

1. Introduction

The board of directors is an important governance mechanism charged with ensuring shareholders' best interests are represented (Jensen and Meckling 1979; SEC 2010).

Expectations for boards to be more engaged in more effective risk oversight have been increasing over the past decade to ensure that risk-taking on the part of management is in line with stakeholder preferences (NYSE 2004; SEC 2010; S&P 2012; COSO 2017). As a result, the SEC proposes that "risk oversight is a key competence of the board" (SEC 2010, p. 43).

Taxes represent one of the largest line item expenses on the financial statements for corporations and the intersection of tax and financial reporting is extremely complex; therefore, the board should be concerned with both tax planning and uncertainty that may be created by tax planning strategies. Additionally, corporations face increasing tax risks as governments deal with fiscal deficits and demands for tax transparency and public scrutiny rise. These issues are triggering greater concern for boards and senior management to proactively manage tax risk and the increased reputational risks, which all combine to elevate tax issues to senior management and the board (EY 2016). Thus, boards are playing an increasingly important role in managing all types of risk across the enterprise, including risks associated with tax planning and compliance (Neubig and Sangha 2004; Erle 2008; Wilson 2013; Deloitte 2016; KPMG 2018; EY 2019). Furthermore, regulatory authorities in recent years have placed increased pressure on the board of directors to ensure the firm's tax risk exposure is consistent with its overall risk appetite (Shulman 2009; Shulman 2010; OECD 2009). In this study, we examine whether and to what extent risk oversight by the board of directors shapes corporate tax planning efforts.

Previous research that examines the intersection of corporate governance and the firm's tax outcomes is relatively nascent and primarily focused on either board member composition

characteristics or the design of executive compensation schemes (e.g., Armstrong, Blouin, Jagolinzer, and Larcker 2015; Minnick and Noga 2010; Rego and Wilson 2012; Richardson, Lanis, and Taylor 2013). U.S.-based studies find limited evidence that the composition characteristics of the board are associated with differences in tax outcomes. This may be unsurprising because variation in the composition of boards of U.S. firms has diminished in recent years (Beasley, Carcello, Hermansen, and Neal 2010; Carcello, Hermanson, and Ye 2011). We propose that the board's focus and important board processes may have a more direct impact on the tax function. However, we are aware of no prior work that examines whether the level of engagement of the board in the oversight of risk is associated with differences in tax outcomes. We contribute to this literature by providing empirical evidence that robust risk oversight by the board is associated with successful tax planning efforts as evidenced by lower tax burdens in conjunction with lower tax uncertainty.

We first examine the association between board risk oversight and the level of the firm's tax planning activities using the level of tax burdens accrued in the firm's financial statements as a measure of tax planning outcomes. Absent any tax-related deductions, a firm pays taxes at the statutory tax rate per dollar of taxable income (35% throughout our sample, and currently 21%). Executing a successful tax planning strategy generally lowers the firm's tax burden, thereby transferring wealth from the government to shareholders. Since lower tax burdens can be achieved without increasing firm risk (e.g., Guenther, Matsunaga, and Williams 2017), more robust board risk oversight should be associated with lower tax burdens if the board is an effective oversight mechanism that helps shape the firm's business strategy in the best interests of shareholders. We propose that boards with more robust risk oversight are better able to understand the risks faced by the firm as a whole and, as such, can help ensure the firm makes

quality tax planning decisions that reduce its tax burden, without jeopardizing the organization's overall reputational risks. For this reason, we predict that greater board risk oversight is associated with lower tax burdens on average.

We next examine the association between more robust board risk oversight and tax uncertainty. We define "tax uncertainty" as volatility regarding firms' tax outcomes (Guenther et al. 2017; Neuman, Omer, and Schmidt 2018). While minimizing tax burdens on average can be beneficial to shareholders, there is a limit. Excessively uncertain tax planning strategies can lead to future tax payments and penalties, resulting in more volatile tax outcomes (Ciconte, Donohoe, Lisowsky, and Mayberry 2016) and ultimately creating a greater risk for providers of capital (Rego and Wilson 2012; Hasan, Hoi, Wu, and Zhang 2014; Lewellen, Mauler, and Watson 2019). Moreover, overly aggressive tax strategies can subject the firm to public scrutiny (Chen, Schuchard, and Stomberg 2019; Dhaliwal, Goodman, Hoffman, and Schwab 2019) and reputational damage (Dyreng, Hoopes, and Wilde 2016; Austin and Wilson 2017). We expect that boards with more robust risk oversight would be more likely to constrain overly aggressive tax planning, resulting in lower tax uncertainty. Hence, we predict that more robust board risk oversight is associated with lower tax uncertainty.

Our sample includes non-financial, non-regulated, U.S. corporations belonging to the Russell 1000 index as of June 2014. Beasley, Blay, Lewellen, and McAllister (2019) develop and validate a measure of board risk oversight robustness using required proxy statement disclosures of the boards' involvement in risk management (SEC 2010). The measure encompasses three factors based on best practices for enterprise risk management (COSO 2004; COSO 2009, 2010; Rittenberg and Martins 2012) including the 1) board's disclosure of a formal responsibility for risk oversight, 2) whether the board regularly engages in risk monitoring, and 3) whether the

board fosters an active risk mindset that incorporates risk management into the firm's strategy and/or corporate culture. Beasley et al. (2019) provide evidence that board risk oversight is a time-invariant characteristic of the firm. For this reason, and to increase power to detect significant results, we use the measure coded in 2014 and examine the association between board risk oversight robustness and our tax outcome measures using firm-years from 2014 through 2017.

We use the GAAP effective tax rate (ETR) as our primary measure of the level of tax planning. Tax planning that decreases the GAAP ETR reflects permanent tax strategies and directly increases earnings (Robinson et al. 2010). Moreover, the GAAP ETR is commonly used by executives (and presumably the board as well) as a salient measure of a firm's overall tax burden and level of tax avoidance (Armstrong et al. 2015; McGuire, Wang, and Wilson 2014; Dyreng, Hanlon, and Maydew 2010; Rego 2003; Rego and Wilson 2012). Consistent with our predictions, we find that more robust board risk oversight is associated with lower GAAP ETRs, indicating that these boards help ensure the firm makes quality tax planning decisions that reduce its tax burden. We then use the volatility of the GAAP ETR as our primary measure of tax uncertainty (Gallemore and Labro 2015; Guenther et al. 2017) and find that more robust board risk oversight is associated with lower GAAP ETR volatility. In sum, our findings indicate that boards with more robust risk oversight on one hand help guide the firm into reducing its tax burden, while on the other hand ensuring the firm abstains from engaging in overly aggressive tax avoidance efforts that may lead to greater uncertainty regarding the tax benefits.

We use several alternative proxies to triangulate the results. We find similar inferences using alternative measures of the tax outcomes including a long-run ETR (5-year), tax expense scaled by total assets (Henry and Sansing 2018), long-run ETR volatility (5-year), and current

year additions to unrecognized tax benefits. We also find similar inferences using an entropy-balanced sample, thereby mitigating concerns of functional-form misspecification (Hainmueller 2012).

Given that we find that the robustness of board risk oversight is associated with lower tax burdens but also lower tax uncertainty, we further examine the nature of the underlying tax planning activities that boards with more robust risk oversight engage in. We find that board risk oversight is negatively associated with shifting of income abroad, and that permanent, rather than temporary, tax planning activities drive our primary results. Collectively, these additional findings indicate that more robust board risk oversight motivates management to invest in permanent tax planning strategies that also do not increase tax uncertainty.

Finally, we examine how the board incentivizes managers to align the firm's tax strategy with shareholder preferences since one way that boards can materially impact corporate tax planning is through the design of executive compensation policies (e.g., Rego and Wilson 2012). Boards that prefer less tax aggressiveness should focus on setting compensation strategies that do not encourage excessive risk-taking. We find that firms with lower equity risk incentives drive the negative associations between board risk oversight and both the GAAP ETR and GAAP ETR volatility. This finding indicates that one mechanism through which robust board risk oversight affects tax outcomes is through the use of compensation strategies that discourage excessive management risk-taking.

We contribute to the tax, corporate governance, and enterprise risk management literatures. Tax planning is an important mechanism for generating financial and cash flow benefits, and firms that choose to engage in these activities have numerous capital market advantages. Given its significance, we expect that the board of directors have a great interest in

setting a tone at the top as well as constructing managerial contracts to incentivize tax planning. Prior research examining U.S. firms provides limited evidence that the board is associated with tax planning. We provide new evidence concerning the board's role in monitoring the firm's tax planning efforts by showing that board risk oversight is associated with more effective tax planning efforts, as evidenced by lower tax burdens that are also less volatile. These findings extend our understanding of the role of governance in shaping tax policy. Furthermore, we extend the corporate governance literature by documenting a significant benefit (consequence) for robust (weak) board risk oversight.

Our study also contributes to enterprise risk management literature. Principles-based frameworks for enterprise risk management (ERM) note that benefits of ERM include increasing positive outcomes (e.g., lowering overall tax burdens) while reducing negative surprises and reducing performance variability (e.g., reducing tax uncertainty). Our findings that greater board risk oversight is associated with lower tax burdens along with lower tax uncertainty demonstrate tangible benefits of ERM. These results should be of interest to corporations and practitioners as best practices for risk management and corporate adoption of risk management practices are still emerging. Survey evidence indicates that while boards believe that risk oversight is important, a large number of firms are not executing effective or robust risk oversight practices (Beasley, Branson, and Hancock 2019). Many companies have been reluctant to implement best practice regarding risk oversight due to concerns that the value is not worth the resource investment (Beasley et al. 2019; Cohen, Krishnamoorthy, and Wright 2017). Thus, our study speaks to the potential positive outcomes of robust risk oversight processes in terms of increasing firm value and mitigate tax risk through effective tax planning.

2. Background and hypotheses

A number of corporate governance events over the past two decades have collectively generated significant attention on the effectiveness of the board of director's oversight activities, particularly the board's role in monitoring management's risk-taking activities. These events include the financial reporting crisis in 2001-2002 and the financial and economic crisis that began in 2008, among other governance-related failures. Regulatory attention surrounding the lack of prudent risk oversight by the board has led to a number of regulatory changes over the past decade designed to strengthen the board of directors' role in risk oversight, as well as increase transparency around risk oversight efforts (NYSE 2004; Dodd-Frank 2010; NACD 2009, 2017, 2018; SEC 2010; S&P 2012).

Widely-recognized principles-based governance frameworks, including those developed by the Committee of Sponsoring Organizations (COSO) and the International Organization for Standardization (ISO), place significant emphasis on the board's role in overseeing management's enterprise-wide risk management processes (COSO 2009, 2017; ISO 2018). COSO frameworks include adequate board oversight as one of the core principles necessary for effective systems of internal control and enterprise-wide risk management, and the ISO emphasizes that oversight bodies, which encompass the board of directors, are accountable for overseeing risk management.

While these governance expectations emphasize the board's role in the oversight of *all* types of firm risks (e.g. strategic, environmental, financial reporting), we focus our study on the association between board risk oversight and tax planning and tax uncertainty. As corporate taxation continues to become a matter of significant public interest and governments and regulators engage in more aggressive oversight of corporate tax strategies, tax risks may trigger

greater reputational risks that are of concern to boards of directors who oversee management on behalf of key stakeholders (PwC 2013; EY 2016). As a result, tax oversight is now an important strategic priority that may impact the overall brand and reputation of the firm. Boards are expected to be well-informed about tax policy developments and trends worldwide (EY 2019).

Two theories dominate the literature regarding the strength of corporate governance mechanisms on firms' tax behavior. First, Desai and Dharmapala propose a complimentary association between tax avoidance and managerial rent extraction (Desai and Dharmapala 2006; Desai, Dyck, and Zingales 2007; Desai and Dharmapala 2009). The "D&D" theory proposes that the opacity and complexity of corporate tax avoidance provide opportunities for managerial rent extraction in weak governance settings. This theoretical perspective asserts that strong board governance should reduce corporate tax aggressiveness since it assumes that tax aggressiveness facilitates managerial diversion or suboptimal firm performance. Studies of firms outside the U.S. find evidence consistent with this view. For example, Richardson et al. (2013) provide evidence that a higher percentage of independent board members is associated with a lower likelihood of being challenged by the tax authority and higher tax burdens using a sample of public Australian firms. Similarly, Li, Maydew, Willis, and Xu (2019) and Desai et al. (2007) find that country-level reforms to corporate governance regulations lead to increases in corporate cash tax burdens and government tax revenues, respectively.

Counter to the predictions laid out in the D&D theory, however, recent research indicates that tax aggressiveness is unlikely to facilitate managerial diversion in a country with an overall strong regulatory environment such as the U.S. (e.g., Blaylock 2016; Atwood and Lewellen 2019). This is consistent with prior studies of U.S. firms that find little association between corporate governance and corporate tax behavior. For example, prior research finds no on-

average association between board independence or financial expertise and tax uncertainty or tax avoidance levels as indicated by UTBs and ETRs (Minnick and Noga 2010; Armstrong et al. 2015). Additionally, Rego and Wilson (2012) find no evidence that the positive association between equity risk incentives and tax avoidance varies with the strength of governance.

A second theory in the literature takes a more nuanced perspective concerning the relationship between firm tax avoidance behavior and corporate governance. Executing a successful tax planning strategy generally lowers the firm's tax burden, thereby transferring wealth from the government to shareholders. On the margin, reducing tax burdens is in the best interest of shareholders because it maximizes shareholder after-tax wealth. However, Armstrong et al. (2015) propose that agency conflicts may still motivate managers to engage in levels of tax avoidance that are not value-maximizing to shareholders. Current tax positions can have long-term implications (Finley 2019) and aggressive tax positions can result in volatile tax cash flows (Hanlon, Maydew, and Saavedra 2017). Due to compensation arrangements and other agency conflicts, management may myopically focus on maximizing current profits without properly considering the long-term risks to the firm of current tax decisions (Goldman, Schuchard, Stomberg, and Williams 2019). Conversely, without incentives, managers may prefer to invest too little in tax planning (Rego and Wilson 2012; Armstrong et al. 2015). In sum, without optimal governance mechanisms in place, managers may focus too much or too little on tax planning.

Taxes represent a material line item on both the balance sheet and the income statement. Taxes also have important implications for the firm's ability to pay dividends, and its profitability (Robinson et al. 2010). Given the board's charge to ensure management acts in the best interests of shareholders (Jensen and Meckling 1979), boards should oversee the underlying

processes and the reporting of tax outcomes to ensure current profitability and corporate risk-taking do not lead to long-term negative impacts on the firm (Erle 2008). Thus, prudent governance by the board should help to move the firm towards its “optimal” level of tax avoidance. Consistent with this theoretical perspective, Armstrong et al. (2015) find that board independence and financial expertise motivate firms with extremely high (low) levels of tax avoidance to decrease (increase) tax avoidance.

In addition to the board’s composition, we argue that the processes the board engages in as part of its governance responsibilities will also affect important firm outcomes. Oversight of management’s processes for managing risks of all types is considered an expected key competency of the board by regulators (SEC 2010) and other governance leaders (COSO 2009; 2017; NYSE 2004). Risk monitoring by the board represents one such important governance process undertaken by the board. Theoretical and practitioner publications stress that it is crucial for corporate boards to understand and be involved in tax risk management (e.g., Neubig and Sangha 2004; Deloitte 2015; Deloitte 2016; KPMG 2018; EY 2016, 2019; PwC 2013). Relatedly, Richardson et al. (2013) find evidence that management’s certification that the firm’s “system of internal controls and risk management is effective” is associated with higher tax burdens in a sample of Australian firms. However, higher tax burdens may be suboptimal for shareholders. Moreover, the authors do not examine the board’s role in the risk management process. The board’s role is to ensure that all firm-wide decisions remain consistent with the firm’s appetite for risk; including its tax planning efforts (COSO 2009). Thus, the board in its oversight role should ensure that management’s risk-taking actions related to tax avoidance maximize shareholder wealth while also not exceeding the firm’s risk tolerance.

Principles-based frameworks for enterprise risk management note that a benefit of ERM is the “*increase of positive outcomes and advantage while reducing negative surprises*” (COSO 2017, p. 6). Efficient tax planning illustrates this as it involves balancing the magnitude of the tax burden with the riskiness of avoiding taxes. More robust risk oversight processes by the board, such as the integration of firm-wide risks into its corporate strategy and involvement in monitoring the firm’s risk profile and appetite for risk-taking, should help facilitate a greater understanding of the potential risks faced by the firm as well as the acceptable level of risk the stakeholders are willing to accept. Thus, more robust board risk oversight should help the board ensure the firm is “threading the needle” between efficient tax planning and excessive risk taking. In sum, we posit that board risk oversight is associated with higher levels of tax planning. We formally state our first hypothesis:

H1: Board risk oversight is positively associated with tax planning.

In addition to the level of planning, we are also interested in whether more robust board risk oversight influences tax uncertainty. Tax experts assert, “boards should consider the impact that the organization’s tax strategies have on its competitive position and be comfortable that the organization’s tax policy is sustainable” (Deloitte 2015; EY 2019). However, historically, corporate tax departments managed the tax function with little involvement from upper-level management or the board, and without an independent assessment of risk, which violated a core principle of risk management (Neubig and Sangha 2004). Attention to material weaknesses and issues related to financial reporting of income taxes (e.g., Gleason, Pincus, and Rego 2017; Drake, Goldman, and Lusch 2016) along with public scrutiny over corporate taxes (Dyrenge et al. 2016; Chen et al. 2019; Dhaliwal et al. 2019) have elevated corporate tax issues to the board in recent years.

Theoretical research and practitioner publications stress that it is crucial for corporate boards to be involved in tax risk management, as well as proposing recommendations for the board's specific areas of involvement. Neubig and Sangha (2004, page 118) propose, "Tax risk should be viewed as an integral part of the corporation's overall enterprise risk management and should be effectively managed and directed by the board." Deloitte (2015) proposes that the board's responsibilities with regards to tax include embedding risk culture and awareness, defining the tax policy and strategy, and monitoring risk appetite and significant areas of uncertainty.

Furthermore, regulatory authorities in recent years have placed increased pressure on the board of directors to ensure the firm's tax uncertainty exposure is consistent with its overall risk appetite (Shulman 2009; Shulman 2010; OECD 2009). Monitoring the firm to ensure it is not subject to excessive tax uncertainty is important because overexposure can lead to future tax payments and penalties, resulting in more volatile tax outcomes (Ciconte et al. 2016; Hanlon et al. 2017). Moreover, overly aggressive tax strategies can subject the firm to public scrutiny and reputational damage (Austin and Wilson 2017; Chen et al. 2019).

Principles-based ERM frameworks note that effective risk oversight should help reduce uncertainty by helping organizations "*reduce performance variability*" and "*anticipate risks that would affect performance and enable them to take action to minimize disruption*" (COSO 2017, p. 7). Therefore, we expect that boards with more robust risk oversight would be more likely to constrain overly aggressive tax planning, resulting in lower tax uncertainty. Hence, we predict that more robust board risk oversight is associated with lower tax uncertainty. We formally state our second hypothesis:

H2: Board risk oversight is negatively associated with tax uncertainty.

3. Research Design

3.1 Data and Sample Selection

Our sample data comes from Beasley et al. (2019a). Beasley et al. (2019a) hand-collected and hand-coded the proxy statements of firms belonging to the Russell 1000 index as of 2014 to create a measure of the robustness of board risk oversight. They find that the proxy statement disclosures to be a fairly time-invariant governance characteristic of the firm (at least within a three or four-year time window). For this reason, to provide greater power to detect results, we use the board risk oversight disclosure score from Beasley et al. (2019a) as of 2014 as a proxy for board risk oversight for the period 2014 through 2017.

Table 1 presents our sample selection procedure. To match with the board risk oversight measure from Beasley et al. (2019a), our sample selection begins with firms in the Russell 1000 index in fiscal-year 2014. We retrieve financial variables from *Compustat*, auditor data from *Audit Analytics*, and board composition data from *ISS* (formerly *RiskMetrics*). Because we are interested in firms' tax planning activities, and firms domiciled in non-U.S. jurisdictions inherently face different tax planning incentives, we remove non-U.S. domiciled firms. For similar reasons, we also remove financial services firms and utility firms. Next, we eliminate firms with non-Big 4 auditors because very few of these large firms do not use a Big 4 auditor, and because these firms face differing levels of external governance that could bias the relation between board risk oversight and tax planning. Lastly, we remove firms that do not have proxy disclosures available. Following these steps, our potential sample comprises 656 firms and 2,434 firm-year observations.

From this initial sample, we make three additional sample cuts for estimating our models. First, we remove firm-year observations with losses. Second, we remove firm-year observations without board characteristic variables. Third, we remove observations without information to

calculate the variables used in our tests. Following these additional cuts, our final sample used for testing is 488 firms comprising 1,555 firm-year observations from 2014 through 2017.

[Insert Table 1 here]

3.2 Board Risk Oversight Measure

Based on an SEC's disclosure rules implemented in 2010, Beasley et al. (2019a) use disclosed information in annual proxy statements to develop a summary score of the robustness of board risk oversight processes for each firm. To measure the robustness of board risk oversight, co-authors from Beasley et al. (2019a) reviewed each disclosure and hand-coded whether the firm addressed each of three best-practice components of board risk oversight using a series of dichotomous variables. The authors relied on the SEC Proxy Disclosure enhancement rule and thought papers and best practices issued by COSO to identify the three best-practice components (COSO 2009, 2010, 2017; Rittenberg and Martens 2012). Following Beasley et al. (2019a), we expect that boards disclosing all three components have more robust processes for monitoring the firm's risk management system, relative to firms disclosing fewer or no components.¹

We now briefly describe the three components of the measure. Please refer to Appendix A for a more detailed description of each component of the measure, as well as examples from sample proxy statements. The first component (*Responsibility*) captures whether the proxy statement directly and verbally articulates the board's responsibility for overseeing the firm's risk management system (SEC 2010). *Responsibility* is equal to 1 if the proxy statement disclosure directly states that the board is responsible for risk oversight. Companies coded as a 0

¹ To ensure a high degree of reliability within our coding protocol, two coauthors independently coded each disclosure. Coding agreement between the co-authors was greater than 90 percent. Once coding was complete, all differences between coders were reconciled. In addition, a graduate research assistant with no former relation to the project coded a random sample of approximately 10 percent of the proxy statements disclosures with greater than 90 percent agreement with the reconciled coding.

for this item either did not directly state where the responsibility for risk oversight resides, stated that management or a subcommittee is primarily responsible for risk oversight, or used opaque language when addressing this point.

The second component of board risk oversight (*Consistency*) captures whether the firm discloses that the board regularly and systematically engages in risk monitoring activities.

Consistency is equal to 1 if the proxy statement disclosure indicates that the board reviews the firm’s risk management policies and procedures or reviews important firm risks at regular time intervals on at least an annual basis (0 otherwise).

The third component (*Risk Mindset*) addresses whether the firm discloses that the board engages in monitoring related to ensuring that the firm maintains an appropriate risk mindset or “tone at the top” that emphasizes the importance of risk management, such as and risk-strategy alignment and the optimal level of firms taking, for all firm decisions. *Risk Mindset* is equal to 1 if the firm discloses that the board is involved in monitoring the firm’s risk appetite, risk-strategy alignment, or corporate culture about risk (0 otherwise).²

3.3 Primary regression models

3.3.1 Hypothesis 1

To test our first hypothesis, whether board risk oversight is associated with the level of firms’ tax planning, we estimate the following equation:

$$GAAPETR_{i,t} = \alpha_0 + \beta_1 BoardOversight_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 RD_{i,t} + \beta_5 CapInt_{i,t} + \beta_6 Debt_{i,t} + \beta_7 NOL_{i,t} + \beta_8 ChangeNOL_{i,t} + \beta_9 Intang_{i,t} + \beta_{10} Inv_{i,t} + \beta_{11} Adv_{i,t} + \beta_{12} Foreign_{i,t} + \beta_{13} BoardInput_{i,t} + Industry\ F.E. + Year\ F.E. + \varepsilon_{i,t} \quad (1)$$

The dependent variable of interest in equation 1 is the firm-year observation’s GAAP ETR, calculated as the total tax expense scaled by pre-tax book income (*GAAPETR*). GAAP

² Thought leadership papers (e.g., (COSO 2009, 2017; Rittenberg and Martens 2012) indicate that any of these three items indicate board involvement in activities promoting an adequate risk mindset at the firm.

ETR captures the impact of accounting earnings but fails to reflect deferral strategies. Thus, deviations from the statutory tax rate for *GAAPETR* primarily capture permanent tax benefits (Hanlon and Heitzman 2010). GAAP ETR, versus other measures of tax planning, is appropriate for use in our study because top management and board of directors consider the GAAP ETR a fundamental and important measure and often consider it as important as or more important than the cash taxes paid (Graham, Hanlon, Shevlin, and Shroff 2014).³ Our independent variable of interest is the board risk oversight (*BoardOversight*). The variable is discrete and takes a value of 0, 1, 2, or 3, where 0 suggests low board risk oversight and 3 suggests high board risk oversight. We more clearly define the variable in Section 3.2 and Appendix A.

We follow the prior literature and include several control variables (Chen, Chen, Chen, and Shevlin 2010; Kubick, Lynch, Mayberry, and Omer 2016; Cen, Maydew, Zhang, and Zuo 2017, among others). First, we control for a firm's size, calculated as the natural log of the market value of equity (*Size*). Next, we control for profitability, calculated as the earnings before extraordinary items scaled by total assets (*ROA*). We also control for R&D investment, which we calculate as the observation's research and development expense divided by sales (*RD*). Next, we control for the observation's capital intensity, calculated as the observation's gross property, plant, and equipment scaled by total assets (*CapInt*). We also control for a firm's leverage using the firm's total long-term debt scaled by total assets (*Leverage*). Next, we include two control variables for net-operating losses. First, we include an indicator variable equal to one if the observation has beginning tax loss carryforward greater than zero, and zero otherwise (*NOL*). Second, we examine the change in tax-loss carryforwards from year t-1 to year t and scale that change by total assets (*ChangeNOL*). We also control for the observation's intangible intensity (*Intang*) and inventory intensity (*Inv*), calculated as intangibles scaled by total assets, and

³ In additional analysis, we also examine other measures designed to capture levels of tax planning activities.

inventory scaled by total assets, respectively. We also control for the observation's brand recognition using advertising expenses scaled by total assets (*Adv*), as well as control for the observation's foreignness using foreign sales scaled by total revenues (*Foreign*). Lastly, we include a comprehensive measure of board quality, defined as the factor score from the number of financial experts on the audit committee, the number of financial experts on the board, the size of the audit committee and board, the percentage of independent board members and the mean tenure for the board members (*BoardInput*).⁴

In addition to our control variables, we also include industry (Fama-French 12 industry factors) and year fixed effects. We winsorize all continuous variables included in equation 1 at the 1 and 99% levels. Additionally, we cluster standard errors by firm. A negative coefficient on *GAAPETR* is consistent with board risk oversight being associated with higher levels of tax planning activities, and thus would be consistent with our H1 hypothesis. See Appendix B for a more detailed discussion of how we calculate the variables in equation 1.

3.3.2 Hypothesis 2

To test our second hypothesis, whether board risk oversight is associated with tax planning uncertainty, we estimate the following equation:

$$GAAPETRVol_{i,t} = \alpha_0 + \beta_1 BoardOversight_{i,t} + \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 RD_{i,t} + \beta_5 CapInt_{i,t} + \beta_6 Debt_{i,t} + \beta_7 NOL_{i,t} + \beta_8 ChangeNOL_{i,t} + \beta_9 Intang_{i,t} + \beta_{10} Inv_{i,t} + \beta_{11} Adv_{i,t} + \beta_{12} Foreign_{i,t} + \beta_{13} BoardInput_{i,t} + \beta_{14} ROAVol_{i,t} + \text{Industry F.E.} + \text{Year F.E.} + \varepsilon_{i,t} \quad (2)$$

The dependent variable of interest in equation 2 is the firm-year observation's GAAP ETR volatility, calculated as the three-year volatility of *GAAPETR* measured across year t-2, year t-1, and year t. Our independent variable of interest remains *BoardOversight*. Furthermore, we continue to employ the same set of control variables as equation 1 with the addition of

⁴ All variables load on one factor with an Eigenvalue of 2.18. All variables load positively except for board tenure, which loads negatively.

earnings volatility (*PTROAVol*), calculated as the three-year volatility of the pretax earnings scaled by assets ratio. We include this variable to control for fundamental differences in profitability that may influence the rate at which firms pay taxes (Guenther et al. 2017). In addition to our control variables, we also include industry (Fama-French 12 industry factors) and year fixed effects. We winsorize all continuous variables included in equation 1 at the 1 and 99% levels. Additionally, we cluster standard errors by firm. A negative coefficient on *GAAPETRVol* is consistent with board risk oversight being associated with lower tax uncertainty, and thus would be consistent with our H2 hypothesis. See Appendix B for a more detailed discussion of how we calculate the variables in equation 2.

4. Results

4.1 Descriptive statistics

Table 2 presents our descriptive statistics study. Panel A presents the detailed information for our variables used in testing. The mean (median) statistic for *GAAPETR* and *GAAPETRVol* are 0.319 (0.313) and 0.058 (0.026), respectively. Given the statutory tax rate during our sample of 35%, these values are reasonable, as well as in line with prior literature (Dyreng et al. 2017; Guenther et al. 2017, among others). The mean (median) value for our independent variable of interest, *BoardOversight*, is 1.251 (1.000). This statistic suggests that the typical firm has approximately one of the board risk oversight components. We also document that 35.8 percent of our sample firms have a *BoardOversight* score above the sample median (*HighBoardOversight* =1). The statistics for our control variables are reasonable and in line with prior literature.

Panel B presents comparative descriptive statistics for firms with a high (2 or 3) versus low (0 or 1) *BoardOversight* score. Consistent with our H1 (H2), we document that high

BoardOversight firms have a significantly lower mean *GAAPETR* (mean *GAAPETRVol*) than low *BoardOversight* firms, and the differences are significant at the 1% (10%) statistical significance level. We also document that high *BoardOversight* firms have higher amounts of *Leverage* ($p < 0.05$) and *NOL* ($p < 0.01$) than low *BoardOversight* firms, which is consistent with tax planning activities that reduce *GAAPETR* less aggressively. Meanwhile, low, relative to high, *BoardOversight* firms have higher amounts of *RD* ($p < 0.01$), which is consistent with the low *BoardOversight* firms reducing *GAAPETR* more aggressively.

[Insert Table 2 here]

4.2 Primary multivariate results

Table 3 presents our primary analysis. Column (1) presents the estimation of equation 1 testing H1. Consistent with our H1, we document a negative and significant coefficient on *BoardOversight* ($\beta_1 = -0.0157$, t-stat = -3.26). We interpret this evidence that for every one unit increase in *BoardOversight*, firms have a 1.57 percentage point lower *GAAPETR*. This result suggests that firms with a *BoardOversight* score of 3 have a 4.71 percentage point lower *GAAPETR* than firms with a 0 score. Given the mean *GAAPETR* in our sample of 31.9%, our findings suggest that a firm with a *BoardOversight* score of 3 has 14.8% lower *GAAPETR* than firms with a 0 score, which we interpret as evidence that high *BoardOversight* is associated with approximately 15% higher levels of tax planning.

Column (2) presents the estimation of equation 2 testing H2. Consistent with our H2, we document a negative and significant coefficient on *BoardOversight* ($\beta_1 = -0.0050$, t-stat = -1.97). We interpret this evidence that for every one unit increase in *BoardOversight*, firms have lower volatility of *GAAPETR* by 0.005, and thus a firm with a *BoardOversight* score of 3 has 0.015 lower *GAAPETRVol* than a firm with a *BoardOversight* of 0. Given a mean of *GAAPETRVol* of

0.058, this lower volatility for the group with the highest *BoardOversight* versus the lowest *BoardOversight* translates to a 25.7% lower level of *GAAPETRVol*. As a result, our evidence in columns (1) and (2) is consistent with higher board oversight being associated with high levels of tax planning and tax planning that is less uncertain, and the results are both statistically and economically significant.

[Insert Table 3 here]

4.3 Additional Analysis

4.3.1 Income Shifting

An important inference that we draw from Table 3 is that high *BoardOversight* firms realize higher levels of tax planning (i.e., lower ETRs) and less uncertain tax planning activities. Prior literature examining the nature of tax planning activities suggests that these may involve lower explicit tax planning activities that are perfectly legal (i.e. municipal bond interest or depreciation deductions) as opposed to higher explicit tax planning activities that may not be upheld upon IRS audit (i.e. transfer pricing or R&D tax credits) (Hanlon and Heitzman 2010). We more clearly assess that this is what is occurring by examining a particularly uncertain tax planning activity, income shifting. Using IRS data, Towery (2017) provides evidence that income shifting related activities are among the most commonly reserved for tax position under Schedule UTP, and thus, this type of activity is among the most uncertain that a firm might choose. However, to the extent that a firm can shift income from a high tax jurisdiction to a low tax jurisdiction, income shifting presents an opportunity for firms to lower their tax burden substantially. Given that we document that high *BoardOversight* firms have more tax planning, but less tax uncertainty, finding that these firms also have less multinational income shifting would be consistent with the firms turning to less uncertain tax planning activities to

operationalize their tax planning activities.

For this test, we follow the research design of Dyreng and Markle (2016). Their design uses a system of equations to consider separately inbound and outbound income shifting by regressing changes in domestic and foreign income on changes in domestic and foreign sales. The joint estimation process enables us to separate parameters for return on sales (foreign, ρ_f , or domestic, ρ_d) from shifting parameters (outbound, θ , and inbound, γ). The intuition behind the shifting parameters is that a dollar of income shifted out of domestic earnings shifts into foreign earnings. Thus, we jointly estimate their two equations while also including interaction terms with our *HighBoardOversight* variable.⁵

Table 4 presents the results of estimating the Dyreng and Markle (2016) equations. Consistent with prior literature, we document statistically significant coefficients on both inbound (γ_0) and inbound (θ_0) income shifting. We also document that the main effects for the return on foreign and domestic sales (0.085 and 0.108, respectively) are statistically significant ($p < 0.01$), and in line with Dyreng and Markle (2016).⁶ The terms that are interacted with *HighBoardOversight* capture the incremental difference for board oversight on income shifting activities. We document that both inbound (γ_1) and outbound (θ_1) income shifting is significantly attenuated for firms with high board risk oversight ($\gamma_1 = -0.280$, t-stat = -1.68; $\theta_1 = -0.181$, t-stat = -1.82, for inbound and outbound income shifting, respectively). These results suggest that firms with higher board risk oversight are associated with significantly less outbound and

⁵ We specifically follow Dyreng and Markle's (2016) equation 4a and 4b. See Page 1609 of their study for additional details as well as page 1626 for their provided code of estimating their system of equations. We limit this sample to only multinational firms (firms with Compustat variables PIFO or TXFO > 0), which reduces our original sample by 160 observations. We also require the difference between the sales reported in the Compustat geographic segment data and total sales to be less than 0.01, dropping 320 obs. Finally, we require data to calculate the change in PIDOM and PIFO, resulting in a final sample of 1,015 firm-years.

⁶ While the purpose of Table 4 is to examine differences in income shifting activities between high and low *BoardOversight* firms, the main effects in this table being similar to prior literature also provide some credence towards us not having a self-selection concern.

inbound income shifting, a series of activities often associated with being high risk and more uncertain.

[Insert Table 4 here]

4.3.2 *Permanent versus Temporary Tax Planning Activities*

Due to the proprietary nature of tax planning activities, it is beyond the scope of this study to identify the specific low-uncertainty tax planning activities that managers use to lower their tax burden. However, through the use of a combination of different dependent variables, we can enlighten our understanding of the nature of the firms' tax planning activities. Specifically, we use a variety of different dependent variables to help identify whether firms employ permanent versus temporary tax positions.

We employ two strategies to draw conclusions on the nature of firms' tax planning activities. First, we follow Campbell, Goldman, and Li (2019) and examine our primary analysis in comparison with re-estimating equation 1 with a cash-effective tax rate and an orthogonalized *GAAPETR* to determine whether the portion of the tax planning activities that drive our results are a function of the component of *GAAPETR* that cannot be explained by cash-effective tax rates, or vice-versa. Because *GAAPETR* captures permanent tax benefits and cash-effective tax rates capture permanent and temporary tax benefits, the process in Campbell et al. (2019) allows us to assess whether one or both components drive our inferences.

We perform this estimation in Table 5 Panel A. Column (1) and (2) present our estimation of equation 1 when *CashETR* (taxed paid scaled by pre-tax book income), and orthogonalized *GAAPETR* (*OrthogGAAPETR*) are our dependent variables of interest, respectively. Recall from column 1 of Table 3 that when *GAAPETR* is our dependent variable of interest, the coefficient on *BoardOversight* is negative and significant ($\beta_1 = -0.0157$, t-stat = -

3.26). However, this coefficient is no longer significant when *CashETR* becomes our dependent variable of interest. Furthermore, *OrthogGAAPETR* is statistically significant ($\beta_1 = -0.1028$, t-stat = -3.14). These findings suggest that strong *BoardOversight* is associated with firms choosing permanent, and not temporary, tax positions to achieve a lower and less uncertain tax planning activities because *GAAPETR* and not *CashETR* is significantly associated with *BoardOversight*, and it is the components of *GAAPETR* that are not explained by *CashETR* that drive our results.

Second, we follow Hanlon and Heitzman (2010) and split book-tax differences into temporary and permanent book-tax differences. Hanlon and Heitzman (2010) define total book-tax differences as the difference between pre-tax book income and an estimated U.S. taxable income. They specifically estimate taxable income as the current tax expense (both U.S. and foreign) scaled by the statutory tax rate less the change in net operating losses from year t-1 to year t (*TotalBTD*). They also define temporary book-tax differences as deferred tax expense scaled by the statutory tax rate (*TempBTD*). Hanlon and Heitzman (2010) do not define permanent book-tax differences. However, one can calculate permanent book-tax differences as the difference between *TotalBTD* and *TempBTD* (*PermBTD*).⁷

We re-estimate equation 1 by replacing *GAAPETR* with *TotalBTD*, *PermBTD*, and *TempBTD* as the dependent variable of interest in Table 5 Panel B columns (1), (2), and (3), respectively. We first examine the relation between *TotalBTD* and *BoardOversight*, and we document a positive and significant coefficient ($\beta_1 = 0.0025$, t-stat = 2.31). This result is consistent with our findings in Table 3 where firms with strong *BoardOversight* are associated with more tax planning activities, in this case, represented by a greater disparity between book income and taxable income. However, we document that the effect does not persist for all book-tax differences. In column (2) we find a positive and significant coefficient on *BoardOversight*

⁷ *TotalBTD*, *TempBTD*, and *PermBTD* are all scaled by total assets.

when our dependent variable of interest is *PermBTD* ($\beta_1 = 0.0038$, t-stat = 2.23). However, we fail to provide a significant relation when *TempBTD* is our dependent variable of interest. These findings are consistent with Panel A in that firms with strong board risk oversight appear to be achieving higher levels of tax planning via permanent and not temporary tax positions. While we are not able to detail the specific tax strategies that firms are choosing, these results provide insights into the nature of the tax planning activities our firms of interest are choosing.

[Insert Table 5 here]

4.3.3 Board Oversight Influence via Compensation Structure

The board of directors is not directly tasked with choosing and executing the details of tax planning activities. However, the board does have significant influence over managers via the design of their compensation packages. For example, should a board wish to incentivize more (less) uncertain tax planning activities, then it would structure the management's compensation in a way that the managers receive more (less) compensation from the volatility of firm earnings (Rego and Wilson 2012). Said another way, boards could structure compensation packages to have a high (low) 'Vega' to incentivize (disincentive) risk. If our findings from H1 and H2 are a function of the board's influence on firm tax planning strategy, then we would expect our findings to be more concentrated among firm-year observations with lower, rather than higher, Vega.

We test this assertion in Table 6 using a subsample of firms for which we can calculate Vega. Specifically, we re-estimate equation 1 (columns (1) and (2) and equation 2 (columns (3) and (4)) for firms with high and low Vega (i.e., above and below the sample median). Consistent with our expectation we document that our results concentrate among the low Vega firms. Specifically, firms with low Vega have a negative and significant relation between *GAAPETR*

and *BoardOversight* ($\beta_1 = -0.0241$, t-stat = -3.43) as well as *GAAPETRVol* and *BoardOversight* ($\beta_1 = -0.0126$, t-stat = -3.14). Meanwhile, we fail to document any significant relations among firms with a high Vega.⁸ As a result, our findings suggest that compensation structure is one way that boards incentivize tax planning activities.⁹

[Insert Table 6 here]

4.4 Robustness

4.4.1 Alternative Measures of Tax Planning and Tax Uncertainty

Many different measures can proxy for tax planning activities and tax uncertainty. In Table 7, we employ other measures to ensure the robustness of our findings. Column (1) and (2) re-estimate equation 1 using a five-year measure of *GAAPETR* (*GAAPETR5*) and *GAAPETR* compiled using the methodology from Henry and Sansing (2018) (*GAAPETRHS*), respectively, as the dependent variable. Columns (3) and (4) re-estimate equation 2 using current year additions to unrecognized tax benefits (*CYUTB*) and five-year *GAAPETRVol* (*GAAPETRVol5*),¹⁰ respectively, as our dependent variable. Across all four columns, we continue to document statistical significance in the same direction as our primary results in Table 3. As a result, our findings appear to be robust to numerous alternative specifications.

[Insert Table 7 here]

4.4.2 Alternative Research Design Using Entropy Balancing

As documented in Table 2 Panel B, there are substantial differences between our low and

⁸ In addition to the low Vega tests being statistically less than 0 and the high Vega tests not being statistically different from 0, we also use an F-test to document that the differences among the coefficients for columns (1) vs (2) and (3) vs (4) are statistically different from one another.

⁹ Because the results from H1 and H2 appear to be a function of risk, as opposed to wealth maximization, we would not expect any cross-sectional variation in high versus low Delta firms. Consistent with this expectation, in untabulated analysis, we also examine the effect of Delta on the relation between tax planning activities and board risk oversight, and we fail to document a significant differences between the two groups of firms.

¹⁰ We also replace *PTROAVOL* with the five-year measure (*PTROAVOL5*) to match the time period of the dependent variable.

high *BoardOversight* firms. While we mitigate concerns about the two groups of firms being different by including a vector of control variables, non-linearity between the high and low *BoardOversight* firms can potentially bias our inferences (Hainmuller 2012; Shipman et al. 2017). To mitigate this concern, we employ an entropy balance. Specifically, we balance the control variables of our high *BoardOversight* firms (i.e. those with a 2 or 3 as their score) with the low *BoardOversight* firms (i.e. those with a 0 or 1 as their score), and we perform this balance across the first two moments (i.e., mean and variance).¹¹ Using this balanced sample, we then re-estimate equation 1 and equation 2 in columns (1) and (2) of Table 8, respectively. Consistent with Table 3, we continue to document negative and significant coefficients. Thus, our inferences do not appear to be driven by non-linearity.

[Insert Table 8 here]

4.4.3 Falsification Test

We perform a falsification test to demonstrate that the *qualitative* information disclosed regarding board risk oversight, rather than the quantity of information, best captures the underlying construct of board risk oversight robustness. We replace *BoardOversight* with the log of the number of words in the board oversight disclosure (*NWords*) and re-estimate our primary. We tabulate the results of this analysis in Table 9. We find no evidence that *NWords* is significantly associated with either *GAAPETR* or *GAAPETRVol*. This analysis provides evidence that the *content* of disclosed board oversight activities, rather than the *quantity of information disclosed*, explains variation in tax planning outcomes.

[Insert Table 9 here]

¹¹ In untabulated analysis, we document no differences in the mean and variance across all control variables between the two groups following this procedure.

5. Conclusion

Corporations face increasing tax risks as governments deal with fiscal deficits and demands for tax transparency and public scrutiny rise, which is triggering greater concern for boards and senior management to proactively manage tax risk and the increased reputational risks. Our study extends our understanding of the importance of more robust board risk oversight in the context of tax planning and tax uncertainty. Our findings highlight that boards engaged in more robust risk oversight practices are associated with lower tax burdens and less volatility in tax outcomes, suggesting that board risk oversight is an important corporate governance mechanism. We provide some initial evidence that boards are playing an increasingly important role in managing all types of risk across the enterprise, including risks associated with tax planning and compliance.

We recognize that the study is subject to limitations. First, we assume that there is no purposeful bias in firms' proxy statement disclosures; however, we assert that any incomplete or inaccurate disclosure information would simply create noise in our measure of board oversight, which would bias against finding results. Second, our study is an association study; thus, we are limited in our ability to demonstrate causal relationships between board oversight and tax planning and tax volatility.

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APPENDIX A: Board Risk Oversight Measure Development Process

Overview of the SEC rule and best practices for board risk oversight

Effective February 28, 2010, the SEC requires the board to disclose in its annual proxy statements its involvement in the oversight of corporate risk-taking within the firm. The SEC Proxy Statement Enhancement requirement (SEC 2010) provides very little guidance on what companies are required to disclose. The following excerpts from the rule summarize the SEC's guidance:

“Disclosure about the board’s approach to risk oversight might address questions such as whether the persons who oversee risk management report directly to the board as whole, to a committee, such as the audit committee, or to one of the other standing committees of the board; and whether and how the board, or board committee, monitors risk. The final rules also require companies to describe the board’s role in the oversight of risk...disclosure about the board’s involvement in the oversight of the risk management process should provide important information to investors about how a company perceives the role of its board and the relationship between the board and senior management in managing the material risks facing the company. This disclosure requirement gives companies the flexibility to describe how the board administers its risk oversight function, such as through the whole board, or through a separate risk committee or the audit committee, for example.”

In sum, the guidance from the SEC is rather vague, but seems to suggest that information such as how the board views its risk oversight role, *how often* it manages risk, and *how* it monitors risk. We reviewed COSO thought leadership papers to gain a greater understanding of “best practices” for the board’s engagement in the risk management process develop our measure of board risk oversight “robustness.” We use the term “robustness” following COSO 2010 to describe the effectiveness of the process. We propose that companies disclosing board risk oversight practices that are in line with best practices should have a more robust (i.e., more effective) board risk oversight process.

The COSO publication *Effective Enterprise Risk Management: The Role of the Board of Directors* highlights four important areas that contribute to more effective board oversight with

regards to risk management: 1) understand the entity's risk philosophy and concur with the entity's risk appetite, 2) know the extent to which management has established effective enterprise risk management of the organization, 3) review the entity's portfolio of risk and consider it against the entity's risk appetite, and 4) be apprised of the most significant risks and whether management is responding appropriately. The publication also emphasizes that, while companies may use committees to help in carrying out risk oversight duties, *risk oversight is a full board responsibility*. From this publication, we gather several important aspects of prudent risk oversight by the board. First, the board should ultimately understand its important responsibility for overseeing and monitoring risk. Second, the board should be regularly monitoring firm-level risks and the risk management process. Third, the board should be helping to set the tone at the top with regards to the appropriate level of risk undertaken by the firm and should ensure that management is on board with this risk philosophy. These three important principles motivated our three components of Board Risk Oversight: 1) *Responsibility*, 2) *Regular monitoring*, and 3) *Risk mindset*. Other thought leadership papers helped us to develop a greater understanding of how to measure these three components. We describe these in greater detail under the description of each component below.

Board Oversight component #1: Formal responsibility for overseeing risk management

Our first component of board risk oversight captures whether the board directly and verbally articulates its responsibility for overseeing the firm's risk management system (SEC 2010). Although the board is [*should be*] ultimately responsible for risk oversight at all firms (COSO 2009), this component is intended to capture the board's understanding of this important responsibility and the underlying level of commitment to monitoring the risk oversight process accepted by the board. Thought leadership papers and empirical research stress the importance of

formal articulation of board and management risk monitoring responsibilities. Specifically, Rittenberg and Martens (2012) assert that a major contributor to the financial crisis was that there was no formal articulation of board and management risk monitoring responsibilities. Similarly, Ittner and Keusch (2015) find in surveys that board involvement is lowest in firms that have not formally defined the board's oversight responsibilities. ISO 31000 (2018) proposes that oversight bodies should demonstrate leadership and commitment by "*issuing a statement or policy that establishes a risk management approach, plan or course of action*" (ISO 31000 2018, p. 5). In carrying out their risk oversight responsibilities, some firms treat risk oversight as a full board responsibility, whereas other firms delegate oversight over specific risks to subcommittees (COSO 2009). Ittner and Keusch (2015) suggest that when risk oversight responsibility is assigned to the board as a whole (rather than delegating different types of risks to respective committees) "the board tends to have a more consistent understanding of the organization's top risks." While boards may delegate more detailed risk management processes to committees, this component is designed to capture the board's commitment to and engagement in its responsibility for risk oversight.

We code *Responsibility* equal to 1 if the proxy statement directly states that the board is responsible for risk oversight. Companies coded as a 0 for this item either did not directly state where the responsibility for risk oversight resides, stated that management or a subcommittee is primarily responsible for risk oversight, or used opaque language when addressing this point. Although *Responsibility* does not directly measure actual risk oversight activities per se, we believe that when a board directly states its responsibility for risk oversight, it will be more directly involved in actively monitoring the oversight process.

Examples of proxy statements coded as 1 for *Responsibility* (links to the respective proxy statements are included below each quote):

1. Iron Mountain Corp.– “The board is **responsible** for oversight of the Company’s management of enterprise risks”
<https://www.sec.gov/Archives/edgar/data/1020569/000104746914003768/a2219430zdef14a.htm>
2. General Motors Co. – “Our board has **overall responsibility** for risk oversight.”
http://www.sec.gov/Archives/edgar/data/1467858/000146785814000130/gm_2014xdef14a.htm
3. Manitowoc – “The Board of Directors is **responsible** for the oversight of risk across the entire Company.”
<http://www.sec.gov/Archives/edgar/data/61986/000119312514109486/d655360ddef14a.htm>
4. Inear Technology Corp – “The Board of Directors is **responsible** for overseeing the major risks facing the Company....”
http://www.sec.gov/Archives/edgar/data/791907/000120677413003334/lineartech_def14a.htm

Examples of proxy statements coded as 0 for *Responsibility*:

1. Bemis – “Our board of directors takes an active role in the oversight of our Company both as a full board and through its committees.”
http://www.sec.gov/Archives/edgar/data/11199/000130817914000064/lbms2014_def14a.htm
2. Gentex Corp – “While the Board of Directors oversees risk management, management of the Company is charged with managing risk through appropriate internal processes and internal controls.”
<http://www.sec.gov/Archives/edgar/data/355811/000119312514123458/d698646ddef14a.htm>
3. FMC Corp: “As part of the Company’s risk management process, the Board regularly discusses with management the Company’s major risk exposures, their potential financial impact on the Company, and the steps the Company takes to manage them.”
[no statement about responsibilities]
http://www.sec.gov/Archives/edgar/data/37785/000130817914000074/lfmc2014_def14a.htm
4. Estee Lauder – “Our Board of Directors regularly receives reports from our President and Chief Executive Officer and other members of senior management regarding areas of significant risk to us, including strategic, operational, financial, legal and regulatory, and reputational risks. However, senior management is responsible for assessing and managing the Company's various risk exposures on a day-to-day basis.”
<http://www.sec.gov/Archives/edgar/data/1001250/000104746913009333/a2216589zdef14a.htm>

To be clear, *Responsibility* equal 0 does not imply that the board plays no role in risk oversight or is not ultimately responsible for risk oversight; rather it indicates that the board does not directly articulate a formal responsibility. While boards can provide risk oversight without

having a formal responsibility for the system, thought leadership papers for best practices regarding board risk oversight (e.g., COSO 2010; ISO 2018; Ittner and Keusch 2015) indicate that boards that disclose a formal responsibility in the proxy statement are likely to be more involved in the risk oversight process relative to boards who do not disclose a formal responsibility. Survey evidence also indicates that a significant number of companies do not assign a formal responsibility for risk oversight to the board (COSO 2010; Ittner and Keusch 2014). Similarly, survey respondents in COSO 2010 indicate that “*there should be a more structured process for reporting key risks to the board*” (COSO 2010, p. 1). Therefore, it should not be a foregone conclusion that all firms have a structured process that assigns risk oversight responsibility to the board.

Board Oversight component #2: Regular monitoring of risk

Our second component of risk oversight involvement, *Consistency*, captures whether the firm discloses that a formal process exists by which the board of directors regularly monitors the risk management system (SEC 2010). Thought leadership papers on risk oversight stress the importance of continuous updating and regular and systematic risk oversight by the board because risks are constantly evolving (COSO 2009; Rittenberg and Martins 2012). Risk oversight should be more effective in companies that have formal, top-down risk reporting approach and have specific policies that prescribe how often the board reviews important risks or risk policies. In contrast, risk oversight may not be consistent in companies where there is no systematically required risk reporting by committees or management and therefore these parties can report risk information to the board “periodically” or as they see fit. In a survey of large U.S. companies, COSO 2010 reports that two-thirds of survey respondents indicate that “board

monitoring of the organization’s risk management process is not done at all or is carried out in an ad-hoc manner” (COSO 2010, p. 2).

Following these thought leaders, we propose that consistent risk monitoring should increase the robustness of the risk oversight process. We propose that risk reporting should occur at least annually, following the methodology of COSO 2010. We search for language within the disclosure indicating that the firm has a systematic risk reporting policy by which board reviews the firm’s risk management policies and procedures or discussed firm risk at board meetings systematically on at least an annual basis. If the proxy statement discloses that risk oversight activities are conducted at regular time intervals (at least annually), we code *Consistency* equal to 1, and 0 otherwise.

The following are examples of proxy statements coded as 1 for *Consistency*, indicating that there is a systematic approach for the board’s review of risk:

1. Ecolab Inc. - “as part of the annual risk assessment, the board determines whether any of the Company’s overall risk management process or control procedures requires modification or enhancement.”
<http://www.sec.gov/Archives/edgar/data/31462/000104746914002792/a2218749zdef14a.htm>
2. FMC Technologies Inc. - “at least annually, management presents to the board the risk areas that it believes to be the most significant to us and the plan for the assessment, monitoring and management of those risks.”
<http://www.sec.gov/Archives/edgar/data/1135152/000119312514127513/d662416ddef14a.htm>
3. Juniper Networks: “These committees provide regular reports on the Company’s risk management efforts, generally on a quarterly basis, to the full Board.”
http://www.sec.gov/Archives/edgar/data/1043604/000120677414001173/juniper_def14a.htm
4. Tupperware Brands Corp – “on an annual basis, the full Board of Directors receives a presentation by management regarding the enterprise risk management process.”
<http://www.sec.gov/Archives/edgar/data/1008654/000119312514121118/d673619ddef14a.htm>

The following are examples of proxy statements coded as 0 for *Consistency*, which indicate a lack of formally required processes, “bottom-up” reporting as deemed necessary by the reporting party, or ad-hoc processes for board risk oversight:

1. Abercrombie and Fitch Co. – “The Board of Directors implements its risk oversight responsibilities by having management provide periodic reports on the significant risks that the Company faces and how the Company is seeking to control or mitigate risk, if and when appropriate”
<https://www.sec.gov/Archives/edgar/data/1018840/000119312514196166/d695052ddef14a.htm>
2. Cummins Inc. – “Depending upon the type of the material identified risks, our Board, Audit Committee, Finance Committee, Compensation Committee and/or Safety, Environment and Technology Committee then receive periodic reports and information directly from our senior management members who have functional responsibility for the management of such risks.”
<https://www.sec.gov/Archives/edgar/data/26172/000104746914003126/a2219103zdef14a.htm>
3. McKesson Corp. – “The Board as a whole also receives periodic reports from the Company’s management on various risks, including risks facing the Company’s businesses.”
https://www.sec.gov/Archives/edgar/data/927653/000130817914000225/lmck2014_def14a.htm
4. Snap-on Inc. – “Periodically, the full Board itself conducts a review of risk management at the Company.”
<https://www.sec.gov/Archives/edgar/data/91440/000119312514091980/d670942ddef14a.htm>

Other examples of firms that are coded as zero for *Consistency* do not describe any process by which the board reviews risk areas or risk management processes.

BoardOversight component #3: Risk mindset

Our third component of risk oversight involvement addresses whether the disclosure indicates that the board engages in activities related to ensuring that the firm maintains an appropriate “risk mindset.” Risk mindset is an important facet of our measure because thought leadership papers stress the importance of a risk mindset that integrates the firm’s appetite and tolerance for risk into the decision-making process at all levels of the firm (COSO 2009; COSO 2010b; Rittenberg and Martens 2012). Board monitoring and support of an appropriate risk mindset ensures that the board understands the important risks faced by the firm and can ensure that that risk-taking is in line with organizational goals (Rittenberg and Martens 2012).

Risk Mindset is set equal to 1 if the disclosure discusses how the board is involved in monitoring the firm's risk appetite, risk-strategy alignment, or corporate culture with regard to risk. Based on thought leadership papers, we believe that any of these three items indicate board involvement in activities promoting an adequate risk mindset at the firm. Thus, to identify boards with greater oversight over the firm's risk mindset, we reviewed the proxies for language within the disclosure that discussed the board's involvement in monitoring these three items.

Risk appetite is defined as "the amount of risk, on a broad level, an organization is willing to accept in pursuit of stakeholder value" and COSO recommends boards establish "a mutual understanding of the organization's overall appetite for risks" (COSO 2009). We searched for evidence in the disclosure that the board actively engages in helping the organization set an appropriate level of risk appetite or tolerance. COSO also suggests that the board should review the company's portfolio of risks and consider whether it is in alignment with the company's strategic objectives and appetite for risk-taking (COSO 2009). Therefore, we examined the disclosures for evidence the board is involved in ensuring the firm's risk portfolio is consistent with its established tolerance for risk or strategic objectives. Disclosures consistent with this item stated something to the effect that "the board engages in activities seeking to align the company's voluntary risk-taking with the company's strategy." Finally, we examined each disclosure within our sample to determine whether the board discussed its involvement in monitoring the firm's risk-related corporate culture. COSO asserts that organizations should seek to create an effective risk-aware culture that "emanates from senior management, cascades through the organization, and is supported by the board" because "prudent risk-taking is built into the organization's culture" (Rittenberg and Martens 2012).

Examples of *Risk Mindset* equal to 1:

1. Coca Cola Enterprises, Inc. – “...the full board reviews in detail the company’s short- and long-term strategies, including consideration of significant risks facing the company and their potential impact.”
<http://www.sec.gov/Archives/edgar/data/1491675/000149167514000014/cce2014proxy.htm>
2. Visa Inc: “...our board of directors is responsible for ensuring that an appropriate culture of risk management exists within the Company and for setting the right “tone at the top”, overseeing our aggregate risk profile...”
<http://www.sec.gov/Archives/edgar/data/1403161/000119312513473409/d534496ddef14a.htm>
3. EMC Corporation – “The Board regularly considers our risk profile when reviewing our overall business plan and strategy and when making decisions impacting the Company.”
<http://www.sec.gov/Archives/edgar/data/790070/000079007014000044/definitiveproxyforearen de.htm>
4. Graham Holding Co – “The Board as a whole actively considers strategic decisions proposed by management, including matters affecting the business strategy and competitive and financial positions of the Company, and monitors the Company’s risk profile.”
<http://www.sec.gov/Archives/edgar/data/104889/000010488914000016/ghcproxy.htm>

Companies coded as zero for risk mindset have no mention the board monitoring the firm’s risk appetite, risk-strategy alignment, or corporate culture with regards to risk, any of which would indicate an active promotion by the board of a risk mindset. Again, the COSO 2010 survey indicated that significant improvements are needed in terms of the board’s engagement in risk appetite dialogue and connection to strategy (COSO 2010, p 8).

To develop our composite measure of board risk oversight robustness (*Board Oversight*) we summed each firm’s score across the three components of board risk oversight as follows:

$$BoardOversight_i = Responsibility + Consistency + Risk Mindset \quad (1)$$

Given the level of judgment involved in developing this simple proxy for board risk oversight robustness, we recognize that we may not be fully capturing all aspects of board risk oversight activities. However, any noise introduced by our attempt to create an observable indicator of more robust board risk oversight should bias against our finding any association between the measure and our outcome variables of interest.

APPENDIX B: Variable Definitions

Board Risk Oversight variables

<i>BoardOversight</i>	A comprehensive measure of the Board's involvement in risk oversight. The variable ranges from 0-3. See Appendix B for details regarding the components of this measure.
<i>HighBoardOversight</i>	An indicator variable equal to 1 if <i>BoardOversight</i> is greater than the median of 1, 0 otherwise.
<i>NWords</i>	The natural log of the number of words in the proxy statement board risk oversight disclosure

Variables of interest

<i>GAAPETR</i>	The GAAP effective tax rate (TXT/PI), winsorized at 0 and 1. Firms with pretax book losses (PI <0) are excluded.
<i>GAAPERVol</i>	The standard deviation of GAAP ETR from year t-2 to year t.
<i>TotalBTD</i>	The total book-tax difference, calculated as pretax income (PI) less total tax expense (TXT) divided by the statutory tax rate of 0.35, scaled by total assets (AT)
<i>TempBTD</i>	The temporary book-tax difference, calculated as deferred tax expense (TXDI) divided by the statutory tax rate of 0.35, scaled by total assets (AT)
<i>PermBTD</i>	Total BTD minus Temporary BTD as calculated above.
<i>CashETR</i>	The cash effective tax rate (TXPD/PI), winsorized at 0 and 1. Firms with pretax book losses (PI <0) are excluded.
<i>OrthogGAAPETR</i>	<i>GAAPETR</i> orthogonalized to <i>CashETR</i> following the procedure outlined by Campbell, Goldman, and Li (2019).
<i>CYUTB</i>	Current increases to the UTB (TXTUBPOSINC) scaled by the beginning of year UTB level (TXUTBBEG).
<i>Vega</i>	Vega is the sensitivity of the change in the option value for a 1% change in stock return volatility, multiplied by the number of options in the CEO's portfolio.
<i>High Vega</i>	An indicator variable equal to 1 if the firm's Vega is above the sample median.

Control variables

<i>Size</i>	The natural log of the market value of equity (PRCC_F*CSHO)
<i>ROA</i>	Earnings before extraordinary items (IB) divided by total assets (AT).
<i>PTROAVol</i>	The standard deviation of pretax ROA (PI/AT) from year t-2 to year t.
<i>RD</i>	Research and development expense (XRD) divided by sales (SALE).
<i>CapInt</i>	Gross property, plant, and equipment (PPEGT) divided by total assets (AT).
<i>Leverage</i>	Total long-term debt (DLC+DLTT) divided by total assets (AT).
<i>NOL</i>	An indicator variable equal to 1 if the beginning tax loss carryforward (TLCF) is greater than zero, 0 otherwise.

<i>ChangeNOL</i>	The change in the tax loss carryforward (TLCF) from year t-1 to year t scaled by total assets (AT).
<i>Intang</i>	Recorded intangibles (INTAN) divided by total assets (AT).
<i>Inv</i>	Inventory (INVT) divided by total assets (AT).
<i>Adv</i>	Advertising expense (XAD) divided by total assets (AT).
<i>Foreign</i>	Foreign (non-U.S.) sales, retrieved from the Compustat geographic segments file, divided by total sales (SALE).

Board and audit committee control variables:

<i>Board Input</i>	A comprehensive measure of board quality, defined as the factor score from a factor analysis of AC FIN, AC SIZE, BD FIN, BD IND, BD SIZE, AND BD TENURE.
<i>AC FIN</i>	The number of financial experts on the audit committee in year <i>t</i> .*
<i>AC SIZE</i>	The number of audit committee members in year <i>t</i> . *
<i>BD FIN</i>	The number of financial experts on the board in year <i>t</i> . *
<i>BD IND</i>	The average percentage of independent board members for year <i>t</i> . *
<i>BD SIZE</i>	The number of board members in year <i>t</i> . *
<i>BD TENURE</i>	The mean tenure for board members (the mean number of years the directors have been associated with the firm). *

Dyreng and Markle (2016) Variables

<i>ΔPIFO</i>	Following Dyreng and Markle (2016), (foreign earnings in year t (PIFO) less foreign earnings in year t-1), scaled by total assets in year t-1 (AT).
<i>ΔPIDOM</i>	Following Dyreng and Markle (2016), (domestic earnings in year t (PIDOM) less domestic earnings in year t-1), scaled by total assets in year t-1 (AT).
<i>ΔSALEFO</i>	Following Dyreng and Markle (2016), (foreign sales in year t less foreign sales in year t-1), scaled by total assets in year t-1 (AT). We compute foreign sales by summing the revenues of non-domestic segments from the Compustat Segments database.
<i>ΔSALEDOM</i>	Following Dyreng and Markle (2016), (domestic sales in year t less domestic sales in year t-1), scaled by total assets in year t-1 (AT). We compute domestic sales by subtracting foreign sales from total global revenues.

Notes: This table presents variable definitions for the variables used in our study. * indicates data retrieved from ISS. All continuous variables are winsorized at 1% and 99%.

TABLE 1: Sample Selection and Composition

	<u>Firms</u>	<u>Firm-years</u>
Firms from the Russell 1000 index with data in Compustat	1,021	
Less:		
Foreign firms (FIC not USA)	(49)	
Financial firms (SIC 6000-6999)	(221)	
Firms with non-Big 4 auditors	(16)	
Utilities	(59)	
Firms without proxy disclosures available	(20)	
Total potential sample firms	<u>656</u>	2,434
Less:		
Firms with current losses ($PI \leq 0$)	(25)	(344)
Firms without board characteristic variables	(124)	(381)
Firms without variables needed to calculate regression	(19)	(154)
Final sample	<u>488</u>	<u>1,555</u>

TABLE 2: Descriptive Statistics**Panel A - Across all firms**

Variable	N	Mean	Median	St Dev	Percentiles:		
					25 th	50 th	75 th
<i>BoardOversight</i>	1,555	1.251	1.000	0.876	1.000	1.000	2.000
<i>HighBoardOversight</i>	1,555	0.358	0.000	0.479	0.000	0.000	1.000
<i>GAAPETR</i>	1,555	0.319	0.313	0.148	0.244	0.313	0.364
<i>GAAPERVol</i>	1,555	0.058	0.026	0.088	0.010	0.026	0.066
<i>TotalBTD</i>	1,555	0.011	0.009	0.037	-0.003	0.009	0.029
<i>Size</i>	1,555	9.537	9.334	1.195	8.622	9.334	10.238
<i>ROA</i>	1,555	0.078	0.070	0.050	0.045	0.070	0.106
<i>PTROAVol</i>	1,555	0.024	0.017	0.023	0.009	0.017	0.030
<i>RD</i>	1,555	0.041	0.009	0.069	0.000	0.009	0.051
<i>CapInt</i>	1,555	0.457	0.347	0.339	0.192	0.347	0.671
<i>Leverage</i>	1,555	0.297	0.279	0.183	0.173	0.279	0.397
<i>NOL</i>	1,555	0.893	1.000	0.309	1.000	1.000	1.000
<i>ChangeNOL</i>	1,555	0.000	0.000	0.034	-0.002	0.000	0.002
<i>Intang</i>	1,555	0.288	0.266	0.212	0.108	0.266	0.428
<i>Inv</i>	1,555	0.111	0.081	0.120	0.018	0.081	0.157
<i>Adv</i>	1,555	0.015	0.001	0.028	0.000	0.001	0.018
<i>Foreign</i>	1,555	0.399	0.355	0.351	0.050	0.355	0.620
<i>Board Input</i>	1,555	0.110	-0.173	1.027	-0.998	-0.173	0.649

TABLE 2 (continued)

Panel B - Across high and low board risk oversight

Variable	High <i>BoardOversight</i>			Low <i>BoardOversight</i>			Mean Diff		t-stat
	N	Mean	St Dev	N	Mean	St Dev			
<i>GAAPETR</i>	556	0.304	0.138	999	0.327	0.153	-0.023	***	-2.89
<i>GAAPERVol</i>	556	0.053	0.078	999	0.062	0.093	-0.009	*	-1.90
<i>TotalBTD</i>	556	0.013	0.035	999	0.010	0.038	0.002		1.24
<i>Size</i>	556	9.536	1.133	999	9.538	1.228	-0.002		-0.03
<i>ROA</i>	556	0.074	0.043	999	0.080	0.053	-0.006	**	-2.27
<i>PTROAVol</i>	556	0.024	0.024	999	0.023	0.023	0.001		0.51
<i>RD</i>	556	0.034	0.058	999	0.044	0.075	-0.010	***	-2.75
<i>CapInt</i>	556	0.435	0.324	999	0.469	0.347	-0.033	*	-1.85
<i>Leverage</i>	556	0.313	0.189	999	0.288	0.179	0.025	**	2.57
<i>NOL</i>	556	0.933	0.249	999	0.871	0.336	0.063	***	3.85
<i>ChangeNOL</i>	556	0.002	0.023	999	0.000	0.038	0.002		1.24
<i>Intang</i>	556	0.307	0.210	999	0.278	0.212	0.029	***	2.58
<i>Inv</i>	556	0.113	0.114	999	0.110	0.123	0.002		0.37
<i>Adv</i>	556	0.016	0.028	999	0.014	0.028	0.002		1.21
<i>Foreign</i>	556	0.386	0.344	999	0.405	0.354	-0.019		-1.04
<i>Board Input</i>	556	0.199	1.044	999	0.060	1.015	0.139	**	2.56

TABLE 3: GAAP ETR Regressions

VARIABLES	(1)		(2)	
	<i>GAAPPETR</i>		<i>GAAPETRVol</i>	
<i>Intercept</i>	0.494	***	0.069	***
	[10.11]		[2.91]	
<i>BoardOversight</i>	-0.016	***	-0.005	**
	[-3.26]		[-1.97]	
<i>Size</i>	-0.003		0.003	
	[-0.69]		[1.31]	
<i>ROA</i>	-1.035	***	-0.775	***
	[-7.48]		[-10.70]	
<i>PTROAVol</i>			0.577	***
			[5.34]	
<i>RD</i>	-0.100		0.076	
	[-1.09]		[1.48]	
<i>CapInt</i>	-0.002		-0.005	
	[-0.10]		[-0.52]	
<i>Leverage</i>	-0.012		-0.005	
	[-0.51]		[-0.33]	
<i>NOL</i>	-0.008		0.004	
	[-0.63]		[0.58]	
<i>ChangeNOL</i>	0.215		-0.130	
	[1.15]		[-1.11]	
<i>Intang</i>	-0.127	***	-0.029	
	[-4.01]		[-1.58]	
<i>Inv</i>	-0.030		-0.017	
	[-0.78]		[-0.72]	
<i>Adv</i>	0.282		0.175	**
	[1.50]		[2.07]	
<i>Foreign</i>	-0.043	***	0.019	**
	[-3.03]		[2.37]	
<i>Board Input</i>	-0.004		0.000	
	[-1.01]		[0.11]	
Fixed effects	Ind, Year		Ind, Year	
Observations	1,555		1,555	
Adjusted R-squared	0.19		0.31	

Notes: This table presents results for our tests examining the association predicted in H1 and H2 between board risk oversight (*Board Oversight*) and levels of tax planning (*GAAPPETR*) and tax uncertainty (*GAAPETRVol*), respectively. All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.

TABLE 4: Income Shifting Analysis

D.V. = Δ <i>PIDOM</i> and Δ <i>PIFO</i>	Coef (z-stat)
<i>Intercept FOR</i> (α)	0.003 *** (5.36)
<i>Intercept DOM</i> (β)	0.001 (1.12)
<i>OutboundTransfers</i> (θ_1)	0.370 *** (6.58)
<i>InboundTransfers</i> (γ_1)	0.504 *** (7.39)
<i>RoForeignSales</i> (ρ_{fo1})	0.086 *** (6.77)
<i>RoDomesticSales</i> (ρ_{do1})	0.108 *** (7.38)
<i>OutboundTransfers*HighBoardOversight</i>	-0.181 * (1.82)
<i>InboundTransfers*HighBoardOversight</i>	-0.280 * (1.68)
<i>RoForeignSales*HighBoardOversight</i>	0.031 (1.03)
<i>RoDomesticSales*HighBoardOversight</i>	0.022 (0.74)
N	1,015
Adj. R ² - Δ <i>PIDOM</i> Eqn.	0.06
Adj. R ² - Δ <i>PIFO</i> Eqn.	0.09

Notes: This table presents results examining whether income shifting differs for firms with high board risk oversight (*HighBoardOversight*=1). We estimate the following system of equations, following Dyreng and Markle (2016):

$$\Delta PIFO_{i,t} = \alpha + (1-\gamma)\rho f \Delta SALEFO_{i,t} + \theta \rho d \Delta SALEDOM_{i,t} + \varepsilon \quad (3a)$$

$$\Delta PIDOM_{i,t} = \beta + \gamma \rho f \Delta SALEFO_{i,t} + (1-\theta)\rho d \Delta SALEDOM_{i,t} + \mu \quad (3b)$$

We interact each of the terms above with *HighBoardOversight*.

All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. P-values are based on one-tailed t-tests for the variable of interest.

TABLE 5: ETR reduction mechanism tests

Panel A - Orthogonalized ETR

VARIABLES	(1) <i>CashETR</i>		(2) <i>OrthogGAAPETR</i>	
<i>Intercept</i>	0.471	***	1.197	***
	[7.17]		[3.51]	
<i>BoardOversight</i>	-0.006		-0.103	***
	[-1.01]		[-3.14]	
<i>Size</i>	-0.007		-0.019	
	[-1.49]		[-0.71]	
<i>ROA</i>	-0.705	***	-7.016	***
	[-4.97]		[-7.36]	
<i>RD</i>	-0.345	***	-0.687	
	[-3.46]		[-1.09]	
<i>CapInt</i>	-0.012		-0.024	
	[-0.54]		[-0.19]	
<i>Leverage</i>	-0.057	**	-0.053	
	[-2.03]		[-0.33]	
<i>NOL</i>	-0.042	***	-0.057	
	[-2.95]		[-0.66]	
<i>ChangeNOL</i>	0.187		1.550	
	[0.85]		[1.21]	
<i>Intang</i>	0.000		-0.851	***
	[-0.00]		[-3.85]	
<i>Inv</i>	0.000		-0.184	
	[-0.01]		[-0.68]	
<i>Adv</i>	0.165		1.953	
	[1.18]		[1.52]	
<i>Foreign</i>	0.011		-0.301	***
	[0.67]		[-3.12]	
<i>Board Input</i>	0.000		-0.023	
	[-0.08]		[-0.93]	
	0.939		0.354	
Observations	1,521		1,521	
Adjusted R-squared	0.11		0.19	

TABLE 5 (continued)

Panel B - Book-tax differences

VARIABLES	(1) <i>TotalBTD</i>		(2) <i>PermBTD</i>		(3) <i>TempBTD</i>	
<i>Intercept</i>	-0.0312	***	-0.052	***	0.0234	***
	[-2.69]		[-3.16]		[2.46]	
<i>BoardOversight</i>	0.0025	**	0.0038	**	-0.0013	
	[2.31]		[2.23]		[-1.17]	
<i>Size</i>	0.0002		0.0011		-0.001	
	[0.20]		[0.77]		[-1.18]	
<i>ROA</i>	0.3404	***	0.3855	***	-0.0591	*
	[10.09]		[6.89]		[-1.86]	
<i>RD</i>	0.0147		0.0547		-0.036	
	[0.56]		[1.62]		[-1.62]	
<i>CapInt</i>	-0.0024		-0.0086		0.0069	*
	[-0.55]		[-1.30]		[1.81]	
<i>Leverage</i>	0.0072		-0.0021		0.0079	
	[1.16]		[-0.19]		[1.11]	
<i>NOL</i>	0.003		0.0006		0.0018	
	[0.85]		[0.11]		[0.61]	
<i>ChangeNOL</i>	-0.0363		-0.035		-0.0042	
	[-1.51]		[-0.85]		[-0.13]	
<i>Intang</i>	0.0178	***	0.0478	***	-0.0299	***
	[2.63]		[4.32]		[-4.06]	
<i>Inv</i>	0.0009		0.0076		-0.0045	
	[0.08]		[0.42]		[-0.36]	
<i>Adv</i>	-0.0904	*	-0.016		-0.0783	**
	[-1.83]		[-0.24]		[-2.47]	
<i>Foreign</i>	0.0162	***	0.0223	***	-0.006	**
	[4.65]		[4.36]		[-2.05]	
<i>Board Input</i>	0.0006		0.0006		0	
	[0.63]		[0.38]		[-0.01]	
Observations	1,555		1,544		1,544	
Adjusted R-squared	0.2868		0.202		0.0941	

Notes: This table presents results for our tests examining the association between *BoardOversight* and permanent versus temporary tax planning. All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.

TABLE 6: Executive Compensation Analysis

VARIABLES	Low Vega		High Vega	
	(1) <i>GAAPETR</i>	(2) <i>GAAPETRVol</i>	(3) <i>GAAPETR</i>	(4) <i>GAAPETRVol</i>
<i>Intercept</i>	0.551 [8.02]	*** 0.089 [2.41]	** 0.407 [7.03]	*** 0.046 [1.38]
<i>BoardOversight</i>	-0.024 [-3.43]	*** -0.013 [-3.14]	*** -0.008 [-1.28]	0.002 [0.60]
<i>Size</i>	-0.003 [-0.57]	0.000 [0.09]	0.002 [0.36]	0.004 [1.25]
<i>ROA</i>	-1.160 [-5.87]	*** -0.786 [-7.03]	*** -0.863 [-4.85]	*** -0.736 [-7.73]
<i>PTROAVol</i>		0.551 [3.40]	***	0.566 [3.83]
<i>RD</i>	-0.204 [-1.94]	* 0.057 [0.72]	-0.068 [-0.41]	0.096 [1.57]
<i>CapInt</i>	0.003 [0.11]	0.012 [0.87]	-0.011 [-0.49]	-0.028 [-2.29]
<i>Leverage</i>	-0.046 [-1.51]	0.006 [0.30]	0.042 [1.14]	0.003 [0.14]
<i>NOL</i>	-0.026 [-1.77]	* 0.002 [0.22]	-0.010 [-0.46]	0.001 [0.07]
<i>ChangeNOL</i>	0.287 [1.81]	* -0.137 [-0.99]	0.010 [0.02]	0.009 [0.04]
<i>Intang</i>	-0.115 [-2.76]	*** -0.021 [-0.79]	-0.132 [-3.38]	*** -0.031 [-1.32]
<i>Inv</i>	-0.026 [-0.46]	0.011 [0.29]	-0.008 [-0.16]	-0.011 [-0.36]
<i>Adv</i>	0.294 [1.12]	0.179 [1.14]	0.316 [1.42]	0.207 [2.01]
<i>Foreign</i>	-0.037 [-2.12]	** 0.036 [2.73]	*** -0.052 [-2.45]	** 0.014 [1.41]
<i>Board Input</i>	-0.008 [-1.43]	0.001 [0.28]	-0.003 [-0.73]	0.001 [0.31]
Test of significance of <i>BoardOversight</i> across low and high Vega				
		Diff	chi ²	p-val
<i>GAAPETR</i> model		-0.017*	3.49	0.062
<i>GAAPETRVol</i> model		-0.015***	7.74	<0.01
Observations	722	722	722	722
Adjusted R-squared	0.241	0.319	0.138	0.261

Notes: This table presents results for our tests comparing *BoardOversight* between firms with low versus high equity risk incentives (*Vega*). All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.

TABLE 7: Board Risk and Alternative Tax Variable Regressions

VARIABLES	(1) <i>GAAPETR5</i>		(2) <i>GAAPETRHS</i>		(3) <i>CYUTB</i>		(4) <i>GAAPETRVOL</i>	
<i>Intercept</i>	0.420	***	0.022	**	0.024		0.052	**
	[8.26]		[2.89]		[0.33]		[2.29]	
<i>BoardOversight</i>	-0.008	**	-0.002	**	-0.013	*	-0.003	*
	[-1.82]		[-2.47]		[-1.75]		[-1.31]	
<i>Size</i>	-0.008	**	0.000		0.012	*	0.003	
	[-2.18]		[-0.27]		[2.04]		[1.13]	
<i>ROA</i>	-0.237	**	0.310	**	0.372	*	-0.676	**
	[-2.04]		[10.69]		[2.35]		[-11.53]	
<i>PTROAVol</i>					0.387			
					[1.23]			
<i>PTROAVol5</i>							0.686	**
							[5.68]	
<i>RD</i>	-0.316	***	-0.006		0.421	*	0.051	
	[-4.82]		[-0.34]		[2.51]		[0.95]	
<i>CapInt</i>	-0.011		0.001		-0.031		-0.002	
	[-0.63]		[0.31]		[-1.28]		[-0.19]	
<i>Leverage</i>	-0.027		-0.002		0.030		0.003	
	[-1.26]		[-0.58]		[0.77]		[0.18]	
<i>NOL</i>	-0.006		-0.002		-0.001		0.006	
	[-0.82]		[-0.95]		[-0.03]		[1.05]	
<i>ChangeNOL</i>	0.184		0.059		0.006		-0.057	
	[0.75]		[1.46]		[0.04]		[-0.75]	
<i>Intang</i>	-0.020		-0.014	**	0.005		-0.024	
	[-0.65]		[-2.88]		[0.11]		[-1.57]	
<i>Inv</i>	-0.042		-0.001		0.002		-0.006	
	[-1.28]		[-0.09]		[0.03]		[-0.26]	
<i>Adv</i>	0.168		0.062	**	0.564	*	0.080	
	[1.23]		[2.04]		[2.38]		[1.15]	
<i>Foreign</i>	-0.032	***	-0.008	**	-0.016		0.019	**
	[-2.69]		[-3.40]		[-0.75]		[2.30]	
<i>Board Input</i>	-0.001		-0.001		-0.003		0.001	
	[-0.28]		[-0.90]		[-0.55]		[0.55]	
Observations	1,503		1,555		1,555		1,503	
Adjusted R-	0.18		0.48		0.05		0.29	

Notes: This table presents results for our tests examining the association between *BoardOversight* and alternative proxies for tax planning and tax uncertainty. All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.

TABLE 8: Entropy balance GAAP ETR Regressions

VARIABLES	(1) <i>GAAPETR</i>		(2) <i>GAAPETRVol</i>	
<i>Intercept</i>	0.436	***	0.068	***
	[9.58]		[2.81]	
<i>HighBoardOversight</i>	-0.015	**	-0.007	*
	[-1.94]		[-1.48]	
<i>Size</i>	-0.004		0.002	
	[-0.98]		[1.01]	
<i>ROA</i>	-0.837	***	-0.784	***
	[-6.02]		[-10.70]	
<i>PTROAVol</i>			0.537	***
			[4.44]	
<i>RD</i>	-0.179		0.084	
	[-1.49]		[1.52]	
<i>CapInt</i>	0.006		-0.009	
	[0.39]		[-0.95]	
<i>Leverage</i>	-0.012		0.000	
	[-0.54]		[0.02]	
<i>NOL</i>	0.001		0.006	
	[0.10]		[0.92]	
<i>ChangeNOL</i>	0.121		-0.004	
	[0.55]		[-0.04]	
<i>Intang</i>	-0.085	***	-0.026	
	[-2.94]		[-1.53]	
<i>Inv</i>	-0.027		-0.015	
	[-0.71]		[-0.71]	
<i>Adv</i>	0.248		0.178	**
	[1.10]		[2.28]	
<i>Foreign</i>	-0.041	***	0.018	**
	[-2.67]		[2.22]	
<i>Board Input</i>	-0.001		0.001	
	[-0.20]		[0.71]	
Observations	1,555		1,555	
Adjusted R-squared	0.14		0.29	

Notes: This table presents results for our robustness tests examining the association between *HighBoardOversight* and tax planning (*GAAPETR*) and tax uncertainty (*GAAPETRVol*) after entropy balancing the covariates between firms with high and low *BoardOversight*. All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.

**TABLE 9: Falsification test:
Alternative board oversight proxy based on disclosure quantity**

VARIABLES	(1) <i>GAAPETR</i>		(2) <i>GAAPETRVol</i>	
<i>Intercept</i>	0.504	***	0.053	**
	[9.64]		[2.03]	
<i>NWords</i>	-0.004		0.003	
	[-0.84]		[0.84]	
<i>Size</i>	-0.003		0.002	
	[-0.78]		[1.10]	
<i>ROA</i>	-1.023	***	-0.767	***
	[-7.29]		[-10.75]	
<i>PTROAVol</i>			0.569	***
			[5.26]	
<i>RD</i>	-0.112		0.077	
	[-1.19]		[1.53]	
<i>CapInt</i>	0.000		-0.005	
	[0.01]		[-0.49]	
<i>Leverage</i>	-0.016		-0.005	
	[-0.68]		[-0.31]	
<i>NOL</i>	-0.012		0.002	
	[-0.92]		[0.26]	
<i>ChangeNOL</i>	0.216		-0.129	
	[1.13]		[-1.13]	
<i>Intang</i>	-0.131	***	-0.029	
	[-4.07]		[-1.63]	
<i>Inv</i>	-0.023		-0.014	
	[-0.59]		[-0.60]	
<i>Adv</i>	0.301		0.186	**
	[1.56]		[2.15]	
<i>Foreign</i>	-0.042	***	0.019	**
	[-2.96]		[2.41]	
<i>Board Input</i>	-0.004		0.000	
	[-1.13]		[0.00]	
Observations	1,555		1,555	
Adjusted R-squared	0.1822		0.3036	

Notes: This table presents results for our falsification tests examining the association between *BoardOversight* and tax planning (*GAAPETR*) and tax uncertainty (*GAAPETRVol*) after replacing *BoardOversight* with the number of words in the proxy statement (*NWords*). All variables are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles unless noted in Appendix B. *, **, and *** indicate a 10%, 5%, and 1% significance level, respectively. T-statistics (in brackets) are based on robust standard errors clustered by firm. P-values are based on one-tailed t-tests for the variable of interest. The model includes industry (Fama French 12 specification) and year fixed effects.