th percentile). In equation (4), we also include the dummy variable *High SURPLUS CASH*, which is equal to one when surplus cash is above the 75th percentile. Our variable of interest is the interaction term between *High INSIDE DEBT* and *High SURPLUS CASH*. We expect λ_3 to be negative, since high inside debt holdings should provide executives with incentives to decrease tax risk in the absence of liquidity constraints. Moreover, we expect λ_1 to be negative consistent with equation (1) and H1. The association between cash availability and tax risk (λ_2) is rather unclear. On the one hand, cash-constrained firms could increase the riskiness of their tax positions to decrease their tax burdens and free liquidity ($\lambda_2 > 0$). On the other hand, Kubick et al. (2015) argue that cash availability and the predictability of future cash flows provide firms with additional ability to engage in tax planning ($\lambda_2 < 0$). Following these arguments, we do not make any clear prediction regarding the sign of λ_2 .

In equation (5), we test H4 and additionally include *High INSTITUTIONAL HOLD*, which is a dummy variable equal to one when a firm's institutional ownership share is above the 75th percentile. Since institutional ownership acts as a monitoring mechanism of the firm's strategic decisions, we expect tax risk to be lower when institutional ownership is high ($\phi_2 < 0$). Our variable of interest is the interaction term *High INSIDE DEBT* \times *High INSTITUTIONAL HOLD*. In a strong corporate governance environment where agency

problems are not exacerbated, management and ownership's interests are well aligned. In this context, the role of inside debt holdings in constraining executives' risk taking behaviors could be substituted by the monitoring function of institutional ownership. Consequently, we expect ϕ_3 to be positive. That is, the negative association between inside debt holdings and tax risk is weaker in firms with strong governance.

4. Data and summary statistics

We use ExecuComp and Compustat data over the period 2007–2012. Our sample starts in 2007, since FIN 48 became effective starting in 2007. Consistent with prior tax avoidance studies, we eliminate financial institutions (SIC from 6000–6999) and utility firms (SIC codes 4900–4999). We construct the sample by first requiring non-missing CEO debt and equity compensation data from the Compustat ExecuComp database. We also drop all firm–year observations missing data required to compute the tax avoidance and control variables used in our analysis. The final sample for our variables of interest (*UTB*) consists of 2,876 CEO–firm–year and 2,710 CFO–firm–year observations. We winsorize all continuous variables at the first and 99th percentiles. Table 1 reports the sample composition by time (Panel A) and two-digit SIC code (Panel B).

[Insert Table 1 about here]

Table 2 presents descriptive statistics for tax avoidance measures (Panel A) and the inside debt holdings and equity compensation of CEOs (Panel B) and CFOs (Panel C), as well as for the control variables (Panel D). The mean (median) *UTB* value is 0.01 (0.01). This means that, on average, unrecognized tax benefits represents 1% of total assets at the beginning of the year. We also define ETR measures for additional tests in Section 5.4. The variable *Cash ETR* is defined as cash taxes paid over pre-tax income ($\text{TXPD}/(\text{PI} - \text{SPI})$). We

examine a one-year proxy to capture short-term tax avoidance, where observations with negative PI - SPI values are excluded from the analysis. Moreover, consistent with the timing of the compensation design and contract negotiation, we measure *Cash ETR* as a three-year rate from year t to $t + 2$ to capture longer-term tax avoidance (Dyreng et al., 2008). We use a three-year window because inside debt data are not available prior to 2006. The mean (median) *Cash ETR* value is 0.26 (0.24). The average long-term ETR, *Cash ETR3*, averages 0.26 (0.25).

With respect to the CEO variables, the average (median) *CEO Inside Debt* is \$4,557,000 (\$597,000). The average (median) *CEO Inside Debt Ratio* is 0.11 (0.03). These findings already indicate that pension plans and deferred compensation add up to a noteworthy amount of the executive compensation package. The mean (median) *Vega* is 4.29 (4.43). The average *CFO Inside Debt* is smaller than *CEO Inside Debt* and amounts to \$1,040,000, with a median of \$109,000. The mean (median) *CFO Inside Debt Ratio* is 0.10 (0.03).

[Insert Table 2 about here]

In Table 3, Panels A and B present the univariate analysis of the CEO and CFO samples, respectively. Each sample is split into high versus low inside debt holdings. We define firms with inside debt above the sample median as the group with high debt and firms with inside debt below the below median as the group with low debt. Consistent with H1, we find that the UTBs are statistically different from each other between the two groups: In the low inside debt sample, the mean *UTB* value is significantly higher (0.0164) than in the high inside debt sample (0.0128). This result holds for both CEOs and CFOs.

Panels C and D of Table 3 present the univariate correlations between inside debt compensation and tax avoidance measures for the CEO and CFO samples, respectively. Consistent with H1, the correlation between the inside debt compensation variables and the

measure of tax risk is negative and significant. In addition, inside debt is positively and significantly correlated with the one-year *Cash ETR*. This is again consistent with H1.

[Insert Table 3 about here]

5. Empirical results

5.1 Relation between inside debt and tax risk (H1 and H2)

Table 4 presents the results from estimating the simultaneous equations model that examines the relation between tax risk and CEO inside debt compensation, thus testing H1. Panel A shows the results from estimating equation (1) using two alternative measures of inside debt holdings as independent variables. We use the ratio of CEO inside debt holdings over total compensation (*Inside Debt Ratio*) in model (1). In model (2), we use an indicator variable equal to one if *Inside Debt Ratio* is above the median and zero otherwise (*High Inside Debt*). Consistent with H1, we find evidence of significant associations between inside debt compensation and tax risk for both inside debt variables.

Importantly, the magnitude of the association between inside debt and tax risk is economically significant. Specifically, we find that a one standard deviation increase in inside debt ratio is accompanied by a 19.95% decrease in UTBs scaled by lagged total assets (i.e., tax risk).² One implication of our results is that inside debt appears to reduce the risk managers take in tax positions. The coefficients of our control variables are generally consistent with the prior literature. Specifically, the coefficient of *Vega* is positive and significant consistent with prior literature (Rego and Wilson, 2012). We find higher *UTB* values (i.e., more tax aggressiveness) in larger firms and firms with a more volatile ROA, lower leverage, more R&D, and foreign income.

² For example, multiplying the coefficient (-0.0133) by one standard deviation of *Inside Debt Ratio* (0.15) and dividing by the mean of *UTB* (0.01) yields a ratio of 19.95%.

[Insert Table 4 about here]

Panel B of Table 4 shows the estimation results from equation (2). The coefficients of *UTB* are insignificant in both models (1) and (2), suggesting that the estimation model relaxes endogeneity concerns. The coefficients of the control variables show that *AGE* and *TENURE* are positively associated with inside debt and that the latter decreases in the year when a new CEO enters the firm. Moreover, *Inside Debt Ratio* is higher for those CEOs who are also the chair of the board. The variables *SURPLUS CASH*, *INVESTMENT*, and $\sigma(\text{Ret})$ are all negatively associated with inside debt holdings.

As a robustness test, we use a lagged specification model following Cassell et al. (2012) to control for the potential endogeneity between the executive compensation structure and firm tax planning decisions. The results are presented in Table 5. We find a negative association between lagged inside debt and UTBs for both alternative proxies of inside debt holdings. Table 5 thus supports the results of the two-stage least squares estimations, confirming the role of inside debt holdings in incentivizing the CEO to act more conservatively toward tax risk. Overall, the results in Tables 4 and 5 support H1 and suggest that an increase in inside debt compensation is negatively associated with corporate tax risk.

[Insert Table 5 about here]

To investigate H2, we test the lagged specification using a quantile regression. Figure 1 is a visual representation of the estimated coefficients over the 99 percentiles along with the upper and lower 90% confidence intervals. The coefficients are estimated using standard errors clustered at the firm level. Figure 1 depicts a concave relation between inside debt holdings and tax risk, consistent with the non-linearity hypothesis. For the first quartile of tax risk, the relation between tax risk and high inside debt compensation is positive but not statistically significant. The coefficient estimates become negative and statistically significant above the 39th percentile. Further, the association becomes increasingly negative for higher

quantiles of tax risk. Importantly, the confidence intervals between the lowest quartile and most quantiles above the median do not overlap. This indicates that the coefficient estimates are also statistically different from each other. Taken together, these results suggest that, while the association between inside debt compensation and tax risk is negative across almost the entire distribution, it becomes more pronounced as UTBs increase. One implication of these results is that inside debt plays a stronger role in mitigating executives' risk taking behavior toward tax planning when the level of tax risk is higher.

[Insert Figure 1 about here]

5.2 Cross-sectional analysis (H3 and H4)

In this section, we first investigate H3 and test whether financial constraints and cash availability moderate or enhance the negative association between inside debt holdings and tax risk. Reducing the tax burden increases after-tax cash flows and decreases the probability of default. However, this has negative consequences on future cash flow levels and volatility. We argue that, for firms that need cash, the increase in after-tax cash flows could dominate the risk argument. Therefore, we expect inside debt holdings to be able to curb risk, particularly when firms are not under liquidity constraints and have high cash availability. Finding these results when expected could also shed light on the causal relation between inside debt and tax avoidance.

Column (1) of Table 6 presents the results of the cross-sectional analysis of liquidity constraints. The variable *High Surplus Cash* defines firms with *Surplus Cash* above the 75th percentile. The coefficient of *High Inside Debt Ratio* is negative and significant (-0.0019), consistent with H1. The coefficient of interest of the interaction term between *High Inside Debt Ratio* and *High Surplus Cash* is also negative and significant (-0.0042). This result is consistent with H3. The responsiveness of tax risk to inside debt holdings increases by over 200% ($= -0.042/(-0.0013)$) if firms have high surplus cash. Moreover, the sum of the two

coefficients (-0.0061) is significantly different from zero (p-value = 0.002). We interpret this result as inside debt curbing tax risk in firms that have cash available at hand, while the effect is weaker in financially constrained firms.

Next, we examine the role played by corporate governance in the association between inside debt holdings and tax risk (H4). We expect that, in firms with high institutional ownership, governance and monitoring mechanisms are in place that substitute for the inside debt component of compensation. Column (2) of Table 6 presents the regression results from estimating equation (5) to examine this prediction. The coefficient of *High Inside Debt Ratio* is negative and significant (-0.0056), consistent with H1. As expected, the coefficient of *High Institutional Holdings* is also negative and significant (-0.0053). Most importantly, the coefficient of interest of the interaction term between *High Inside Debt Ratio* and *High Institutional Holdings* is positive and significant (0.0099). This result suggests a substitution effect between institutional ownership and inside debt compensation. In firms with strong monitoring by institutional owners, inside debt compensation is no longer associated with a decreased tax risk: The sum of the coefficient of *High Inside Debt Ratio* and that of the interaction term (0.0044) is not significantly different from zero (p-value = 0.4383).

[Insert Table 6 about here]

5.3 Additional analysis: CFO inside debt

Our first additional tests are centered on the role of the CFO. In contrast to the CEO, the CFO's responsibilities are closer to the daily operations of the tax unit. To this end, we examine whether our results on H1 also hold for the inside debt compensation of the CFO. Table 7 presents the regression results from estimating equations (1) and (2) in a simultaneous equation model. Consistent with H1 and the results using CEO inside debt, CFO inside debt holdings are negatively associated with tax risk. The coefficient of *Inside Debt Ratio* is -0.0129, whose economic magnitude is quite comparable to that for the CEO sample.

Specifically, we find that a one standard deviation increase in the inside debt ratio is accompanied by a 19.35% decrease in UTBs scaled by lagged total assets (i.e., tax risk). This result implies that higher inside debt induces CFOs to act more conservatively toward tax risk. The coefficients of our control variables are generally consistent with the prior results on CEOs.

[Insert Table 7 about here]

As a sensitivity test, we again use the lagged specification model following Cassell et al. (2012) to control for the potential endogeneity between the executive compensation structure and firm tax planning decisions. Table 8 supports the results of the two-stage least squares estimations. We again find a negative association between inside debt and UTBs, confirming the role of inside debt holdings in reducing CFOs' risk taking behavior in tax planning.

[Insert Table 8 about here]

5.4 The cost of reducing tax risk

In the final step, we examine the potential costs of reducing tax risk. To be more precise, we examine the potential consequences at the tax level. In line with concurrent research (Chi et al., 2014; Kubick et al., 2014), we expect inside debt holdings to also be negatively associated with the level of tax avoidance. In Table 9, we test equations (1) and (2) using the one-year *Cash ETR* (model 1) and the three-year *Cash ETR* (model 2) as tax variables for both the CEO (Panels A and B) and CFO (Panels C and D) samples.

We find that the ratio of CEO inside debt is positively association with *Cash ETR* (i.e., greater inside debt to overall compensation is associated with a decrease in the level of tax avoidance). The coefficient of *CEO Inside Debt Ratio* is positive (+0.2466) and significant.

Economically, a one standard deviation increase in inside debt ratio is accompanied by a 14.23% increase in *CashETR*. The results also hold when we use a dummy for high inside debt holdings as the independent variable. Surprisingly, it appears that the relation is no longer significant when we use the long-term *Cash ETR*. The coefficient of *CEO Inside Debt Ratio* is no longer significant when we use *CashETR3* as a dependent variable.

The results for the CFO sample are not quite as strong. First, there is no significant association with the one-year *Cash ETR* when using the continuous measure *Inside Debt Ratio*. However, the coefficient of the *High Inside Debt Ratio* dummy is 0.2633 and significant. Second, the sign of the association with the three-year *Cash ETR* is not as expected. Furthermore, it appears that the simultaneous equation model cannot rule out endogeneity concerns, since the coefficient of the three-year *Cash ETR* in Panel D is also significant and we cannot establish the direction of the relation. These findings suggest that inside debt holdings are also associated with the ETR. The reduction in tax risk appears to come only at the cost of a short-term increase in tax payments and is not associated with an increase in long-term tax payments.

[Insert Table 9 about here]

To investigate this cost further, we examine the association between UTBs and cash ETRs while controlling for executive compensation measures (including inside debt holdings) and other determinants of tax avoidance (e.g., Dyreng et al., 2008, 2010). We use the one-year measure of *Cash ETR* and another measure of the three-year *Cash ETR* that is computed around year t (i.e., from year $t - 1$ to year $t + 1$) to account for timing issues of the ETR measure. Table 10 presents the regression results. We find that *UTB* is negatively and significantly associated with *Cash ETR*. This result suggests that higher UTB values will translate into greater tax avoidance. Put differently, higher tax risk is associated with lower

ETRs. Therefore, as long as inside debt holdings act as a constraining mechanism in tax risk, this association should also translate into less tax avoidance.

[Insert Table 10 about here]

6. Conclusion

In this study, we examine how inside debt holdings held by top executives (CEOs and CFOs) are associated with tax risk. Since inside debt compensation is expected to restrain managers from engaging in risky activities (Jensen and Meckling, 1976), we argue that the association between inside debt holdings and tax avoidance can be more clearly predicted with respect to tax risk than the level of tax payments. In line with theoretical predictions, we find that larger inside debt holdings correspond to a decrease in tax risk. Moreover, we find evidence that this relation becomes more negative at higher levels of tax risk.

We further find that inside debt holdings curb managers' behavior toward tax risk, particularly when the firm is not facing liquidity constraints. Finally, we examine whether differences in corporate governance strength also affect the association between inside debt and tax risk. We find a substitution effect between institutional ownership and inside debt compensation, since the monitoring action of institutional owners seems to replace the role of inside debt in curbing executives' behavior toward tax risk.

Our findings are of interest because previous research has documented the negative implications of tax uncertainty and tax risk with respect to firm investing decisions (Blouin et al., 2012; Jacob et al., 2015) and valuation (Hutchens and Rego, 2015). Since inside debt holdings provide incentives to decrease tax risk, remunerating executives with deferred compensation and pension plans could have beneficial effects on firm investment and value.

We extend the literature on executive compensation and corporate tax planning strategies (Desai and Dharmapala, 2006; Rego and Wilson, 2012; Armstrong et al., 2015) by focusing on CEO and CFO inside debt holdings and by providing further evidence on the

possible determinants of the tax undersheltering puzzle. High inside debt holdings align managers' and debtholders' interests. Consequently, managers reduce tax risk and therefore these firms could face higher tax rates in the future.

Appendix A

Variable definition	
Dependent variables	
<i>UTB</i>	TXTUBEND scaled by lagged total assets.
<i>Cash ETR</i>	Taxes paid (TXPD) scaled by pre-tax income less special items (PI - SPI). The variable is bounded between 0 and 1.
<i>Cash ETR 3</i>	The three-year sum of taxes paid (TXPD) divided by the three-year sum of pre-tax income minus special items (PI - SPI). The three years cover from the current year t to the following two years ($t + 1$ and $t + 2$). The variable is bounded between 0 and 1.
Independent variables	
CEO and CFO variables	
<i>CEO/CFO Inside Debt Ratio</i>	The ratio of the sum of the present value of accumulated pension and deferred compensation over the value of total compensation.
<i>CEO/CFO High Inside Debt Ratio</i>	An indicator variable equal to one when <i>Inside Debt Ratio</i> is above the median and zero otherwise.
<i>CEO/ CFO Log Inside Debt</i>	The natural log of the sum of the present value of accumulated pension and deferred compensation.
<i>CEO/CFO Delta</i>	The natural logarithm of the option delta computed as $1\% \times (\text{share price}) \times (\text{number of shares held}) + 1\% \times (\text{share price}) \times (\text{option delta}) \times (\text{number of options held})$.
<i>CEO/CFO Vega</i>	The natural logarithm of the sensitivity of the change in the Black–Scholes option value for a 1% change in stock return volatility multiplied by the number of options in the CEO's or CFO's portfolio.
<i>CEO/CFO Age</i>	The age of the executive in fiscal year t .
<i>CEO Tenure</i>	The tenure of the CEO in fiscal year t .
<i>CEO Turnover</i>	An indicator variable equal to 1 when there is a new CEO and zero otherwise.
<i>Chairman</i>	An indicator variable equal to 1 when the CEO is also the chair of the board and zero otherwise.
Firm-level variables	
<i>SIZE</i>	The natural logarithm of the firm's total assets (AT).
<i>BtM</i>	The book-to-market ratio calculated as total common equity (CEQ) divided by common shares outstanding (CSHO) multiplied by the stock price at the fiscal year-end (PRCC F).
<i>LEVERAGE</i>	Total debt (DLC + DLTT) scaled by total assets (AT).
<i>FOREIGN</i>	Pre-tax foreign income (PIFO).
$\sigma(\text{Ret})$	The 60-month stock price return volatility.
<i>Pre-Tax ROA</i>	The pre-tax ROA.
$\sigma(\text{ROA})$	The three-year Pre-Tax volatility of ROA.

<i>NOL</i>	An indicator variable equal to one if the firm has net operating loss carryforwards and zero otherwise.
<i>Discr. Acc.</i>	Discretionary accruals calculated using the performance-adjusted modified Jones model.
<i>CAPX</i>	Capital expenditures (CAPX) scaled by total assets (AT) at the beginning of the year.
<i>R&D</i>	R&D expenses (XRD) scaled by total assets (AT) at the beginning of the year.
<i>INVESTMENT</i>	Total investments, calculated as the sum of R&D expenditures (XRD), acquisitions (AQC), and net capital expenditures—i.e., capital expenditures (CAPX) less the sales of property, plant, and equipment (SPPE)—divided by average total assets (AT).
<i>Surplus Cash</i>	Net cash flows from operating activities minus depreciation plus R&D expenses scaled by lagged total assets.
<i>FCF</i>	Free cash flow computed as net cash flows from operating activities minus capital expenditures scaled by lagged total assets.
<i>CF vol</i>	The three-year volatility of EBITDA scaled by lagged total assets.
<i>High INSTITUTIONAL HOLD</i>	An indicator variable equal to 1 when the percentage of institutional ownership is above the 75th percentile and zero otherwise.
<i>High SURPLUS CASH</i>	An indicator variable equal to 1 when surplus cash is above the 75th percentile and zero otherwise.

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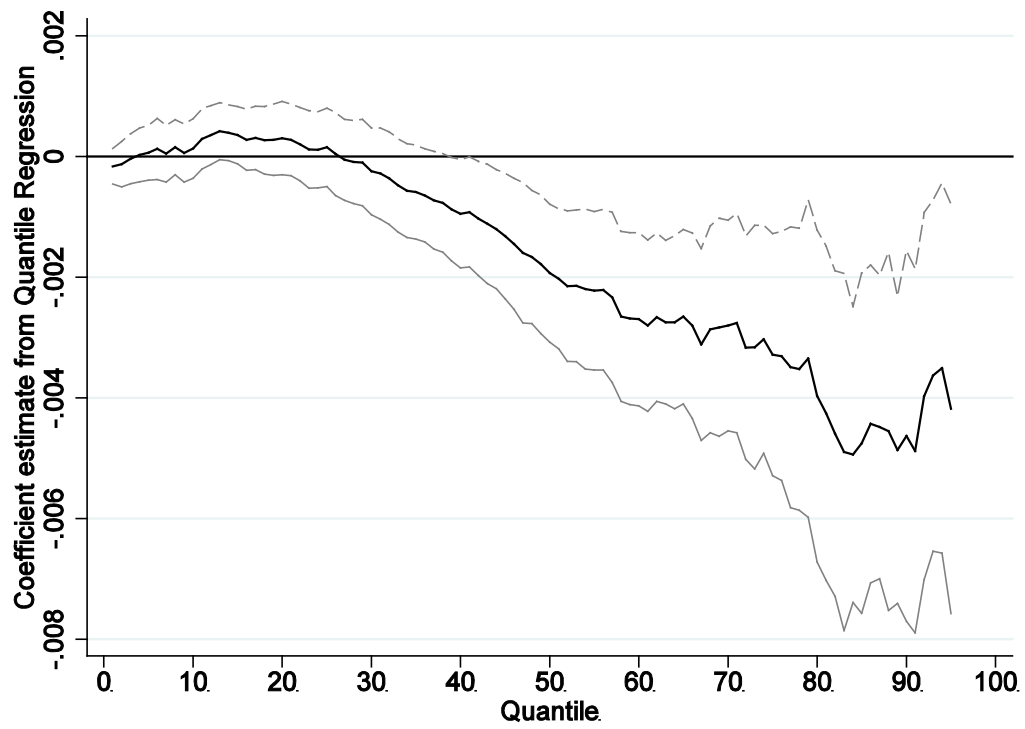
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Figure 1

Distribution of the tax risk coefficient estimated at different quantiles



This figure plots the estimates of the coefficient of *Tax Risk*. We estimate the *Tax Risk* coefficient separately for each quantile using equation (3). The upper 90% confidence bounds (dotted line) and lower 90% confidence bounds (solid line) are also presented.

Table 1 CEO sample composition

Panel A: Time distribution				
Fiscal year	Frequency	%	Cumulative Freq.	Cumulative %
2007	365	12.69	365	12.69
2008	404	14.05	769	26.74
2009	531	18.46	1,300	45.20
2010	597	20.76	1,897	65.96
2011	543	18.88	2,440	84.84
2012	436	15.16	2,876	100.00

Panel B: Industry distribution				
Industry (1-digit SIC)	Frequency	%	Cumulative Freq.	Cumulative %
0, 1 (agriculture, mining, oil, and construction)	114	3.96	114	3.96
2 (food, tobacco, textiles, paper, and chemicals)	558	19.40	672	23.37
3 (manufacturing, machinery, and electronics)	1,134	39.43	1,806	62.80
4 (transportation and communication)	144	5.01	1,950	67.80
5 (wholesale and retail)	361	12.55	2,311	80.35
7 (services)	407	14.15	2,718	94.51
8, 9 (health, legal, and educational services and other)	158	5.49	2,876	100.00

Table 2 Descriptive statistics

Variable	N	Mean	S.D.	Q1	Median	Q3
Panel A: Tax avoidance proxies						
<i>UTB</i>	2876	0.01	0.02	0.00	0.01	0.02
<i>Cash ETR</i>	3552	0.26	0.19	0.13	0.24	0.34
<i>Cash ETR3</i>	2317	0.26	0.17	0.16	0.25	0.33
Panel B: CEO characteristics						
<i>CEO Inside Debt</i> (<i>\$thousands</i>)	2876	4557	9669	0.00	597	4624
<i>CEO Inside Debt Ratio</i>	2876	0.11	0.15	0.00	0.03	0.17
<i>CEO High ID</i>	2876	0.54	0.50	0.00	1.00	1.00
<i>CEO Log Inside Debt</i>	1842	7.74	1.75	6.57	7.97	9.07
<i>CEO Delta</i>	2876	5.42	1.30	4.58	5.42	6.32
<i>CEO Vega</i>	2876	4.29	1.58	3.33	4.43	5.40
<i>CEO Age</i>	2876	54.90	6.61	50.00	55.00	60.00
<i>CEO Tenure</i>	2876	7.33	5.99	3.04	5.84	9.67
<i>CEO Turnover</i>	2876	0.10	0.29	0.00	0.00	0.00
<i>CEO Chairman</i>	2876	0.51	0.50	0.00	1.00	1.00
Panel C: CFO characteristics						
<i>CFO Inside Debt</i> (<i>\$thousands</i>)	2710	1040	2216	0.00	109	886
<i>CFO Inside Debt Ratio</i>	2710	0.10	0.15	0.00	0.03	0.14
<i>CFO High ID</i>	2710	0.54	0.50	0.00	1.00	1.00
<i>CFO Delta</i>	2710	3.82	1.21	3.08	3.87	4.65
<i>CFO Vega</i>	2710	2.99	1.45	2.11	3.11	4.02
<i>CFO Age</i>	2710	50.48	6.30	46.00	50.00	55.00
Panel D: Firm controls						
<i>MtB</i>	2876	2.83	2.61	1.39	2.10	3.24
<i>Size</i>	2876	7.53	1.46	6.48	7.45	8.47
<i>Leverage</i>	2876	0.22	0.19	0.04	0.19	0.32
<i>Foreign</i>	2876	0.03	0.05	0.00	0.01	0.05
$\sigma(\text{Ret})$	2876	0.42	0.16	0.30	0.40	0.50
<i>Pre-tax ROA</i>	2876	0.08	0.12	0.03	0.09	0.14
$\sigma(\text{ROA})$	2876	0.06	0.06	0.02	0.04	0.07
<i>NOL</i>	2876	0.82	0.38	1.00	1.00	1.00
<i>ΔNOL</i>	2876	0.01	0.08	-0.00	0.00	0.01
<i>Discr. Acc.</i>	2876	0.05	0.05	0.02	0.03	0.06
<i>Capx</i>	2876	0.05	0.06	0.02	0.03	0.06
<i>Intangibles</i>	2876	0.27	0.25	0.07	0.21	0.42
<i>R&D</i>	2876	0.04	0.06	0.00	0.01	0.06
<i>Investment</i>	2876	0.12	0.11	0.05	0.09	0.16
<i>Free cash flow</i>	2876	0.07	0.08	0.03	0.07	0.12
<i>Surplus cash</i>	2876	0.11	0.10	0.05	0.10	0.16
$\sigma(\text{Cash flow})$	2876	0.04	0.04	0.01	0.03	0.05
<i>Loss</i>	2876	0.15	0.36	0.00	0.00	0.00

This table presents summary statistics for our main variables. Panel A summarizes tax avoidance proxies. Panel B (C) presents statistics on CEO (CFO) executive compensation. Panel D uses firm-level control variables. The variable definitions are presented in Appendix A. All the continuous variables are winsorized at the first and 99th percentiles.

Table 3 Univariate analysis and correlation matrix

Panel A: CEO sample					
	<i>High Inside Debt Ratio</i>	<i>Low Inside Debt Ratio</i>			
	Mean	Mean		Δ	
<i>UTB</i>	0.0128	0.0164		-0.0036***	
Test statistic				-5.16	
<i>N</i>	1556	1320			
Panel B: CFO sample					
	<i>High Inside Debt Ratio</i>	<i>Low Inside Debt Ratio</i>			
	Mean	Mean		Δ	
<i>UTB</i>	0.0132	0.0168		-0.0037***	
Test statistic				-5.04	
<i>N</i>	1464	1246			
Panel C: CEO sample					
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>
I. <i>UTB</i>	1.000				
II. <i>Cash ETR</i>	-0.1061***	1.000			
III. <i>Cash ETR 3</i>	-0.1207***	0.6122***	1.000		
IV. <i>CEO Inside Debt Ratio</i>	-0.0580***	0.0448***	0.0105	1.000	
V. <i>CEO High Inside Debt Ratio</i>	-0.0989***	0.0377**	0.0119	0.6371***	1.000
Panel D: CFO sample					
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>
I. <i>UTB</i>	1.000				
II. <i>Cash ETR</i>	-0.1121***	1.000			
III. <i>Cash ETR 3</i>	-0.1264***	0.6280***	1.000		
IV. <i>CFO Inside Debt Ratio</i>	-0.0273	-0.0057	-0.0411	1.000	
V. <i>CFO High Inside Debt Ratio</i>	-0.0991	0.0396***	0.6088	0.4275***	1.000

Panels A and B present the univariate analysis results for the CEO and CFO samples, respectively. The samples are split into *High Inside Debt Ratio* and *Low Inside Debt Ratio* around the sample median. Panels C and D present the Pearson correlations for the CEO and CFO samples, respectively. Here, Δ is the difference in means between the *High Inside Debt Ratio* and *Low Inside Debt Ratio* samples. The test statistics in Panels A and B are computed allowing for unequal variances. Significant correlations are in bold. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. For detailed variable definitions, see Appendix A. All the continuous variables are winsorized at the first and 99th percentile.

Table 4 CEO inside debt and tax risk (simultaneous equation model)

Panel A: Dependent variable UTB				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff.</i>	<i>t-Stat</i>
<i>CEO Inside Debt Ratio</i>	-0.0133*	-1.93		
<i>CEO High Inside Debt Ratio</i>			-0.0076**	-2.35
<i>Delta</i>	-0.0010**	-2.44	-0.0012***	-2.70
<i>Vega</i>	0.0012***	4.18	0.0013***	4.43
<i>Size</i>	0.0017***	4.25	0.0021***	4.28
<i>Pre-Tax ROA</i>	-0.0166***	-3.81	-0.0154***	-3.48
<i>NOL</i>	0.0001	0.16	0.0003	0.32
<i>ΔNOL</i>	0.0077**	2.02	0.0080**	2.07
<i>FCF</i>	0.0128**	2.29	0.0117**	2.05
<i>σ(Cash Flow)</i>	-0.0362***	-3.42	-0.0379***	-3.53
<i>Foreign</i>	0.0727***	9.20	0.0755***	9.24
<i>Leverage</i>	-0.0024	-1.21	-0.0021	-1.04
<i>Intangibles</i>	-0.0021	-1.35	-0.0030*	-1.78
<i>R&D</i>	0.0886***	11.54	0.0791***	8.14
<i>Capx</i>	0.0014	0.17	-0.0001	-0.02
<i>Discr. Acc.</i>	0.0150**	2.28	0.0170**	2.52
<i>σ(ROA)</i>	0.0328***	4.33	0.0329***	4.31
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2876		2876	
<i>R²</i>	0.26		0.25	
Panel B: Dependent variable CEO Inside Debt				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff.</i>	<i>t-Stat</i>
<i>UTB</i>	0.5418	1.02	-1.5363	-0.87
<i>Delta</i>	-0.0521***	-16.03	-0.1139***	-10.46
<i>Vega</i>	0.0044*	1.74	0.0181**	2.15
<i>Age</i>	0.0042***	10.38	0.0063***	4.60
<i>Tenure</i>	0.0011**	2.07	0.0017	0.98
<i>Turnover</i>	-0.0464***	-5.23	-0.1665***	-5.61
<i>Chairman</i>	0.0393***	7.04	0.0643***	3.44
<i>Surplus Cash</i>	-0.0702**	-2.01	-0.2898**	-2.48
<i>Investment</i>	-0.0932***	-3.45	-0.3772***	-4.17
<i>MtB</i>	0.0032***	3.04	0.0075**	2.12
<i>Size</i>	0.0386***	14.57	0.1306***	14.73
<i>Loss</i>	-0.0050	-0.61	-0.0399	-1.46
<i>σ(Ret)</i>	-0.1001***	-5.20	-0.3457***	-5.36
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2876		2876	
<i>R²</i>	0.33		0.28	

This table presents the regression results for the simultaneous equation model. Panel A shows the results from estimating equation (1) in which the dependent variable is *UTB*. In model (1), the independent variable is *Inside Debt Ratio*; in model (2), the independent variable is *High Inside Debt Ratio*. Panel B shows the results from estimating equation (2). Each model includes industry (two-digit SIC) and year fixed effects. The p-values are two tailed. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.

Table 5 CEO inside debt and tax risk (OLS regression, lagged specification)

	<i>Dependent variable UTB</i>			
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff</i>	<i>t-Stat</i>
<i>CEO Inside Debt Ratio</i> _{t-1}	-0.0059*	-1.86		
<i>CEO High Inside Debt Rat</i>			-0.0034***	-3.16
<i>Delta</i> _{t-1}	-0.0095*	-1.70	-0.0010*	-1.91
<i>Vega</i> _{t-1}	0.0014**	2.45	0.0014**	2.51
<i>Size</i>	0.0018***	2.60	0.0020***	2.89
<i>MtB</i>	0.0009***	3.13	0.0009***	3.13
<i>Pre-Tax ROA</i>	-0.0248***	-3.25	-0.0247***	-3.25
<i>NOL</i>	0.0003	0.21	0.0004	0.25
<i>ΔNOL</i>	0.0081	1.32	0.0081	1.32
<i>FCF</i>	0.0162**	2.26	0.0157**	2.21
<i>σ(Cash Flow)</i>	-0.0322*	-1.81	-0.0329*	-1.84
<i>Foreign</i>	0.0846***	4.38	0.0816***	4.46
<i>Leverage</i>	-0.0138***	-3.94	-0.0134***	-3.87
<i>Investment</i>	0.0261***	4.41	0.0248***	4.22
<i>Discr. Acc.</i>	0.0059	0.77	0.0074	0.95
<i>σ(ROA)</i>	0.0358***	2.82	0.0359***	2.81
<i>Age</i>	-0.0000	-0.05	-0.0000	-0.03
<i>Tenure</i>	-0.0000	-0.22	-0.0000	-0.20
<i>Turnover</i>	0.0003	0.25	0.0002	0.15
<i>Chairman</i>	-0.0016	-1.44	-0.0016	-1.40
<i>Loss</i>	0.0001	0.09	0.0011	0.08
<i>σ(Ret)</i>	0.0061	1.55	0.0052	1.32
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2790		2790	
<i>R²</i>	0.25		0.26	

This table presents the OLS regression results where the dependent variable is *UTB*. In model (1), the independent variable is *Inside Debt Ratio* and, in model (2), the independent variable is *High Inside Debt Ratio*. All the compensation variables are lagged one year. The variable definitions are provided in Appendix A. Each model includes industry (two-digit SIC) and year fixed effects. The p-values (two tailed) are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.

Table 6 Cross-sectional analysis

<i>Dependent variable: UTB</i>				
	(1)		(2)	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff</i>	<i>t-Stat</i>
<i>CEO High Inside Debt Ratio</i> _{<i>t</i>}	-0.0019*	-1.70	-0.0056*	-1.81
<i>High Surplus Cash</i> _{<i>t-1</i>}	0.0048***	2.75		
<i>High ID</i> × <i>High SC</i>	-0.0042*	-1.90		
<i>High Institutional Holdings</i>			-0.0053**	-2.14
<i>High ID</i> × <i>High IH</i>			0.0099***	1.97
<i>Controls</i>	Yes			
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2771		496	
<i>R</i> ²	0.25		0.44	
<i>p-Value</i>	0.002		0.4383	

This table presents OLS regression results in which the dependent variable is *UTB*. The variable *High Surplus Cash* is a dummy variable equal to one when *Surplus Cash* is above the 75th percentile and zero otherwise; *High ID* × *High SC* is the interaction term between *CEO High Inside Debt Ratio*_{*t-1*} and *High Surplus Cash*_{*t-1*}; *High Institutional Holdings* is a dummy variable equal to one when *Institutional Holdings* is above the 75th percentile and zero otherwise; and *High ID* × *High IH* is the interaction term between *CEO High Inside Debt Ratio*_{*t-1*} and *High Institutional Holdings*. All the compensation variables are lagged one year. The variable definitions are provided in Appendix A. Each model includes industry (two-digit SIC) and year fixed effects. The p-values (two tailed) are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.

Table 7 CFO inside debt and tax risk (simultaneous equation model)

Panel A: Dependent variable UTB				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff.</i>	<i>t-Stat</i>
<i>CFO Inside Debt Ratio</i>	-0.0129*	-1.73		
<i>CFO High Inside Debt Ratio</i>			-0.0092*	-1.80
<i>Delta</i>	-0.0010**	-2.44	-0.0012***	-2.70
<i>Vega</i>	0.0012***	4.18	0.0013***	4.43
<i>Size</i>	0.0017***	4.25	0.0021***	4.28
<i>Pre-Tax ROA</i>	-0.0166***	-3.81	-0.0154***	-3.48
<i>NOL</i>	0.0001	0.16	0.0003	0.32
<i>ΔNOL</i>	0.0077**	2.02	0.0080**	2.07
<i>FCF</i>	0.0128**	2.29	0.0117**	2.05
<i>σ(Cash Flow)</i>	-0.0362***	-3.42	-0.0379***	-3.53
<i>Foreign</i>	0.0727***	9.20	0.0755***	9.24
<i>Leverage</i>	-0.0024	-1.21	-0.0021	-1.04
<i>Intangibles</i>	-0.0021	-1.35	-0.0030*	-1.78
<i>R&D</i>	0.0886***	11.54	0.0791***	8.14
<i>Capx</i>	0.0014	0.17	-0.0001	-0.02
<i>Discr. Acc.</i>	0.0150**	2.28	0.0170**	2.52
<i>σ(ROA)</i>	0.0328***	4.33	0.0329***	4.31
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2710		2710	
<i>R²</i>	0.25		0.23	
Panel B: Dependent variable CFO Inside Debt				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff.</i>	<i>t-Stat</i>
<i>UTB</i>	0.5418	1.02	-1.5363	-0.87
<i>Delta</i>	-0.0521***	-16.03	-0.1139***	-10.46
<i>Vega</i>	0.0044*	1.74	0.0181**	2.15
<i>Age</i>	0.0042***	10.38	0.0063***	4.60
<i>Tenure</i>	0.0011**	2.07	0.0017	0.98
<i>Turnover</i>	-0.0464***	-5.23	-0.1665***	-5.61
<i>Chairman</i>	0.0393***	7.04	0.0643***	3.44
<i>Surplus Cash</i>	-0.0702**	-2.01	-0.2898**	-2.48
<i>Investment</i>	-0.0932***	-3.45	-0.3772***	-4.17
<i>MtB</i>	0.0032***	3.04	0.0075**	2.12
<i>Size</i>	0.0386***	14.57	0.1306***	14.73
<i>Loss</i>	-0.0050	-0.61	-0.0399	-1.46
<i>σ(Ret)</i>	-0.1001***	-5.20	-0.3457***	-5.36
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2710		2710	
<i>R²</i>	0.29		0.28	

This table presents the regression results for the simultaneous equation model. Panel A shows the results from estimating equation (1) in which the dependent variable is *UTB*. In model (1), the independent variable is *CFO Inside Debt Ratio* and, in model (2), the independent variable is *CFO High Inside Debt Ratio*. Panel B shows the results from estimating equation (2). Each model includes industry (two-digit SIC) and year fixed effects. The p-values are two tailed. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.

Table 8 CFO inside debt and tax risk (OLS regression, lagged specification)

	<i>Dependent variable UTB</i>			
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Coeff.</i>	<i>t-Stat</i>
<i>CFO Inside Debt Ratio</i> _{<i>t-1</i>}	0.0003	0.09		
<i>CFO High Inside Debt Rat</i>			-0.0029**	-2.52
<i>Controls</i>	Yes		Yes	
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2572		2572	
<i>R</i> ²	0.26		0.26	

This table presents the OLS regression results in which the dependent variable is *UTB*. In model (1), the independent variable is *CFO Inside Debt Ratio* and, in model (2), the independent variable is *CFO High Inside Debt Ratio*. All the compensation variables are lagged one year. The variable definitions are provided in Appendix A. Each model includes industry (two-digit SIC) and year fixed effects. The p-values (two tailed) are based on robust standard errors adjusted for heteroscedasticity and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 9 CEO and CFO inside debt and the level of tax avoidance (simultaneous equation model)

<i>Panel A: Dependent variables Cash ETR (1) and Cash ETR 3 (2)</i>				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>
<i>CEO Inside Debt Ratio</i>	0.2466*** (3.43)		0.0516 (0.68)	
<i>CEO High Inside Debt Ratio</i>		0.1373*** (4.06)		0.0369 (1.04)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Industry FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	3552	3552	2317	2317
<i>R²</i>	0.11	0.05	0.14	0.14
<i>Panel B: Dependent variable CEO Inside Debt</i>				
	<i>(1)</i>		<i>(2)</i>	
	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>
<i>Cash ETR</i>	-0.0557 (-1.07)	-0.1862 (-1.02)	-0.1332 (-1.63)	-0.5772** (-2.00)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Industry FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	3552	3552	2317	2317
<i>R²</i>	0.34	0.29	0.35	0.27

Table 9 (continued)

Panel C: Dependent variables Cash ETR (1) and Cash ETR 3 (2)				
	(1)		(2)	
	Coeff.	Coeff.	Coeff.	Coeff.
<i>Inside Debt Ratio</i>	0.0483 (0.61)		-0.1595** (-2.06)	
<i>CFO High Inside Debt Ratio</i>		0.2633*** (4.60)		0.0280 (0.56)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Industry FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	3136	3136	2018	2018
<i>R</i> ²	0.13	-0.17	0.13	0.14
Panel D: Dependent variable CFO Inside Debt				
	(1)		(2)	
	Coeff.	Coeff.	Coeff.	Coeff.
<i>Cash ETR</i>	-0.0635 (-1.17)	0.2560 (1.34)	-0.2195** (-2.44)	-0.3981 (-1.32)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>Industry FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	3136	3136	2018	2018
<i>R</i> ²	0.29	0.28	0.26	0.28

This table presents the regression results for the simultaneous equation model. In model (1), the dependent variable is the one-year *Cash ETR* and, in model (2), the dependent variable is the three-year *Cash ETR* (*Cash ETR 3*). Panel A shows the results from estimating equation (1) using the CEO sample. Panel B shows the results from estimating equation (2) using the CEO sample. Panel C shows the results from estimating equation (1) using the CFO sample. Panel D shows the results from estimating equation (2) using the CFO sample. Each model includes industry (two-digit SIC) and year fixed effects. The p-values are two tailed. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.

Table 10 Cost of reducing tax risk

Dependent variables Cash ETR (1) and Cash ETR 3* (2)				
	(1)		(2)	
	Coeff.	<i>t-Stat</i>		<i>t-Stat</i>
<i>UTB</i>	-0.7744***	-2.66	-0.6847**	-2.29
<i>CEO Inside Debt Ratio</i> _{<i>t-1</i>}	-0.0091	-0.24	0.0066	0.16
<i>Controls</i>	Yes		Yes	
<i>Year FE</i>	Yes		Yes	
<i>Industry FE</i>	Yes		Yes	
<i>N</i>	2560		1560	
<i>R</i> ²	0.12		0.15	

This table presents the OLS regression results in which the dependent variable is, in model (1), the one-year *Cash ETR* and, in model (2) the three-year *Cash ETR* computed in years $t - 1$, t , and $t + 1$ (*Cash ETR 3**). All the compensation variables are lagged one year. The variable definitions are provided in Appendix A. Each model includes industry (two-digit SIC) and year fixed effects. The p-values (two tailed) are based on robust standard errors adjusted for heteroscedasticity and clustered by firm. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix B

Table B1

Relations between CEO inside debt, tax risk, and tax avoidance
(simultaneous equation model, alternative inside debt measure)

<i>Panel A: Dependent variable UTB (1) and Cash ETR (2)</i>		
	(1)	(2)
	<i>Coeff.</i>	<i>Coeff.</i>
<i>CEO Ln Inside Debt</i>	-0.0011** (-2.11)	0.1163* (1.82)
<i>Controls</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>Industry FE</i>	Yes	Yes
<i>N</i>	1842	2303
<i>R²</i>	0.28	0.12
<i>Panel B: Dependent variable CEO Inside Debt</i>		
	(1)	(2)
	<i>Coeff.</i>	<i>Coeff.</i>
<i>UTB</i>	5.7600 (0.83)	
<i>Cash ETR</i>		-0.8280 (-1.10)
<i>Controls</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>Industry FE</i>	Yes	Yes
<i>N</i>	1842	2303
<i>R²</i>	0.43	0.44

This table presents the regression results for the simultaneous equation model. Panel A shows the results from estimating equation (1). In model (1), the dependent variable is *UTB* and, in model (2), the dependent variable is the one-year *Cash ETR*. The independent variable is the natural logarithm of the CEO's inside debt holdings (*CEO Ln Inside Debt*). Panel B shows the results from estimating equation (2). Each model includes industry (two-digit SIC) and year fixed effects. The p-values are two-tailed. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All the continuous variables are winsorized at the first and 99th percentiles. All the variables are calculated as described in Appendix A.