Tax Avoidance and Ex Ante Cost of Capital

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Abstract: We investigate the relationship between tax avoidance and ex ante cost of capital. We provide evidence that investors perceive tax avoidance differently at different levels. We find that, if low tax-avoidance firms increase tax avoidance, ex ante cost of capital declines. In contrast, if high tax-avoidance firms increase tax avoidance, ex ante cost of capital increases. These findings suggest a nonlinear, convex relationship between tax avoidance and ex ante cost of capital. We then estimate a firm-year-specific, expected level of tax avoidance for each sample observation and find that ex ante cost of capital increases as firms deviate from their expected levels of tax avoidance. On average, when firms deviate from their expected levels of tax avoidance in one year, they revert back toward their expected levels of tax avoidance in the following year. Finally, as firms move toward their expected levels of tax avoidance, they experience reductions in their ex ante cost of capital.

Keywords: cost of capital, tax avoidance, book-tax differences, effective tax rates
JEL Classifications: H25, H26, K34, M41

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1. Introduction

With the highest marginal corporate income tax rate at 35 percent, U.S. federal income taxes represent a significant cash outflow for profitable firms. Firms undertake tax-avoidance activities to minimize their tax burdens for a given level of pre-tax income and provide additional after-tax income and cash flow for their shareholders.[1] However, Scholes et al. (2009) suggest that firms' tax-avoidance activities are influenced by non-tax costs, which are specific to the context examined. In this study, we examine one such context: investors' perceptions of firms' tax-avoidance activities.[2] Specifically, we investigate the association between firms' tax-avoidance activities and ex ante cost of capital.

We begin by examining ranges of tax-avoidance levels along the tax-avoidance continuum to determine whether investors' perceptions of firms' tax-avoidance activities, as measured by the ex ante cost of capital, vary with the level.[3] We then estimate a firm-year-specific, expected level of tax avoidance for each sample observation to address the following research question: Does the ex ante cost of capital vary with firms' deviation from (and subsequent movement toward) their expected level of tax avoidance?

[1] Consistent with Hanlon and Heitzman (2010, 137), we use the term "tax avoidance" to mean a reduction in explicit taxes. Accordingly, tax-avoidance activities are those that generate cash tax savings. In our view, the certainty of those cash tax savings varies with the aggressiveness of the tax-avoidance activities. More aggressive tax avoidance results in less certain cash tax savings, whereas less aggressive tax avoidance results in more certain cash tax savings.

[2] There are numerous non-tax costs associated with tax-avoidance activities. As examples, firms face audit risk for taking aggressive tax positions and may incur large tax consulting fees that outweigh the associated tax benefits. Firms also may incur implicit taxes that reduce explicit returns to tax-avoidance projects. Desai and Dharmapala (2009) suggest that tax-avoidance activities may make firms' financial statements so opaque that investors struggle to evaluate the financial results. Given these benefits and costs, it is unclear how investors view firms' tax-avoidance activities.

[3] Numerous studies (e.g., Hanlon 2005, Ayers et al. 2009, Blaylock et al. 2012) provide evidence that investors impound information about the level of a firm's tax avoidance (specifically, the magnitude of book-tax differences) into stock price.

We argue that, as managers undertake tax-avoidance activities, investors' perceptions of those activities depend on the extent to which the observed tax avoidance falls short of or exceeds investors' expectations. Significant differences between actual and expected tax avoidance result in non-tax costs. Specifically, investors' perceptions of tax avoidance could increase firms' ex ante cost of capital if those firms engage in either too little or too much tax avoidance. We propose that, as firms' actual levels of tax avoidance converge to investors' expected levels of tax avoidance, non-tax costs decline, and ex ante cost of capital declines accordingly.

Sikes and Verrecchia (2014) propose a theoretical model of the association between tax avoidance and cost of capital. They demonstrate that, "when a meaningful proportion of firms in an economy engage in tax avoidance strategies, the covariance between a firm's cash flow and the market cash flows increases, thereby increasing a firm's cost of capital." More importantly for our study, Sikes and Verrecchia (2014) provide support for examining the relation between tax avoidance and ex ante cost of capital at different levels of tax avoidance because, in their theoretical model, tax avoidance with more uncertain outcomes (which we contend occurs with higher levels of tax avoidance) exacerbates the increase in cost of capital.

Two recent studies empirically examine the association between tax avoidance and the ex ante cost of capital. Hutchens and Rego (2013) find a positive association between firms' tax-reserve balances and ex ante cost of capital. In contrast, Goh et al. (2013) examine how investors perceive "less aggressive and less risky" forms of tax avoidance and report that higher book-tax differences (BTDs), higher permanent BTDs, and lower long-run cash ETRs are associated with lower ex ante cost of capital.[4] We distinguish our study from Hutchens and Rego (2013) and Goh

[4] In a related study, Guenther et al. (2013) study the associations among tax avoidance (5-year cash ETR), tax aggressiveness (unrecognized tax benefits, scaled by total assets), tax risk (standard deviation of 1-year cash ETR

et al. (2013) by arguing that, along the tax-avoidance continuum, investors assess whether the expected costs of engaging in additional tax avoidance exceed the expected benefits. As investors' collective view of firms' tax avoidance shifts from favorable to unfavorable, we expect the ex ante cost of capital to increase.[5]

After examining the sample average association between tax avoidance and ex ante cost of capital at different levels of tax avoidance, we estimate a firm-year-specific expected level of tax avoidance for each sample observation. Based on the Scholes et al. (2009) global tax-planning framework, Kim et al. (2015) suggest that each firm has a unique, target level of tax avoidance that maximizes firm value. In a static world, firms would not deviate from their target levels of tax avoidance. However, Kim et al. (2015) note that, in a dynamic world, firms may establish a new firm-value-maximizing target level of tax avoidance and modify actual tax-avoidance activities accordingly. Thus, consistent with the Scholes et al. (2009) global tax-planning framework, we investigate whether ex ante cost of capital varies with firms' distance from (and subsequent movement toward) their expected levels of tax avoidance.

To investigate the association between tax avoidance and the ex ante cost of capital, we estimate three measures of tax avoidance: book-tax differences (*BTD*), cash ETRs (*CETR*), and GAAP ETRs (*GAAPETR*). For our first test, we divide our sample into quartiles according to each measure of tax avoidance and examine the associations between tax avoidance and ex ante cost of capital for the top and bottom quartiles, respectively, relative to the middle two quartiles. We find that increasing tax avoidance from the minimum value to the top of the first quartile results in lower ex ante cost of capital, implying that investors perceive the benefits of tax

over the previous five years), and firm risk (stock return volatility) and find a significantly positive association between tax risk and firm risk but no association between either tax avoidance or tax aggressiveness and firm risk.

[5] Other studies (e.g., Crocker and Slemrod 2005, De Waegenaere et al. 2010, and McCarty 2012) have suggested that a point exists along the tax-avoidance continuum at which the marginal costs equal the marginal benefits.

avoidance to exceed the costs. In contrast, increasing tax avoidance from the bottom of the fourth quartile to the maximum value results in higher ex ante cost of capital, implying that investors view the costs of tax avoidance to outweigh the benefits. These results suggest that, on average, firms undertaking too little tax avoidance can reduce ex ante cost of capital by engaging in additional tax avoidance, and firms undertaking too much tax avoidance can reduce ex ante cost of capital by curtailing excessive tax avoidance.

To address the issue of whether individual firms engage in too little or too much tax avoidance, we estimate each observation's expected level of tax avoidance in two ways: industry-year median levels and predicted values from a 5-year autoregressive model. We find that, as the magnitude of the deviation between firms' actual and expected levels of tax avoidance increases, ex ante cost of capital also increases. Partitioning the sample into tax avoidance below and above expected levels, respectively, ex ante cost of capital is significantly greater for firms that have tax avoidance *above* expected levels when we use *GAAPETR* as our measure of tax avoidance; however, ex ante cost of capital is significantly greater for firms that have tax avoidance *below* expected levels when we use *BTD or CETR* as our measure of tax avoidance. We also find that the magnitude of the deviation between firms' actual and expected levels of tax avoidance in year t is negatively associated with the magnitude of the change in tax avoidance from year t to year t+1, indicating that firms with tax avoidance below (above) expected levels increase (decrease) tax avoidance to adjust toward their expected levels. Finally, among firms that adjust actual tax avoidance levels toward expected levels, we find some evidence that these adjustments are associated with lower ex ante cost of capital.

This study makes three contributions to the tax-avoidance literature. First, we demonstrate that the association between tax avoidance and the ex-ante cost of capital is not

linear; as tax-avoidance increases, investor perceptions change from positive to negative. Second, our results provide initial evidence that ex ante cost of capital varies with investors' perceptions of tax avoidance, suggesting levels of tax avoidance that are too aggressive and, perhaps more important, levels of tax avoidance that are not aggressive enough. Finally, we provide evidence that firm-specific, expected levels of tax avoidance exist and that firms attempt to align their actual levels of tax avoidance with these expected levels. Interestingly, we find that ex ante cost of capital increases with the deviation from expected levels of tax avoidance, and this result occurs for firms with actual levels of tax avoidance both above (too aggressive) and below (not aggressive enough) expected levels. This demand by investors for some firms to engage in more tax avoidance is consistent with the small negative market reaction to revelations of corporate tax shelter investments (Hanlon and Slemrod 2009) and little reputational cost of tax-shelter activity (Gallemore et al. 2014). It is also consistent with Friedman's (1970) admonition about executives' responsibilities to investors: "That responsibility is to conduct the business in accordance with their desires, which generally will be to make as much money as possible while conforming to the basic rules of the society, both those embodied in law and those embodied in ethical custom."

The remainder of our study proceeds as follows: In the next section, we review relevant tax-avoidance studies and present our hypotheses. Then, we discuss the data and empirical methods that we use to test our hypotheses. Next, we present the results of our data analyses. Finally, we conclude.

2. Prior research and hypothesis development

Investor perception of tax avoidance

Hanlon and Heitzman (2010, 138) state, "Risk-neutral shareholders expect managers acting on their behalf to focus on profit maximization, which includes going after opportunities to reduce tax liabilities *as long as the expected incremental benefit exceeds the incremental cost*" (emphasis added). Thus, in executing their fiduciary duty to shareholders and selecting the level of tax avoidance for their firms, managers must weigh the potential benefits of current cash tax savings against the potential costs of the increased risk of tax-authority audit along with other non-tax costs suggested by the Scholes et al. (2009) worldwide tax-planning framework.[6]

Cash tax savings from tax-avoidance activities such as accelerated depreciation deductions are unlikely to draw scrutiny from taxing authorities. By increasing this type of tax avoidance, cash flows from tax savings are expected to increase, and the ex-ante cost of capital should decline.[7] However, at some point, the cash tax savings from additional tax-avoidance activities are likely less certain, and that increased uncertainty likely changes investors' perceptions of the benefits of the additional tax avoidance. McGuire et al. (2014) suggest that firms contemplate tax-shelter investments in the context of their overall investment strategies; thus, many firms do not invest in tax shelters because other investment opportunities offer higher cash flows. We argue that, as firms increase their investments in tax avoidance, the expected

[6] Survey evidence in Graham et al. (2014) provides support for the prominent role of this risk-reward tradeoff in managers' decisions not to engage in tax avoidance: tax executives that considered but did not implement a particular tax-planning strategy selected "the transaction lacked business purpose or economic substance" as the most important factor in deciding to forego the strategy, a reason often cited by the IRS when disputing firms' tax positions.

[7] Lambert et al. (2007, 392) demonstrate that adding a new riskless or low-risk component of cash flow (in our setting, cash tax savings from tax-avoidance activities) to a firm's existing cash flow decreases that firm's cost of capital.

benefits from additional tax avoidance decrease because the likelihood that this additional tax avoidance will produce additional cash tax savings decreases.

Prior research provides little guidance as to where along the tax avoidance continuum investors perceive expected costs to surpass expected benefits. Assuming that firms rank order their tax positions similar to other projects (i.e., higher NPV projects before lower NPV projects), we expect investors to associate lower levels of tax avoidance with more certain cash tax savings and higher levels of tax avoidance with less certain cash tax savings. Thus, we suggest that the relation between tax avoidance and ex ante cost of capital differs at different levels of tax avoidance.[8] Numerous recent studies examine investor perceptions of tax avoidance and provide mixed results. We summarize these studies below.

Book-tax differences and cash effective tax rates

One line of research investigates various measures of book-tax differences and cash ETRs. Desai and Dharmapala (2009) measure BTDs using the approach from Manzon and Plesko (2002) and find that the association between BTDs and firm value (proxied by Tobin's Q) is positive when the firm has strong corporate governance. De Simone et al. (2014) report that investors positively value current and long-run cash tax savings in that lower 1- and 5-year cash ETRs are associated with higher Tobin's Q. This positive valuation of tax-avoidance activities is greater for income-mobile firms (i.e., firms with long-run, sustainable tax avoidance). In contrast, Kim et al. (2011) find that firms with larger BTDs and lower long-run cash ETRs are

[8] De Simone and Stomberg (2012, 2) share this view: "Tax avoidance arising from sustainable strategies, which offer the taxpayer a high likelihood of retaining a significant portion of benefits originally claimed even upon audit… represent increased expected future cash flows and should enhance firm value. In contrast, tax benefits from excessively aggressive strategies such as tax shelters, for example, are more likely to be overturned upon audit and draw penalties from taxing authorities, making them negative NPV investments that erode firm value."

more likely to experience stock-price crashes in the future.[9] Most recently, Inger (2014) explores investor perception of different methods of tax avoidance. She finds that firm value (proxied by Tobin's Q) increases with stock-option tax deductions, is unaffected by accelerated depreciation tax deductions, and decreases with deferred taxes on foreign earnings.

Tax shelter participation

A second line of research explores investor reaction to firms' tax-shelter participation. Hanlon and Slemrod (2009) investigate market reaction to the initial press mention that a firm was involved in a tax shelter and find that the average company's stock price drops when news of tax-shelter participation reaches investors. Wilson (2009) documents that tax-shelter firms with strong corporate governance experience higher abnormal returns during the period of tax-shelter participation as compared to well-governed control firms without tax shelter involvement. Gallemore et al. (2014) examine a sample of publicly identified tax-shelter participants and fail to find evidence of reputational costs following the revelation of tax-shelter involvement.

Tax reserves

A third line of research investigates investor response to firms' tax-reserve disclosures as required by FASB Interpretation No. 48 (FIN 48). Frischmann et al. (2008) find that the portion of tax reserves that generate permanent tax savings is positively associated with returns in the short window surrounding the first-quarter earnings announcement. The authors interpret this result as evidence that "investors respond positively to news of aggressive tax reporting and/or revising downward their estimates of firms' ETRs (with a consequent upward revision in after-tax net income)" (262). Song and Tucker (2008) find that firms' tax reserves are positively

[9] Kim et al. (2011) measure BTDs by deriving a factor from three distinct metrics: totals BTDs, permanent BTDs (which they label as ETR differential), and residual BTDs (Desai and Dharmapala 2006). They also find that higher tax-shelter scores are associated with greater stock-price crash risk.

related to firm value, as measured by the market-to-book ratio. Robinson and Schmidt (2013) find a positive association between tax reserves and abnormal returns surrounding the 2007 first-quarter earnings announcement, but this positive association disappears for firms with high disclosure quality.

Koester (2011) finds a positive relationship between firm value and tax reserves driven by the component of tax reserves related to permanent tax savings. Hutchens and Rego (2013) report that tax reserves are positively associated with the ex-ante cost of capital. Finally, McCarty (2012) finds a concave association between firms' tax-reserve balances and their log market values of equity; however, she finds little evidence of an association (either linear or nonlinear) between tax reserves and ex ante cost of capital. McCarty does not examine other measures of tax avoidance.

Tax avoidance and cost of capital

Assuming that firms rank order their tax-avoidance activities from most certain to least certain cash flows, investors should associate lower levels of tax avoidance with more certain cash tax savings and higher levels of tax avoidance with less certain cash tax savings. We argue that investors' perceptions of these available tax-avoidance opportunities will alter ex ante cost of capital when firms deviate from expected levels of tax avoidance (either too much or too little). Accordingly, we believe that the association between tax avoidance and ex ante cost of capital varies with the level of tax avoidance. Thus, we posit that the relation between tax avoidance and ex ante cost of capital is negative when the benefits of tax avoidance are more certain and positive when the benefits of tax avoidance are less certain.

If investors recognize the uncertainty associated with tax avoidance as we contend, one investor reaction should be to diversify away the additional risk. Sikes and Verrecchia (2014)

address the issue of diversification of additional risk associated with additional tax avoidance and conclude that the additional risk associated with uncertain tax positions is non-diversifiable. Furthermore, recent empirical research indicates that investors may not be able to diversify a particular firm's tax risk unless they seek investment outside that firm's industry. Specifically, Brown (2011), Brown and Drake (2014), and Kubick et al. (2015) provide evidence that diversifying tax risk within an industry is difficult if not impossible. All three studies suggest that firms either act in concert to implement strategies to reduce taxes or mimic the industry average level of tax avoidance by implementing the same tax-planning strategies. We contend that tax risk is not a first-order effect in investment decisions; thus, it is unlikely that investors would avoid a particular industry because of the tax-avoidance strategies employed by firms in that industry.

We augment prior research by exploring the possibility that the relation between the level of tax avoidance and investor perception of the costs and benefits associated with tax avoidance varies with the level of tax avoidance. We predict that ex ante cost of capital decreases while the rewards of tax avoidance exceed the costs (i.e., the cash flows are more certain); however, once the expected costs surpass the expected benefits (such that the cash flows are less certain), this association reverses. Our first hypothesis expresses these expectations:

> *HYPOTHESIS 1. The association between tax avoidance and ex ante cost of capital varies with the level of tax avoidance.*

The tradeoff theory of capital structure (Leary and Roberts 2005) holds that companies determine target capital structures by weighing the costs and benefits of debt financing and that firms' convergence to these targets depends on various adjustments costs. Building on this tradeoff theory, numerous studies (e.g., Flannery and Rangan 2006; Faulkender et al. 2012;

Flannery and Hankins 2013) have developed partial-adjustment models to examine how quickly firms adjust to their target capital structures.

Accounting researchers recently have adopted these partial adjustment models to examine how quickly firms adjust to their target tax avoidance levels. Specifically, Kim et al. (2015) apply the Scholes et al. (2009) framework and assume that each firm has a unique, target level of tax avoidance. They examine how quickly firms converge to their target levels of tax avoidance and examine firm characteristics associated with speed of convergence. We build on this study by investigating how investors perceive firms' deviations from their expected levels of tax avoidance through the lens of ex ante cost of capital. We argue that, if the ex ante cost of capital varies with the level of firms' tax avoidance, firms will return to expected levels of avoidance when actual levels deviate from investors' expectations. Stated differently, as firms' actual levels of tax avoidance move away from their expected levels, we predict that firms' ex ante cost of capital will increase as the deviation from expectations increases. Because prior literature has not examined and thus does not provide evidence on the association between ex ante cost of capital and deviations from expected levels of tax avoidance, we state our research question as follows:

RESEARCH QUESTION 1. Does the ex ante cost of capital vary with firms' deviation from (and subsequent movement toward) their expected level of tax avoidance?

3. Sample selection and research design

Sample selection

Our initial sample contains 46,331 firm-year observations from 1993 to 2014 with complete data in the Compustat, CRSP, and IBES databases to calculate each of four measures of ex ante cost of capital. We eliminate 21,001 observations that lack necessary data to calculate each of three measures of tax avoidance. Next, we exclude 2,132 observations that lack

necessary data to calculate control variables. Finally, we remove 4,013 observations that lack necessary data (three consecutive years) to calculate our measure of accrual quality. We retain a sample of 19,204 firm-year observations to conduct our analyses.

Empirical model

To test our first hypothesis, we estimate the following OLS regression model with standard errors clustered by firm:

$$AvgPremium_{i,t+1} = \alpha + \beta_1 TaxAV_{i,t} + \beta_2 ROA_{i,t} + \beta_3 IndustryPremium_{i,t} + \beta_4 LnAT_{i,t} + \beta_5 LnGrowth_{i,t} + \beta_6 LnBMRatio_{i,t} + \beta_7 B\_mkt_{i,t} + \beta_8 B\_smb_{i,t} + \beta_9 B\_hml_{i,t} + \beta_{10} Leverage_{i,t} + \beta_{11} AQError_{i,t} + \beta_{12} PPEGT_{i,t} + \beta_{13} GrossStock_{i,t} + year\ indicator\ variables + industry\ indicator\ variables + e_{i,t} \quad (1)$$

Dependent variable

Consistent with prior literature (Dhaliwal et al. 2005, 2006; Daske et al. 2008; Hail and Leuz 2009; Callahan et al. 2012; and Hutchens and Rego 2013), we calculate *AvgPremium* using the four approaches of ex ante cost of capital estimation from Gebhardt et al. (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004), respectively. We calculate this measure as of June 30 following the close of the fiscal year. Appendix B contains a detailed discussion of the calculation of these four measures of ex ante cost of capital. Following prior studies (e.g., Dhaliwal et al 2005), we average these four measures of ex ante cost of capital to generate our dependent variable, *AvgPremium*.

Independent variables of interest

TaxAV is one of three measures of tax avoidance: total book-tax differences (*BTD*), cash effective tax rate (*CETR*), and GAAP effective tax rate (*GAAPETR*). Total BTDs represent the gap between income for financial-reporting and tax-reporting purposes and therefore are readily

observable to investors as a signal of firms' tax avoidance behavior, reflecting both temporary and permanent differences. Cash ETRs reflect firms' actual cash tax payments for a given level of pretax income, whereas GAAP ETRs reflect firms' book tax expense for a given level of pretax income. Thus, the numerator of *GAAPETR* includes tax accruals for financial-reporting purposes, whereas the numerator of *CETR* includes only cash flows and is not affected by tax accruals.

BTD is defined as the difference between a firm's pretax book income and estimated taxable income for the current year. Following Rego and Wilson (2012), we calculate total book-tax differences (*BTD*) as:

$$BTD_{it} = \frac{\left(BI_{it} - \frac{CFTE_{it} + CFOR_{it}}{STR} \right)}{Assets_{t-1}}$$

where *BI* is pretax book income (Compustat *PI*), *CFTE* is current federal tax expense (*TXFED*), *CFOR* is current foreign tax expense (*TXFO*), and *STR* is the highest U.S. corporate statutory tax rate. We estimate taxable income by grossing up the sum of current federal tax expense and current foreign tax expense by the statutory tax rate. Higher values of *BTD* indicate more tax avoidance.

Following Dyreng et al. (2008), we calculate *CETR* as cash taxes paid (*TXPD*) divided by pretax book income (*PI*) minus special items (*SPI*).[10] We eliminate all observations with negative book income or negative cash taxes paid. Because higher *CETR* reflects less tax avoidance, we multiply this measure by -1 so that tax avoidance is increasing in *CETR*. We restrict this variable to values between 0 and -1.

[10] We estimate *CETR* on an annual basis. Dyreng et al. (2008) suggest measuring *CETR* over multiyear periods because of the volatility of cash taxes paid, but such a measurement is inappropriate in the context of our study.

Our last measure of tax avoidance is the firm's GAAP effective tax rate *(GAAPETR),* defined as tax expense (*TXT*) divided by pretax book income (*PI*) minus special items (*SPI*). Again, we eliminate all observations with negative book income or negative tax expense. As with *CETR*, we multiply *GAAPETR* by -1 so that tax avoidance is increasing in *GAAPETR* and restrict this variable to values between 0 and -1.

Control variables

Prior research establishes that several variables influence *AvgPremium*. To control for firm profitability, we include return on assets (*ROA*). Gebhardt et al. (2001) found that industry average ex ante cost of capital affects firm ex ante cost of equity capital. Accordingly, we include *IndustryPremium*, the industry-year median of *AvgPremium* (using Fama-French 48 industries). We expect a positive coefficient on *IndustryPremium*. Following Gebhardt et al. (2001), we control for the log of assets (*LnAT*), the log of the long-term earnings growth rate as reported by IBES (*LnGrowth*), and the log of the book-to-market ratio (*LnBMRatio*). To control for firm risk, we include the three Fama-French factors (B_{MKT}, B_{SMB} and B_{HML}) and anticipate positive coefficients for these variables, suggesting that firms with higher risk generally have a higher ex ante cost of equity capital. Following Hail and Leuz (2006) and Daske et al. (2008), we also control for firm leverage (*Leverage*), which we define as prior-year long-term debt scaled by total assets.

We control for the accrual quality because prior research suggests that accrual quality affects ex ante cost of capital (Francis et al. 2004). To measure accrual quality, we use the approach from Francis et al. (2005), which models accruals as a function of prior-year cash flow, current-year cash flow, future-year cash flow, changes in sales, and property plant and equipment. Each of these variables is scaled by average total assets, and the model is estimated

by industry. Following Francis et al. (2005), we define accrual quality (*AQ*) as the standard deviation of the residual from this model over the previous five years for each firm, and we multiply *AQ* by -1 so that larger values indicate higher accrual quality. Because financial-reporting quality and tax-reporting quality are positively correlated (e.g., Frank et al. 2009), we orthogonalize our measure of accrual quality from our measures of tax avoidance by estimating the following regression model:

$$AQ_{i,t} = \alpha + \beta_1 BTD_{i,t} + \beta_2 CETR_{i,t} + \beta_3 GAAPETR_{i,t} + \varepsilon$$

AQError is the residual (ε) from this regression. Because we previously multiplied *AQ* by -1, larger values of *AQError* indicate higher accrual quality. We expect a negative coefficient on *AQError*, indicating that firms with higher accrual quality have lower ex ante cost of capital.

Our final two control variables are *PPEGT* and *GrossStock*. *PPEGT*, defined as gross property plant and equipment divided by total assets, measures the percentage of a firm's gross assets that are comprised of depreciable assets. This variable controls for tax avoidance attributable to depreciation deductions. Finally, *GrossStock* is an indicator variable coded 1 if the firm issued more than one million in gross stock during the year, 0 otherwise.

Testing Hypothesis 1

We hypothesize that firms with relatively low levels of tax avoidance (i.e., bottom quartile) experience decreases in ex ante cost of capital as tax avoidance increases. In contrast, we predict that firms with relatively high levels of tax avoidance (i.e., top quartile) experience increases in ex ante cost of capital as tax avoidance increases. Thus, consistent with Hypothesis 1, we expect a negative β_1 coefficient in the bottom quartile of tax avoidance and a positive β_1 coefficient in the top quartile. Finally, we expect a less significant or insignificant β_1 coefficient in the middle quartiles.

Examining Research Question 1

To address our research question, we estimate each firm-year observation's expected level of tax avoidance using two different approaches. First, we calculate the industry-year median for each of our measures of tax avoidance. *Res1TaxAV* is the difference between each observation's actual level of tax avoidance and the industry-year median level. Our second measure is based on a 5-year autoregressive model that predicts each observation's current-year tax avoidance as a function of the previous five years of actual tax avoidance. *Res2TaxAV* is the difference between each observation's actual level of tax avoidance and the predicted level from the autoregressive model. Because we expect that larger deviations from expected levels of tax avoidance result in higher ex ante cost of equity capital, we calculate the absolute values of both *Res1TaxAV* and *Res2TaxAV* (*ABSRes1TaxAV* and *ABSRes2TaxAV*, respectively). We estimate the following models:

$$AvgPremium_{i,t} = \alpha + \beta_1\, ABSRes1TaxAV_{i,t} + \beta_2\, ROA_{i,t} + \beta_3\, IndustryPremium_{i,t} + \beta_4\, LnAT_{i,t} + \beta_5\, LnGrowth_{i,t} + \beta_6\, LnBMRatio_{i,t} + \beta_7\, B\_mkt_{i,t} + \beta_8\, B\_smb_{i,t} + \beta_9\, B\_hml_{i,t} + \beta_{10}\, Leverage_{i,t} + \beta_{11}\, AQError_{i,t} + \beta_{12}\, PPEGT_{i,t} + \beta_{13}\, GrossStock_{i,t} + \textit{year indicator variables} + \textit{industry indicator variables} + e_{i,t} \quad (2a)$$

$$AvgPremium_{i,t} = \alpha + \beta_1\, ABSRes2TaxAV_{,t} + \beta_2\, ROA_{i,t} + \beta_3\, IndustryPremium_{i,t} + \beta_4\, LnAT_{i,t} + \beta_5\, LnGrowth_{i,t} + \beta_6\, LnBMRatio_{i,t} + \beta_7\, B\_mkt_{i,t} + \beta_8\, B\_smb_{i,t} + \beta_9\, B\_hml_{i,t} + \beta_{10}\, Leverage_{i,t} + \beta_{11}\, AQError_{i,t} + \beta_{12}\, PPEGT_{i,t} + \beta_{13}\, GrossStock_{i,t} + \textit{year indicator variables} + \textit{industry indicator variables} + e_{i,t} \quad (2b)$$

A positive β_1 coefficient for *ABSRes1TaxAV* in Model (2a) and a positive β_1 coefficient for *ABSRes2TaxAV* in Model (2b) indicate that, as firms deviate from their expected levels of tax avoidance, their average premiums increase.

Next, we test whether average premiums associated with deviations from expected levels of tax avoidance differ for observations below or above these expected levels by partitioning our sample into subsamples with below-expected tax avoidance and above-expected tax avoidance, for each measure of tax avoidance. We estimate Models (2a) and (2b) separately for each subsample and test for differences in the *ABSRes1TaxAV* and *ABSRes2TaxAV* coefficients between subsamples to provide evidence on whether average premiums differ for being below or above expectations.

After examining whether a higher ex ante cost of capital occurs for firms that deviate from expected tax avoidance, we estimate Models (3a) and (3b) to test whether firms adjust tax-avoidance activities in the subsequent year to bring their actual tax avoidance in line with expectations:

$$\Delta TaxAV_{i,t+1} = \alpha + \beta_1 Res1TaxAV_{i,t} + \beta_2 \Delta ROA_{i,t+1} + \beta_3 \Delta LnAT_{i,t+1} + \beta_4 \Delta LnGrowth_{i,t+1} + \beta_5 \Delta LnBMRatio_{i,t+1} + \beta_6 \Delta B\_mkt_{i,t+1} + \beta_7 \Delta B\_smb_{i,t+1} + \beta_8 \Delta B\_hml_{i,t+1} + \beta_9 \Delta Leverage_{i,t+1} + \beta_{10} \Delta AQError_{i,t+1} + \beta_{11} \Delta PPEGT_{,t+1} + \beta_{12} \Delta GrossStock_{,t+1} + year\ indicator\ variables + industry\ indicator\ variables + e_{i,t} \quad (3a)$$

$$\Delta TaxAV_{i,t+1} = \alpha + \beta_1 Res2TaxAV_{i,t} + \beta_2 \Delta ROA_{i,t+1} + \beta_3 \Delta LnAT_{i,t+1} + \beta_4 \Delta LnGrowth_{i,t+1} + \beta_5 \Delta LnBMRatio_{i,t+1} + \beta_6 \Delta B\_mkt_{i,t+1} + \beta_7 \Delta B\_smb_{i,t+1} + \beta_8 \Delta B\_hml_{i,t+1} + \beta_9 \Delta Leverage_{i,t+1} + \beta_{10} \Delta AQError_{i,t+1} + \beta_{11} \Delta PPEGT_{,t+1} + \beta_{12} \Delta GrossStock_{,t+1} + year\ indicator\ variables + industry\ indicator\ variables + e_{i,t} \quad (3b)$$

In both Models (3a) and (3b), $\Delta TaxAV_{i,t+1}$ is the change in the particular measure of tax avoidance (*BTD*, *CETR*, or *GAAPETR*) from year t to year t+1, and each control variable is calculated as the change from year t to year t+1 (i.e., the value in year t+1 minus the value in year t). We expect a negative β_1 coefficient on *Res1TaxAV* and *Res2TaxAV* in both the negative-

and positive-error subsamples. Specifically, for the below-expectation subsample, we expect firms with actual tax avoidance below that expected in year t to increase their actual tax avoidance from year t to year t+1 (e.g., negative *Res1TaxAV* × negative β_1 coefficient = positive *ΔTaxAV).* In contrast, for above-expectation subsample, we expect firms with actual tax avoidance above that expected in year t to decrease their actual tax avoidance from year t to year t+1 (e.g., positive *Res1TaxAV* × negative β_1 coefficient = negative *ΔTaxAV).*

Finally, we examine whether ex ante cost of capital decreases as firms' actual tax avoidance moves closer to their expected tax avoidance by estimating Models (4a) and (4b):

$$\Delta AvgPremium_{i,t+1} = \alpha + \beta_1 IndicatorVariable_{i,t+1} + \beta_2 \Delta ROA_{i,t+1} + \beta_3 \Delta LnAT_{i,t+1} + \beta_4 \Delta LnGrowth_{i,t+1} + \beta_5 \Delta LnBMRatio_{i,t+1} + \beta_6 \Delta B\_mkt_{i,t+1} + \beta_7 \Delta B\_smb_{i,t+1} + \beta_8 \Delta B\_hml_{i,t+1} + \beta_9 \Delta Leverage_{i,t+1} + \beta_{10} \Delta AQError_{i,t+1} + \beta_{11} \Delta PPEGT_{,t+1} + \beta_{12} \Delta GrossStock_{,t+1} + year\ indicator\ variables + industry\ indicator\ variables + e_{i,t} \quad (4a)$$

$$\Delta AvgPremium_{i,t+1} = \alpha + \beta_1 IndicatorVariable_{i,t+1} + \beta_2 \Delta ROA_{i,t+1} + \beta_3 \Delta LnAT_{i,t+1} + \beta_4 \Delta LnGrowth_{i,t+1} + \beta_5 \Delta LnBMRatio_{i,t+1} + \beta_6 \Delta B\_mkt_{i,t+1} + \beta_7 \Delta B\_smb_{i,t+1} + \beta_8 \Delta B\_hml_{i,t+1} + \beta_9 \Delta Leverage_{i,t+1} + \beta_{10} \Delta AQError_{i,t+1} + \beta_{11} \Delta PPEGT_{,t+1} + \beta_{12} \Delta GrossStock_{,t+1} + year\ indicator\ variables + industry\ indicator\ variables + e_{i,t} \quad (4b)$$

In both models, $\Delta AvgPremium_{i,t+1}$ is the change in average premium from year t to year t+1, and $IndicatorVariable_{i,t+1}$ is an indicator variable coded 1 for observations (1) with tax avoidance *below* expectations in year t that *increased* tax avoidance from year t to year t+1 or (2) with tax avoidance *above* expectations in year t that *decreased* tax avoidance from year t to year t+1. Thus, for both models, *IndicatorVariable* is coded 1 for observations that adjust actual levels of tax avoidance toward expected levels. In both models, we expect a negative β_1 coefficient on

IndicatorVariable in both the below- and above-expectation subsamples, indicating that ex ante cost of capital declines as firms adjust toward expected levels of tax avoidance.

4. Empirical results

Descriptive statistics

Table 1 provides descriptive statistics for our sample. We report a mean (median) ex ante cost of capital (*AvgPremium*) of 5.6 percent (5.4 percent), consistent with Dhaliwal et al. (2006). Consistent with Khurana and Moser (2013) for the full sample of 19,204 observations, we find that the mean (0.026) and median (0.021) of *BTD* are both positive, indicating that firms generally report higher financial income than taxable income. The mean (median) firm in our sample has a cash effective tax rate (*CETR*) of 26.4 percent (26.1 percent). Finally, our mean (median) GAAP effective tax rate (*GAAPETR*) is 31.9 percent (34.1 percent).

Correlations

Table 2 provides a correlation matrix for our model variables. For the full sample, *AvgPremium* is significantly, positively correlated with *BTD* and *GAAPETR* but significantly, negatively correlated with *CETR*. Table 2 also indicates that many of the control variables are highly correlated both with *AvgPremium* and one another, demonstrating the importance of including these variables as controls in our regression models.

Regression results - Model (1)

Hypothesis 1 predicts that the association between tax avoidance and ex ante cost of capital differs with the level of tax avoidance. To test this hypothesis, we partition our sample into quartiles according to the level of tax avoidance within a particular industry-year. Table 3, Panels A-C presents these OLS regression results. Consistent with Hypothesis 1, we find a significantly negative coefficient for low *BTD* in Panel A, low-avoidance *CETR* in Panel B, and

low-avoidance *GAAPETR* in Panel C. These results indicate that, for observations in the bottom quartile for each measure of tax avoidance, investors perceive the benefits of additional tax avoidance to exceed the costs. Also consistent with Hypothesis 1, we find a significantly positive coefficient for high *BTD* in Panel A, high-avoidance *CETR* in Panel B, and high-avoidance *GAAPETR* in Panel C. These finding suggests that, at high levels of tax avoidance, investors perceive the costs to exceed the benefits as tax avoidance increases. Thus, we provide evidence that the association between tax avoidance and ex ante cost of capital varies with the level of tax avoidance for all three measures of tax avoidance.

We find that, as *ROA* increases, ex ante cost of capital also increases. Consistent with Gephardt et al. (2001) and Dhaliwal et al (2005), we find a negative and significant coefficient on *LnAT*, indicating that larger firms generally have lower ex ante cost of capital. Also consistent with Gephardt et al. (2001) and Dhaliwal et al. (2005), we find positive and significant coefficients on *IndustryPremium*, *LnGrowth*, and *LnBMRatio*, indicating that firms with higher industry-year average ex ante cost of capital and firms with higher growth opportunities have higher ex ante cost of capital. The coefficients on *B_mkt* and *B_smb* are positive and significant. In contrast, the coefficients on *B_HML* are generally insignificant. The coefficient on *Leverage* is typically positive and significant, indicating that firms with higher leverage generally have higher ex ante cost of equity capital. The coefficient on *AQError* is negative and significant, indicating that firms with higher accrual quality generally have lower ex ante cost of equity capital. The coefficient on *PPEGT* is generally positive and significant, while the coefficient on *GrossStock* is typically insignificant. Thus, our model of the association between tax avoidance and ex ante cost of capital provides evidence consistent with prior research on factors that influence the response variable.

Regression results - Models (2a) and (2b)

In Table 4, Panels A and B, we present the results of estimating Models (2a) and (2b). In Model (2a), *ABSRes1TaxAV* is the absolute value of the difference between the observation's actual level of tax avoidance and the expected level based on industry-year medians. Panel A indicates that, for each measure of *TaxAV*, as *ABSRes1TaxAV* increases, ex ante cost of equity capital also increases. In Model (2b), *ABSRes2TaxAV* is the absolute value of the difference between the observation's actual level of tax avoidance and the expected level based on the autoregressive model. Panel B indicates that, for each measure of *TaxAV*, as *ABSRes2TaxAV* increases, ex ante cost of equity capital also increases.

Table 5, Panels A and B contain the results of separately estimating Models (2a) and (2b) for observations below and above their expected tax avoidance to determine whether the effect of deviations from expected tax avoidance on ex ante cost of capital is larger for either group. In Panel A, when *BTD* or *CETR* is the measure of tax avoidance, we find positive coefficients for *ABSRes1TaxAV* in both the below- and above-expectation subsamples, but the magnitudes of the coefficients are not significantly different between subsamples. However, when *GAAPETR* is the measure of tax avoidance, the coefficient on *ABSRes1TaxAV* for the below-expectation subsample (0.010) is significantly smaller than the coefficient for the above-expectation subsample (0.037), indicating higher ex ante cost of capital when *GAAPETR* is above relative to below expectations.

In Panel B, when *BTD* is the measure of tax avoidance, we find positive coefficients for *ABSRes2TaxAV* in both the below- and above-expectation subsamples, and the coefficient in the below-expectation subsample (0.054) is marginally statistically greater than the coefficient in the above-expectation subsample (0.031). When *CETR* is the measure of tax avoidance, we find a

positive coefficient for *ABSRes2TaxAV* in the below-expectation subsample, an insignificant coefficient in the above-expectation subsample, and the coefficient in the below-expectation subsample (0.017) is highly statistically greater than the coefficient in the above-expectation subsample (0.000). Taken together, these results for *BTD* and *CETR* suggest a higher ex ante cost of capital when tax avoidance is below relative to above expectations. However, when *GAAPETR* is the measure of tax avoidance, the coefficient on *ABSRes2TaxAV* for the below-expectations subsample (0.026) is significantly smaller than the coefficient for the above-expectations subsample (0.047), indicating higher ex ante cost of capital when *GAAPETR* is above relative to below expectations.

Regression results - Models (3a) and (3b)

In Table 6, Panels A and B, we present the results of estimating Models (3a) and (3b) to assess whether firms that deviate from their expected levels of tax avoidance adjust their tax-avoidance activities to narrow the gap between actual and expected tax avoidance in the subsequent year. Results from this estimation will provide evidence on whether firms have expected levels of tax avoidance and, consistent with Kim et al (2014), move toward those expectations in the presence of current deviations.

In both Models (3a) and (3b), the dependent variable is $\Delta TaxAV_{i,t+1}$, measured as the change in each firm's actual tax avoidance from year t to year t+1. For Model (3a), our independent variable of interest, *Res1TaxAV*, is the signed difference between actual and expected tax avoidance in year t using industry-year medians as expected tax avoidance. Because the results of estimating Model (2a) suggest that firms have higher ex ante cost of capital as their deviations from expected tax avoidance increase, we predict that firms below their expected tax avoidance will increase tax avoidance in the subsequent year, whereas firms above their expected

tax avoidance will decrease tax avoidance in the subsequent year. In Panel A, for the below-expectation subsample, we find a negative coefficient on *Res1TaxAV* for each measure of tax avoidance. This result suggests that, the more actual tax avoidance falls below the expected level in year t, the more actual tax avoidance increases (i.e., moves toward expected) from year t to year t+1. For the above-expectation subsample, we again find a negative coefficient on *Res1TaxAV* for each measure of tax avoidance. This result indicates that, the more actual tax avoidance exceeds the expected level in year t, the more actual tax avoidance decreases (i.e., moves toward expected) from year t to year t+1. We find consistent results in Panel B when we use the autoregressive model to estimate expected tax avoidance.

Regression results - Models (4a) and (4b)

In Table 7, Panels A and B, we present the results of estimating Models (4a) and (4b) to assess whether firms that modify their tax-avoidance activities to bring actual tax avoidance closer to their expected levels experience a reduction in ex ante cost of capital. In both Models (4a) and (4b), the dependent variable is $\Delta AvgPremium_{i,t+1}$, measured as the change in each firm's average equity premium from year t to year t+1. In both models, our independent variable of interest, *IndicatorVariable*, is an indicator variable coded 1 for observations (1) with tax avoidance *below* expectations in year t that *increased* tax avoidance from year t to year t+1 or (2) with tax avoidance *above* expectations in year t that *decreased* tax avoidance from year t to year t+1. Stated differently, for both below- and above-expectation subsamples, *IndicatorVariable* is coded 1 for observations that move closer to their expected levels of tax avoidance.

In Table 7, Panel A (where we estimate expected tax avoidance as each observation's industry-year median level), when firms report lower-than-expected levels of tax avoidance (either lower *BTD* or higher *CETR*) in the current year and increase tax avoidance in the

subsequent year, ex ante cost of capital declines; however, we do not find evidence of this effect for *GAAPETR*. In contrast, when firms report higher-than-expected levels of tax avoidance (lower *GAAPETR*) in the current year and decrease tax avoidance in the subsequent year, ex ante cost of capital declines; however, we do not find evidence of this effect for *BTD* or *CETR*. Consistent with Panel A, in Panel B (where we estimate expected tax avoidance based on the 5-year autoregressive model), when firms report lower-than-expected levels of tax avoidance (either lower *BTD* or higher *CETR*) in the current year and increase tax avoidance in the subsequent year, ex ante cost of capital declines; however, we do not find evidence of this effect for *GAAPETR*. In contrast, when firms report higher-than-expected levels of tax avoidance (either higher *BTD* or lower *GAAPETR*) in the current year and decrease tax avoidance in the subsequent year, ex ante cost of capital declines; however, we do not find evidence of this effect for *CETR*. Taken together, the results in Table 7 provide some support for the supposition that, by adjusting tax avoidance toward expected levels, firms experience a reduction in ex ante cost of capital.

5. Conclusion

With the highest marginal corporate federal income tax rate at 35 percent, U.S. federal taxes represent a significant cash outflow for firms. As a result, firms attempt to reduce tax burdens by engaging in tax-avoidance activities, but these activities incur non-tax costs (Scholes et al. 2009). This study examines one non-tax cost, ex ante cost of capital, and its relation with tax avoidance.

We provide evidence that investors perceive tax avoidance differently at different levels of tax avoidance. We find that, for firms with relatively low levels of tax avoidance, increasing tax avoidance results in lower ex ante cost of capital, suggesting that investors view the benefits

of tax avoidance to exceed the costs at these relatively low levels. In contrast, for relatively high levels of tax avoidance, increasing tax avoidance results in higher ex ante cost of capital, suggesting that investors view the costs of tax avoidance as outweighing the benefits at these relatively high levels. These findings suggest that the relation between tax avoidance and ex ante cost of capital is nonlinear.

We next examine the extent to which ex ante cost of capital varies with investor expectations of tax avoidance. We estimate a firm-year-specific expected level of tax avoidance for each sample observation using two approaches (industry-year medians and a 5-year autoregressive model). We find that, as the magnitude of the deviation between firms' actual and expected levels of tax avoidance increases, ex ante cost of capital also increases, regardless of whether actual tax avoidance falls below or rises above expectations. We also find that the magnitude of the deviation between firms' actual and expected levels of tax avoidance in year t is negatively associated with the magnitude of the change in tax avoidance from year t to year t+1, indicating that firms with tax avoidance below (above) expectations increase (decrease) tax avoidance to adjust toward their expected levels. Finally, among firms that adjust actual tax avoidance levels toward expected levels, ex ante cost of capital is lower.

We make three contributions to the tax-avoidance literature. First, we demonstrate that the association between tax avoidance and the ex ante cost of capital changes with levels of tax avoidance, which is in contrast with prior studies' assumptions that this association is linear. Second, by estimating investor perceptions of tax avoidance, we provide initial evidence on when investors believe tax avoidance is either too high or too low. Our results suggest that, as tax avoidance increases, investors' perceptions of additional tax avoidance shift from favorable to unfavorable. Finally, we provide evidence that investors' firm-year-specific expectations of

tax avoidance exist and that the ex ante cost of capital is associated with deviations from these expectations. This is the first study to provide evidence on the relative costs of being too aggressive versus not aggressive enough. We also find that firms attempt to align their actual levels of tax avoidance with these expected levels and that ex ante cost of capital decreases for reductions in existing deviations from expected levels.

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Appendix 1
Variable definitions

AvgPremium	The average of the ex ante cost of equity capital premiums from Gephardt al. (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004), all calculated as of June 30 following the close of the fiscal year. See Appendix B for calculations of these measures.
TaxAV	Book-tax differences (*BTD*), cash effective tax rate (*CETR*), or GAAP effective tax rate (*GAAPETR*)
BTD	Total book-tax differences, calculated as: BTD = (PI - ((TXFED + TXFO) / STR)) / Prior Year Assets Where PI refers to pretax income, TXFED refers to current federal tax expense, TXFO refers to current foreign tax expense, and STR refers to the statutory tax rate of 35%.
CETR	If cash taxes paid (TXPD) is greater than 0 and pretax income (PI) less special item (SPI) is greater than 0 then CETR = TXPD / (PI – SPI), otherwise CETR = ".".CETR is then multiplied by -1 so that it is increasing in tax avoidance. If CETR is less than -1 then CETR = -1. If CETR is greater than 0 then CETR = 0.
GAAPETR	If income tax expense (TXT) is greater than 0 and pretax income (PI) less special items (SPI) is greater than 0 then GAAPETR = TXT / (PI – SPI), otherwise GAAPETR = ".". GAAPETR is then multiplied by -1 so that it is increasing in tax avoidance. If GAAPETR is less than -1 then GAAPETR = -1. If GAAPETR is greater than 0 then GAAPETR = 0.
ROA	Return on Assets defined as PI/AT.
IndustryPremium	The median of *AvgPremium* for each of the Fama and French 48 industries for each year
LnAT	The natural log of the firm's assets (AT)
LnGrowth	The natural log of the firm's predicted long-term growth as reported by I/B/E/S
LnBMRatio	The natural log of the book-to-market ratio: book value of equity (CEQ) divided by market value of equity (PRCC_F×CSHO)

B_mkt *B_hml* *B_smb*	The Fama and French (1993) risk factors are computed by regressing a firm's monthly stock returns (for the period starting forty-eight months prior to fiscal year-end and ending at fiscal year-end); monthly Fama and French (1993) factors are available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html.
Leverage	Long-term debt (LT) scaled by total assets (AT)
AQ	Accrual Quality is measured as the standard deviation of the firm-level residuals from the Francis et al. (2005) model to calculate accrual quality based on the model originally proposed by Dechow and Dichev (2002). In their model, TCA = PY_CFO + CY_CFO + FY_CFO + ΔSale + PPEGT + e. Where, TCA = (Change_ACT - Change_LCT - Change_CHE + Change_DLC) / Avg_AT All variables are scaled by average assets. The model is a regression of working capital accruals on lagged, current, and future cash flows plus the change in revenue and PPE. All variables are scaled by average total assets. The model is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classifications.
AQError	The residual of the regression of AQ = BTD + CETR + GAAPETR + e
PPEGT	Gross property plant and equipment (PPEGT) scaled by total assets (AT)
GrossStock	An indicator variable coded 1 if the firm issued more than one million of gross stock (SSKT) in the previous year, 0 otherwise
ABSRes1TaxAV	Absolute value of the difference between the actual measures of tax avoidance and the median measures of tax avoidance for each of the Fama and French 48 industries for the year.
ABSRes2TaxAV	Absolute value of the difference between actual tax avoidance and expected tax avoidance, estimated using the 5-year autoregressive model
Indicator Variable	This variable is coded 1 if the firm-year observation had a negative error from tax avoidance in the current year and had a positive change in tax avoidance in the subsequent year. Alternatively, this variable is coded 1 if the firm-year observation had a positive error from tax avoidance in the current year and had a negative change in tax avoidance in the subsequent year.

Appendix B
Cost of capital measures

Gebhardt, Lee, and Swaminathan (2001)

$$P_0 = BV_0 + \sum_{t=1}^{12} \frac{FEPS_t - (r * BV_{t-1})}{(1+r)^t} + \frac{FEPS_{12} - (r * BV_{12})}{r * (1+r)^{12}}$$

Where

P_0 is the price of the stock in June of year t
BV is the book value of the firm at the beginning of the year divided by number of shares outstanding at the beginning of the year
FEPS is the forecasted earnings per share for period t based on IBES analysts forecasts
r estimated ex ante cost of capital

The Gebhardt et al. (2001) calculation of the ex ante cost of capital is based on the residual income model and assumes that in years 4 through 12 residual income reverts back to industry medians based on the Fama and French (1997) 48 industry classification system. To find the stock premium we subtract the yield on the 10-year treasury note.

Claus and Thomas (2001)

$$P_0 = BV_0 + \sum_{t=1}^{4} \frac{FEPS_t - (r * BV_{t-1})}{(1+r)^t} + \frac{FEPS_5 - (r * BV_4)(1+f)}{(r-f)(1+r)^5}$$

Where

P_0 is the price of the stock in June of year t
BV is the book value of the stock at the beginning of the year divided by number of shares outstanding at the beginning of the year
FEPS is the forecasted earnings per share for period t
r estimated ex ante cost of capital
f is the inflation rate, which is set at 3%.

The Claus and Thomas (2001) ex ante cost of capital measure assumes that abnormal earnings grow at a constant rate equal to the rate of inflation.

Additional Notes
Consistent with prior literature we also impose the following rules

(1) If IBES long-term growth is missing we estimate long-term growth as $FEPS_{t+2}$ divided by $FEPS_{t+1}$ minus 1
(2) If FEPS for periods t+3, t+4 and t+5 when explicit FEPS is missing we estimate FEPS has prior period earnings per share multiplied by 1 + IBES long-term growth rate
(3) For each of the models we assume a constant payout ratio between 0 and 1
(4) We require a positive long-term growth rate. Growth rates below 0% are deleted from the sample

Gode and Mohanram (2003)

$$P_0 = A + \sqrt{A^2 + \left(\frac{FEPS_{t+1}}{P_t}\right)\left(g_2 - \left(r_f - 0.03\right)\right)}$$

Where:

$$A = \frac{1}{2}\left(\left(r_f - 0.03\right) + \frac{DPS_{t+1}}{P_0}\right)$$

g_2 = short-term growth rate that equals the IBES long-term growth forecast. If the long-term forecast is not available then we calculate g2 as ($FEPS_{t+2}$ / $FEPS_{t+1}$) – 1

DPS t+1= FEPS t+1 times the year t dividend payout ratio

Rf = the risk-free rate equal to the yield on a ten year U.S. Treasury Bond

This model assumes in perpetuity, the short-term growth rate reverts back to the risk-free rate minus the inflation rate of 3%. To find the cost of capital premium for this model we subtract the 10-year U.S. treasury rate.

Easton (2004)

$$P_0 = \frac{FEPS_2 - FEPS_1}{ER^2}$$

Where

P_0 is the price of the stock in June of year t
BV is the book value of the stock at the beginning of the year divided by number of shares outstanding at the beginning of the year
FEPS is the forecasted earnings per share for future period t+1 and future period t+2
ER^2 estimated ex ante cost of capital

TABLE 1
Descriptive statistics

Variable	N	Min	25th Pctl	50th Pctl	75th Pctl	Max	Mean	Std Dev
AvgPremium	19,204	-0.025	0.033	0.054	0.075	0.210	0.056	0.036
BTD	19,204	-0.833	0.002	0.021	0.045	0.300	0.026	0.047
CETR	19,204	-1.000	-0.351	-0.261	-0.152	0.000	-0.264	0.164
GAAPETR	19,204	-0.995	-0.380	-0.341	-0.270	0.000	-0.319	0.109
ROA	19,204	-0.041	0.061	0.099	0.149	0.420	0.113	0.072
IndustryPremium	19,204	-0.011	0.044	0.053	0.065	0.155	0.055	0.017
LnAT	19,204	1.716	5.445	6.502	7.665	12.757	6.625	1.659
LnGrowth	19,204	-6.320	-2.120	-1.881	-1.571	0.182	-1.823	0.517
LnBMRatio	19,204	-5.506	-1.304	-0.873	-0.479	1.555	-0.918	0.668
B_MKT	19,204	-7.480	0.632	1.007	1.427	5.430	1.057	0.678
B_SMB	19,204	-3.850	0.143	0.649	1.233	6.750	0.742	0.927
B_HML	19,204	-3.240	-0.446	0.156	0.754	3.040	0.132	0.997
Leverage	19,204	0.000	0.004	0.125	0.252	0.794	0.153	0.150
AQError	19,204	-0.636	-0.013	0.010	0.026	0.052	0.000	0.039
PPEGT	19,204	0.000	0.226	0.419	0.700	1.570	0.496	0.337
GrossStock	19,204	0.000	0.000	1.000	1.000	1.000	0.689	0.463

TABLE 2

Correlation matrix

	Avg Premium	BTD	CETR	GAAP ETR	ROA	Industry Premium	LnAT	Ln Growth	Ln BMRatio	B_mkt	B_smb	B_hml	Leverage	AQError	PPEGT	Gross Stock
BTD	**0.018**	1.000														
CETR	**-0.025**	**0.431**	1.000													
GAAPETR	**0.085**	**0.181**	**0.327**	1.000												
ROA	**-0.244**	**0.216**	**-0.056**	**-0.193**	1.000											
Industry Premium	**0.459**	**0.044**	**0.021**	**0.069**	**-0.050**	1.000										
LnAT	**-0.083**	-0.003	**0.075**	**0.100**	**-0.106**	**0.174**	1.000									
LnGrowth	**0.177**	**0.041**	**0.090**	-0.001	0.015	**-0.088**	**-0.359**	1.000								
LnBMRatio	**0.507**	**-0.108**	**-0.110**	**-0.034**	**-0.519**	**0.188**	**-0.129**	**-0.105**	1.000							
B_mkt	**0.112**	0.010	**0.069**	**0.092**	**-0.076**	**0.060**	0.018	**0.101**	**0.055**	1.000						
B_smb	**0.145**	-0.005	-0.009	-0.002	**-0.058**	**0.022**	**-0.302**	**0.156**	**0.120**	**-0.066**	1.000					
B_hml	**0.120**	-0.015	**-0.075**	**-0.103**	**-0.092**	**0.048**	-0.008	**-0.111**	**0.200**	**0.086**	**0.112**	1.000				
Leverage	**0.123**	**-0.013**	**0.052**	-0.014	**-0.355**	**0.049**	**0.279**	**-0.164**	**0.052**	-0.018	**-0.048**	**0.193**	1.000			
AQError	**-0.094**	0.000	0.000	0.000	**-0.023**	**0.059**	**0.301**	**-0.186**	**-0.027**	**-0.080**	**-0.136**	0.014	**0.128**	1.000		
PPEGT	0.003	**0.051**	0.000	**-0.061**	**-0.054**	-0.010	**0.122**	**-0.160**	**0.080**	**-0.061**	**-0.070**	**0.204**	**0.236**	**0.241**	1.000	
GrossStock	**-0.112**	0.007	**0.084**	**0.083**	**0.084**	**0.056**	**0.368**	**-0.050**	**-0.218**	**0.042**	**-0.096**	**-0.109**	**-0.040**	**0.087**	**-0.117**	1.000

Correlations in bold indicate significance at $p<0.01$.

TABLE 3

Panel A: OLS regression results (dependent variable: AvgPremium, tax avoidance: BTD)

	Prediction	Low Avoidance	Quartile 2	Quartile 3	High Avoidance
Intercept	?	0.065***	0.068***	0.076***	0.066***
		(12.43)	(14.08)	(15.35)	(11.46)
BTD	-/?/?/+	-0.054***	-0.038	0.043	0.045***
		(-3.85)	(-1.04)	(1.60)	(3.13)
ROA	+	0.040***	0.055***	0.084***	0.078***
		(4.01)	(5.49)	(9.01)	(6.65)
IndustryPremium	+	0.565***	0.496***	0.385***	0.461***
		(10.14)	(10.13)	(8.00)	(8.62)
LnAT	-	-0.001***	-0.001***	0.000	-0.001
		(-2.63)	(-2.60)	(-0.79)	(-1.63)
LnGrowth	+	0.019	0.018***	0.021***	0.020***
		(16.29)	(16.89)	(17.94)	(16.23)
LnBMRatio	+	0.029	0.029***	0.032***	0.028***
		(21.39)	(21.39)	(27.09)	(16.38)
B_mkt	+	0.002**	0.002***	0.003***	0.003***
		(2.36)	(3.56)	(4.56)	(3.84)
B_smb	+	0.002***	0.001***	0.002***	0.001**
		(2.94)	(2.58)	(2.87)	(2.06)
B_hml	+	0.001	0.001**	0.000	0.000
		(1.56)	(2.21)	(0.23)	(-0.11)
Leverage	+	0.047***	0.047***	0.052***	0.052***
		(11.40)	(13.08)	(13.96)	(12.10)
AQError	-	-0.059***	-0.061***	-0.072***	-0.096***
		(-3.37)	(-4.11)	(-5.89)	(-6.56)
PPEGT	+	0.008***	0.001	0.004**	0.007***
		(4.25)	(0.53)	(2.23)	(3.64)
GrossStock	-	0.000	-0.001	-0.002*	0.000
		(-0.45)	(-1.38)	(-1.67)	(-0.01)
Year Control Variables		YES	YES	YES	YES
48 Industry Controls		YES	YES	YES	YES
Number of Obs.		4,586	5,045	5,233	4,340
R-square		55.81%	54.85%	55.87%	53.01%

Industry- and year- fixed effects are included but not reported.

*** Significant at 0.01 (two-tailed), ** Significant at 0.05 (two-tailed), * Significant at 0.1 (two-tailed)

TABLE 3

Panel B: OLS regression results (dependent variable: AvgPremium, tax avoidance: CETR)

	Prediction	Low Avoidance	Quartile 2	Quartile 3	High Avoidance
Intercept	?	0.068***	0.055***	0.061***	0.079***
		(12.53)	(10.19)	(11.86)	(13.44)
CETR	-/?/?/+	-0.017***	-0.017**	-0.006	0.020**
		(-5.31)	(-2.03)	(-0.78)	(2.18)
ROA	+	0.067***	0.072***	0.066***	0.091***
		(6.82)	(7.32)	(6.66)	(7.58)
IndustryPremium	+	0.475***	0.513***	0.468***	0.449***
		(9.16)	(11.29)	(9.90)	(7.15)
LnAT	-	-0.001***	0.000	0.000	-0.002***
		(-3.22)	(-1.21)	(-0.41)	(-3.57)
LnGrowth	+	0.020***	0.019***	0.017***	0.021***
		(17.61)	(16.76)	(16.31)	(18.19)
LnBMRatio	+	0.032***	0.028***	0.027***	0.030***
		(21.00)	(21.59)	(21.12)	(22.46)
B_mkt	+	0.003***	0.002***	0.003***	0.003***
		(3.48)	(2.92)	(3.73)	(4.58)
B_smb	+	0.001***	0.001	0.001**	0.002***
		(2.61)	(1.39)	(2.56)	(3.20)
B_hml	+	0.000	0.001**	0.001**	0.000
		(-0.32)	(2.18)	(1.99)	(0.03)
Leverage	+	0.048***	0.055***	0.044***	0.047***
		(11.77)	(14.46)	(11.35)	(11.86)
AQError	-	-0.065***	-0.055***	-0.094***	-0.081***
		(-4.89)	(-3.77)	(-7.17)	(-5.51)
PPEGT	+	0.005***	0.003	0.004**	0.009***
		(2.89)	(1.60)	(2.07)	(4.30)
GrossStock	-	0.000	-0.001	-0.002	-0.001
		(0.14)	(-1.19)	(-1.56)	(-1.23)
Year Control Variables		YES	YES	YES	YES
48 Industry Controls		YES	YES	YES	YES
Number of Obs.		4,768	5,261	5,150	4,025
R-square		54.94%	55.99%	54.84%	53.61%

Industry- and year- fixed effects are included but not reported.

***Significant at 0.01 (two-tailed), ** Significant at 0.05 (two-tailed), * Significant at 0.1 (two-tailed)

TABLE 3

Panel C: OLS regression results (dependent variable: AvgPremium, tax avoidance: GAAPETR)

	Prediction	Low Avoidance	Quartile 2	Quartile 3	High Avoidance
Intercept	?	0.066***	0.068***	0.070***	0.086***
		(10.52)	(8.53)	(11.33)	(14.48)
GAAPETR	-/?/?/+	-0.022***	0.023	0.017	0.018***
		(-4.01)	(1.38)	(1.39)	(2.57)
ROA	+	0.087***	0.111***	0.088***	0.066***
		(8.75)	(11.04)	(7.60)	(4.92)
IndustryPremium	+	0.429***	0.450***	0.458***	0.535***
		(7.61)	(9.45)	(9.77)	(9.68)
LnAT	-	-0.001***	-0.001**	-0.001**	-0.001*
		(-3.34)	(-2.22)	(-2.12)	(-1.70)
LnGrowth	+	0.020***	0.021***	0.018***	0.020***
		(17.62)	(18.56)	(16.64)	(16.25)
LnBMRatio	+	0.031***	0.032***	0.029***	0.029***
		(21.45)	(23.82)	(20.75)	(19.29)
B_mkt	+	0.002***	0.002***	0.002***	0.002***
		(3.42)	(2.75)	(3.22)	(3.00)
B_smb	+	0.001**	0.002***	0.001	0.002***
		(2.20)	(3.54)	(1.41)	(3.44)
B_hml	+	0.000	0.001**	0.001***	0.000
		(0.61)	(2.23)	(2.77)	(-0.36)
Leverage	+	0.053***	0.052***	0.058***	0.040***
		(12.25)	(14.28)	(14.10)	(9.60)
AQError	-	-0.070***	-0.055***	-0.073***	-0.091***
		(-4.79)	(-4.22)	(-4.63)	(-5.77)
PPEGT	+	0.005***	0.005***	0.002	0.007***
		(2.67)	(3.23)	(0.99)	(2.93)
GrossStock	-	-0.001	0.000	-0.003***	-0.001
		(-0.85)	(0.18)	(-2.51)	(-1.10)
Year Control Variables		YES	YES	YES	YES
48 Industry Controls		YES	YES	YES	YES
Number of Obs.		4,769	5,156	5,108	4,171
R-square		55.99%	57.42%	55.94%	53.00%

Industry- and year- fixed effects are included but not reported.

*** Significant at 0.01 (two-tailed), ** Significant at 0.05 (two-tailed), * Significance at 0.1 (two-tailed)

TABLE 4

Panel A: OLS regression results (industry-year medians, dependent variable: AvgPremium)

	Prediction	BTD	CETR	GAAPETR
Intercept	?	0.070***	0.067***	0.067***
		(21.78)	(21.00)	(21.05)
ABSRes1TaxAV	+	0.039***	0.017***	0.030***
		(5.40)	(8.18)	(8.90)
ROA	+	0.061***	0.070***	0.074***
		(9.87)	(11.35)	(11.84)
IndustryPremium	+	0.473***	0.475***	0.470***
		(16.79)	(17.01)	(16.74)
LnAT	-	-0.001***	-0.001**	-0.001***
		(-2.86)	(-2.45)	(-2.62)
LnGrowth	+	0.019***	0.019***	0.019***
		(30.22)	(30.37)	(30.06)
LnBMRatio	+	0.029***	0.029***	0.029***
		(33.77)	(33.69)	(33.86)
B_mkt	+	0.002***	0.003***	0.002***
		(6.08)	(6.32)	(6.06)
B_smb	+	0.001***	0.001***	0.001***
		(4.43)	(4.46)	(4.50)
B_hml	+	0.000	0.000	0.000
		(1.41)	(1.27)	(1.48)
Leverage	+	0.048***	0.048	0.048***
		(19.06)	(19.30)	(19.38)
AQError	-	-0.073***	-0.073***	-0.073***
		(-7.90)	(-7.91)	(-7.98)
PPEGT	+	0.005***	0.005***	0.005***
		(3.92)	(3.95)	(3.88)
GrossStock	-	-0.001*	-0.001	-0.001*
		(-1.67)	(-1.60)	(-1.65)
Year Control Variables		YES	YES	YES
48 Industry Controls		YES	YES	YES
Number of Obs.		19,185	19,185	19,185
R-square		54.01%	54.11%	54.23%

Industry- and year- fixed effects are included but not reported.

*** Significant at 0.01 (two-tailed), ** Significance at 0.05 (two-tailed), and * Significant at 0.1 (two-tailed)

TABLE 4

Panel B: OLS regression results (autoregressive model, dependent variable: AvgPremium)

	Prediction	BTD	CETR	GAAPETR
Intercept	?	0.064***	0.060***	0.060***
		(18.85)	(15.38)	(15.21)
ABSRes2TaxAV	+	0.038***	0.012***	0.039***
		(5.60)	(4.12)	(7.44)
ROA	+	0.059***	0.061***	0.065***
		(8.83)	(7.81)	(7.99)
IndustryPremium	+	0.488***	0.439***	0.429***
		(15.93)	(12.93)	(12.89)
LnAT	-	0.000	0.000	0.000
		(-1.04)	(-0.13)	(-1.01)
LnGrowth	+	0.019***	0.017***	0.017***
		(27.96)	(20.51)	(18.86)
LnBMRatio	+	0.028***	0.028***	0.027***
		(29.90)	(24.47)	(23.26)
B_mkt	+	0.002***	0.002***	0.002***
		(5.30)	(4.03)	(3.75)
B_smb	+	0.001***	0.001***	0.001
		(4.09)	(3.13)	(1.61)
B_hml	+	0.000	0.000	0.001
		(1.29)	(1.05)	(1.42)
Leverage	+	0.046***	0.048***	0.046***
		(17.30)	(15.38)	(14.75)
AQError	-	-0.084***	-0.070***	-0.071***
		(-8.22)	(-5.82)	(-5.92)
PPEGT	+	0.005***	0.005***	0.003**
		(4.20)	(2.99)	(1.98)
GrossStock	-	-0.002**	-0.002**	-0.002*
		(-2.09)	(-2.32)	(-1.84)
Year Control Variables		YES	YES	YES
48 Industry Controls		YES	YES	YES
Number of Obs.		16,710	12,626	12,194
R-square		54.02%	54.07%	53.59%

Industry- and year- fixed effects are included but not reported.

*** Significant at 0.01 (two-tailed), ** Significant at 0.05 (two-tailed), and * Significant at 0.1 (two-tailed)

TABLE 5

Panel A: OLS regression results (industry-year medians, below and above expectations, dependent variable: AvgPremium)

	BTD		CETR		GAAPETR	
	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above
Intercept	0.073***	0.068***	0.065***	0.068***	0.064***	0.073***
	(15.92)	(18.58)	(17.24)	(16.71)	(16.81)	(17.26)
ABSRes1TaxAV	0.055***	0.031***	0.016***	0.019***	0.010**	0.037***
	(4.41)	(3.53)	(6.76)	(4.20)	(2.32)	(7.62)
ROA	0.035***	0.075***	0.066***	0.079***	0.097***	0.075***
	(3.78)	(10.36)	(8.96)	(9.34)	(12.69)	(7.50)
IndustryPremium	0.512***	0.455***	0.508***	0.447***	0.430***	0.493***
	(11.36)	(13.93)	(13.69)	(11.88)	(11.76)	(12.69)
LnAT	-0.002***	0.000*	-0.001**	-0.001*	-0.001***	-0.001**
	(-3.97)	(-1.69)	(-2.34)	(-1.94)	(-3.13)	(-2.30)
LnGrowth	0.019***	0.020***	0.020***	0.019***	0.020***	0.019***
	(18.43)	(25.93)	(23.48)	(22.55)	(24.28)	(21.55)
LnBMRatio	0.029***	0.029***	0.029***	0.028***	0.031***	0.029***
	(24.07)	(29.72)	(27.54)	(26.46)	(29.57)	(24.21)
B_mkt	0.001**	0.003***	0.002***	0.003***	0.002***	0.002***
	(1.98)	(6.84)	(3.82)	(5.66)	(4.54)	(3.81)
B_smb	0.002***	0.001***	0.001***	0.002***	0.001***	0.001***
	(3.29)	(3.47)	(2.79)	(3.69)	(3.67)	(3.06)
B_hml	0.001*	0.000	0.000	0.000	0.001*	0.000
	(1.90)	(0.70)	(0.95)	(1.18)	(1.93)	(1.04)
Leverage	0.047***	0.049***	0.051***	0.045***	0.053***	0.048***
	(12.70)	(17.92)	(16.03)	(14.88)	(16.69)	(15.17)
AQError	-0.051***	-0.081***	-0.060***	-0.086***	-0.064***	-0.083***
	(-3.10)	(-8.27)	(-5.47)	(-7.70)	(-5.77)	(-6.74)
PPEGT	0.005***	0.005***	0.004***	0.006***	0.005***	0.004**
	(2.69)	(3.78)	(2.86)	(3.86)	(3.71)	(2.27)
GrossStock	0.000	-0.002**	-0.001	-0.002**	-0.001	-0.002**
	(0.24)	(-2.14)	(-0.65)	(-2.06)	(-0.66)	(-2.10)
Number of Obs.	6,376	12,809	10,092	9,093	10,205	8,980
R-square	53.57%	54.81%	55.30%	53.55%	56.36%	53.97%

TABLE 5
Panel B: OLS regression results (autoregressive model, below and above expectations, dependent variable: AvgPremium)

	BTD		CETR		GAAPETR	
	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above
Intercept	0.067***	0.061***	0.067***	0.056***	0.055***	0.067***
	(14.49)	(16.50)	(14.09)	(12.17)	(12.13)	(13.42)
ABSRes2TaxAV	0.054***	0.039***	0.017***	0.000	0.026***	0.047***
	(4.50)	(5.16)	(4.54)	(0.03)	(3.69)	(6.49)
ROA	0.040***	0.072***	0.053***	0.067***	0.071***	0.068***
	(4.44)	(9.54)	(5.30)	(6.91)	(7.36)	(5.96)
IndustryPremium	0.493***	0.488***	0.435***	0.445***	0.465***	0.383***
	(9.92)	(13.66)	(9.39)	(10.78)	(11.00)	(8.30)
LnAT	-0.001*	0.000	-0.001	0.000	0.000	0.000
	(-1.78)	(-0.19)	(-1.42)	(0.82)	(-1.26)	(-0.49)
LnGrowth	0.019***	0.019***	0.019***	0.015***	0.016***	0.017***
	(18.45)	(24.30)	(16.18)	(15.63)	(14.83)	(15.09)
LnBMRatio	0.027***	0.028***	0.028***	0.027***	0.028***	0.028***
	(22.11)	(28.15)	(19.91)	(19.80)	(19.79)	(17.36)
B_mkt	0.003***	0.002***	0.002***	0.003***	0.002***	0.002***
	(4.10)	(4.32)	(2.59)	(4.01)	(3.00)	(2.97)
B_smb	0.001**	0.001***	0.001**	0.001***	0.001*	0.000
	(2.45)	(3.83)	(2.35)	(2.56)	(1.71)	(0.72)
B_hml	0.000	0.001	0.000	0.000	0.000	0.001
	(0.60)	(1.51)	(0.51)	(0.98)	(1.03)	(1.36)
Leverage	0.049***	0.045***	0.048***	0.048***	0.048***	0.046***
	(12.73)	(16.09)	(11.99)	(14.19)	(13.64)	(12.03)
AQError	-0.094***	-0.077***	-0.072***	-0.070***	-0.067***	-0.078***
	(-6.34)	(-6.85)	(-4.85)	(-5.15)	(-4.47)	(-6.04)
PPEGT	0.006***	0.005***	0.004**	0.005***	0.004**	0.002
	(3.56)	(3.90)	(2.41)	(2.88)	(2.57)	(0.84)
GrossStock	-0.001	-0.002***	-0.001	-0.003***	-0.001	-0.002*
	(-0.81)	(-2.55)	(-1.17)	(-2.68)	(-1.29)	(-1.94)
Number of Obs.	5,735	10,975	5,550	7,076	6,482	5,712
R-square	55.04%	54.17%	54.14%	54.72%	54.01%	53.97%

TABLE 6

Panel A: OLS regression results (industry-year medians, below and above expectations, dependent variable: ΔTaxAV)

	BTD		CETR		GAAPETR	
	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above
Intercept	-0.001	0.000	-0.032***	-0.043***	-0.001	0.009
	(-0.43)	(-0.05)	(-3.71)	(-4.17)	(-0.23)	(1.33)
Res1TaxAV	-0.693***	-0.441***	-0.751***	-0.423***	-0.800***	-0.607***
	(-11.07)	(-22.01)	(-30.31)	(-15.99)	(-28.61)	(-22.44)
ΔROA	0.251***	0.357***	0.436***	0.412***	-0.042	-0.163***
	(10.84)	(14.11)	(8.75)	(6.95)	(-1.61)	(-5.19)
ΔLnAT	0.003	0.021***	0.109***	0.101***	-0.004	0.015
	(0.50)	(3.35)	(7.13)	(8.31)	(-0.55)	(1.57)
ΔLnGrowth	0.002	0.000	-0.011**	0.007	0.000	0.002
	(1.00)	(0.44)	(-2.23)	(1.50)	(-0.05)	(0.66)
ΔLnBMRatio	0.008***	0.006***	-0.033***	-0.019***	-0.005	-0.008*
	(4.12)	(3.13)	(-6.20)	(-3.84)	(-1.51)	(-1.85)
ΔB_mkt	-0.001	0.000	-0.001	-0.007*	-0.003	-0.003
	(-1.06)	(-0.39)	(-0.34)	(-1.79)	(-1.02)	(-1.13)
ΔB_smb	0.000	-0.001	-0.004	0.001	0.002	0.002
	(0.47)	(-0.82)	(-1.47)	(0.31)	(1.11)	(0.79)
ΔB_hml	0.001	-0.001	0.001	-0.005	-0.005**	-0.003
	(0.75)	(-0.90)	(0.19)	(-1.64)	(-2.23)	(-1.11)
ΔLeverage	0.038***	0.044***	-0.030	-0.050*	-0.025	-0.018
	(3.51)	(3.65)	(-1.01)	(-1.78)	(-1.48)	(-0.93)
ΔAQError	-0.039	0.116***	-0.112	0.231**	0.016	0.070
	(-1.16)	(3.02)	(-0.97)	(2.00)	(0.24)	(0.83)
ΔPPEGT	0.021	-0.022	0.063	0.054	-0.012	-0.016
	(1.40)	(-1.62)	(1.50)	(1.56)	(-0.61)	(-0.62)
ΔGrossStock	-0.002	-0.001	0.001	-0.001	-0.001	0.005
	(-1.21)	(-0.71)	(0.32)	(-0.21)	(-0.26)	(1.39)
Number of Obs.	4,750	8,975	7,340	6,282	7,496	6,229
R-square	33.96%	30.79%	29.09%	9.33%	22.85%	18.76%

TABLE 6
Panel B: OLS regression results (autoregressive model, below and above expectations, dependent variable: ΔTaxAV)

	BTD		CETR		GAAPETR	
	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above	Avoidance Below	Avoidance Above
Intercept	0.000	-0.004**	-0.017**	-0.022**	-0.018**	0.022***
	(-0.06)	(-2.19)	(-2.12)	(-2.00)	(-2.55)	(3.42)
Res2TaxAV	-0.430***	-0.240***	-0.912***	-0.548***	-1.093***	-0.941***
	(-8.91)	(-13.67)	(-25.80)	(-17.48)	(-38.66)	(-26.42)
ΔROA	0.377***	0.353***	0.481***	0.314***	-0.053**	-0.107***
	(15.47)	(15.38)	(6.77)	(4.90)	(-1.99)	(-3.54)
ΔLnAT	0.011**	0.015***	0.051**	0.079***	-0.013*	0.000
	(2.04)	(2.86)	(2.29)	(5.11)	(-1.71)	(-0.01)
ΔLnGrowth	0.001	0.001	-0.007	0.004	0.002	-0.001
	(0.87)	(1.27)	(-1.01)	(0.51)	(0.71)	(-0.19)
ΔLnBMRatio	0.008***	0.002	-0.027***	-0.018***	-0.002	-0.005
	(3.50)	(1.33)	(-3.58)	(-3.19)	(-0.76)	(-1.39)
ΔB_mkt	-0.003	0.000	-0.009	0.003	-0.004	0.001
	(-1.64)	(-0.12)	(-1.33)	(0.59)	(-1.59)	(0.44)
ΔB_smb	0.001	-0.001	0.001	0.000	0.000	0.001
	(0.72)	(-0.71)	(0.17)	(-0.05)	(0.14)	(0.32)
ΔB_hml	0.000	0.001	-0.005	0.000	-0.002	0.001
	(-0.17)	(1.23)	(-1.17)	(0.06)	(-1.25)	(0.39)
ΔLeverage	0.063***	0.030***	0.015	-0.056*	-0.011	-0.025
	(5.61)	(3.42)	(0.37)	(-1.71)	(-0.70)	(-1.36)
ΔAQError	-0.014	0.058**	-0.096	0.061	0.016	0.174**
	(-0.33)	(2.22)	(-0.57)	(0.38)	(0.32)	(2.11)
ΔPPEGT	-0.005	-0.004	0.049	0.000	-0.015	-0.012
	(-0.35)	(-0.30)	(0.75)	(-0.01)	(-0.75)	(-0.45)
ΔGrossStock	-0.001	0.000	0.003	0.002	0.003	-0.002
	(-0.54)	(0.20)	(0.57)	(0.39)	(0.88)	(-0.64)
Number of Obs.	4,206	7,947	4,222	5,329	5,066	4,346
R-square	28.05%	21.12%	26.00%	11.37%	35.93%	30.26%

TABLE 7
Panel A: OLS regression results (industry-year medians, below and above expectations, ΔAvgPremium)

	BTD		CETR		GAAPETR	
	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance
	Below	Above	Below	Above	Below	Above
Intercept	0.003***	0.004***	0.005***	0.003***	0.004***	0.003***
	(2.61)	(4.31)	(5.38)	(2.54)	(5.26)	(2.83)
IndicatorVariable	-0.001*	0.000	-0.001***	0.000	0.000	-0.002***
	(-1.71)	(0.56)	(-2.77)	(-0.43)	(-0.51)	(-4.56)
ΔROA	0.035***	0.061***	0.036***	0.068***	0.053***	0.053***
	(4.33)	(9.03)	(5.20)	(8.59)	(7.44)	(6.48)
ΔLnAT	0.000	-0.001	-0.001	0.000	-0.002	0.001
	(-0.16)	(-0.41)	(-0.52)	(-0.22)	(-1.26)	(0.27)
ΔLnGrowth	0.020***	0.021***	0.021***	0.021***	0.021***	0.022***
	(18.32)	(26.30)	(21.40)	(25.72)	(22.88)	(23.80)
ΔLnBMRatio	0.041***	0.040***	0.039***	0.041***	0.040***	0.040***
	(28.09)	(35.68)	(30.88)	(31.90)	(32.56)	(30.43)
ΔB_mkt	0.000	0.001*	0.000	0.001	0.000	0.001
	(-0.15)	(1.80)	(0.83)	(1.06)	(0.61)	(1.23)
ΔB_smb	0.000	0.001**	0.000	0.001***	0.001*	0.001
	(0.64)	(2.34)	(1.22)	(1.94)	(1.85)	(1.27)
ΔB_hml	0.001*	0.000	0.000	0.000	0.001	-0.001
	(1.70)	(-0.96)	(0.33)	(-0.33)	(1.56)	(-1.39)
ΔLeverage	0.041***	0.048***	0.041***	0.051***	0.049***	0.044***
	(6.96)	(11.65)	(8.80)	(10.08)	(10.51)	(8.79)
ΔAQError	-0.027	-0.010	-0.020	-0.009	-0.014	-0.017
	(-1.27)	(-0.90)	(-1.42)	(-0.63)	(-0.91)	(-1.32)
ΔPPEGT	0.009	0.018***	0.011**	0.020***	0.015***	0.012**
	(1.56)	(4.30)	(2.37)	(3.88)	(3.34)	(2.43)
ΔGrossStock	0.003***	0.003***	0.003***	0.002***	0.003***	0.003***
	(3.58)	(5.02)	(5.43)	(3.04)	(4.87)	(3.86)
Number of Obs.	4,555	8,581	7,021	6,021	7,179	5,957
R-square	54.56%	57.27%	55.02%	57.82%	57.09%	55.68%

TABLE 7
Panel B: OLS regression results (autoregressive model, below and above expectations, dependent variable: ΔAvgPremium)

	BTD		CETR		GAAPETR	
	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance
	Below	Above	Below	Above	Below	Above
Intercept	0.004***	0.003**	0.006***	0.004***	0.004***	0.004***
	(2.80)	(2.51)	(4.26)	(4.07)	(3.68)	(4.12)
IndicatorVariable	-0.001*	0.001***	-0.001*	0.000	0.000	-0.001**
	(-1.79)	(3.03)	(-1.92)	(0.47)	(-0.32)	(-2.42)
ΔROA	0.037***	0.062***	0.024**	0.058***	0.045***	0.044***
	(4.04)	(8.50)	(2.48)	(6.97)	(4.88)	(4.52)
ΔLnAT	0.000	-0.001	-0.002	-0.001	-0.003	0.001
	(-0.12)	(-0.61)	(-0.77)	(-0.40)	(-1.10)	(0.53)
ΔLnGrowth	0.022***	0.020***	0.023***	0.019***	0.021***	0.020***
	(19.09)	(23.49)	(17.60)	(17.34)	(17.28)	(17.95)
ΔLnBMRatio	0.040***	0.040***	0.036***	0.039***	0.038***	0.038***
	(25.07)	(33.85)	(20.45)	(25.38)	(22.12)	(24.10)
ΔB_mkt	0.001	0.000	0.002***	0.001	0.001*	0.001
	(1.57)	(-0.09)	(2.70)	(0.86)	(1.75)	(0.95)
ΔB_smb	0.001	0.001*	0.000	0.000	0.000	0.000
	(1.08)	(1.84)	(-0.86)	(1.10)	(0.02)	(0.63)
ΔB_hml	0.000	0.000	0.001	0.000	0.000	0.000
	(0.32)	(-0.46)	(1.54)	(-0.04)	(0.34)	(-0.81)
ΔLeverage	0.042***	0.050***	0.042***	0.047***	0.046***	0.041***
	(6.88)	(11.81)	(6.42)	(8.85)	(8.13)	(6.82)
ΔAQError	-0.010	0.000	-0.011	0.011	0.000	0.000
	(-0.43)	(-0.03)	(-0.54)	(0.79)	(0.02)	(0.01)
ΔPPEGT	0.008	0.015***	0.019***	0.007	0.012**	0.011*
	(1.55)	(3.46)	(3.48)	(1.37)	(2.33)	(1.84)
ΔGrossStock	0.001*	0.003***	0.001*	0.003***	0.003***	0.002***
	(1.68)	(4.86)	(1.95)	(4.12)	(3.79)	(3.01)
Number of Obs.	4,028	7,602	4,065	5,162	4,907	4,183
R-square	54.00%	56.46%	52.30%	54.74%	52.46%	53.76%