Tax avoidance and corporate capital structure

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ABSTRACT

This paper investigates whether U.S. public corporations with a strategy of general tax avoidance use more debt compared to non-tax avoiders. General tax avoidance is characterized as the reduction of explicit taxes for any reason, ranging from the benign reduction of taxes stemming from incompatible rules for financial and tax reporting to the employment of abusive tax shelters. Prior research has suggested that tax avoidance exists, may be an incentivized and ongoing practice, and is associated with different market outcomes. The influence of general tax avoidance on capital structure has a theoretical foundation in the trade-off theory, but is relatively unexplored. Firms with an ongoing focus of general tax avoidance may be willing to have higher leverage and accept higher costs associated with the risk of financial distress to maintain lower cash effective tax rates. The empirical results in this study suggest that ex ante tax avoiders have higher average leverage prior to a refinancing, issue more long-term debt as a percentage of assets at a refinancing point, and have higher average leverage following a refinancing event. Cross-sectional regression results indicate that ex ante general tax avoidance is a robust positive influence on leverage. Overall, the results suggest that firms with an ex ante focus on general tax avoidance use relatively more debt in their capital structures.

Keywords: tax avoidance, capital structure, leverage, trade-off theory

INTRODUCTION

The New York Times has reported that 115 firms in the S&P 500 paid a total corporate tax rate of 20% or less over the past five years as opposed to the U.S. federal statutory rate of 35% (Leonhardt, 2011). Following reports that General Electric had a zero federal tax bill for 2010, the *Wall Street Journal* has illustrated how self-employed persons can "pull a GE" on federal taxes (Arends, 2011). Corporations are either viewed with contempt or praised for managing tax bills below the statutory rate. One side of the controversy has claimed that corporate tax advantages are at the expense of non-corporate taxpayers, while the other side has suggested that the resulting increased corporate cash flow is better off with shareholders rather than in the hands of legislators (Farnham, 2011). Regardless of the social consequences, corporations appear to strategically manage their tax payments.

Prior research has suggested that tax avoidance may be incentivized, ongoing, and associated with distinct market outcomes. Dyreng, Hanlon, and Maydew (2010) have found that top executives significantly influence their firm's tax avoidance. Rego and Wilson (2012) have suggested that equity risk incentives motivate tax avoidance. Dyreng, Hanlon, and Maydew (2008) have observed that some firms are able to avoid or defer tax payments over long periods of time. Ayers, Laplante, and McGuire (2010) and Blaylock, Shevlin, and Wilson (2012) have suggested that market participants view the earnings of tax avoiders to be of higher quality compared to other types of firms. Prior studies have linked tax avoidance to a firm's capital structure in the context of abusive tax avoidance (e.g., Graham & Tucker, 2006). However, the influence of general tax avoidance on the firm's capital structure is relatively unexplored.

This study examines the capital structure implications of general tax avoidance, defined herein as the reduction of tax payments for any reason. This definition is non-judgmental, and no attempt is made to distinguish abusive from non-abusive tax avoiders. The influence of general tax avoidance on capital structure has a theoretical foundation in the trade-off theory. Firms with an ongoing focus of general tax avoidance may be willing to have higher leverage and accept higher costs associated with the risk of financial distress to maintain lower cash effective tax rates. In this study, ex ante general tax avoiders are predicted to have higher leverage in a broad cross-section of firms, be more likely to issue debt at a refinancing point, and have higher leverage following a refinancing compared to non-tax avoiders.

Firms are identified as ex ante general tax avoiders using the long-run cash effective tax rate (ETR) in Dyreng, et al. (2008). The long-run cash ETR is more likely to capture general rather than abusive tax avoidance (Dyreng, et al., 2008; Lisowsky, 2010). The results in this study suggest that ex ante tax avoidance positively influences leverage in a general cross-section of firms. In the context of the dynamic trade-off theory, tax avoiders maintain relatively higher leverage following a refinancing event. These results support the notion that ex ante general tax avoiders value leverage as part of an overall tax avoidance strategy, and are robust to alternative definitions of leverage, methods of identifying general tax avoidance, and definitions of a refinancing event. General tax avoidance is also positively associated with the likelihood of issuing debt at a refinancing point. However, the significance is weak and the results are sensitive to alternative definitions.

This paper contributes to the existing literature by examining the relationship between general tax avoidance and capital structure in the context of the dynamic trade-off theory. Dyreng, et al. (2008) have observed that firms with the ability to sustain low cash ETRs over long periods have higher leverage on average, but have not formally tested this proposition.

Prior studies have primarily examined the capital structure implications of abusive tax avoidance. These studies have suggested that the benefits from tax shelters substitute for the tax benefits of debt (Graham & Tucker, 2006; Wilson, 2009; Lisowsky, 2010). This study presents robust evidence that firms with a general tax avoidance focus use more debt in their capital structures, as predicted in the trade-off theory. Although highly statistically significant, the economic influence of ex ante general tax avoidance on leverage is small, and thus is unlikely to be a first-order effect. Ex ante general tax avoidance has a positive but weak and statistically unstable influence on the likelihood of debt issuance. The robust results of higher leverage (in the general cross-section and post-refinancing), combined with the results that tax avoiders are at least as likely to issue more debt as non-tax avoiders, suggest that tax avoiders are using debt as part of an overall tax avoidance strategy.

The paper proceeds as follows. The second section defines tax avoidance and reviews the literature that supports the empirical hypotheses. The third section defines the data and empirical methods used to test the hypotheses. The fourth section discusses the sample, empirical results, and sensitivity analysis. The fifth section concludes.

LITERATURE REVIEW AND HYPOTHESES

Hanlon and Heitzman (2010, p. 137) have defined tax avoidance broadly as "the reduction of explicit taxes." This broad definition encompasses tax avoidance practices ranging from the benign to the abusive (Slemrod, 2004). At the benign extreme tax avoidance may arise from differences between U.S. tax law and U.S. GAAP. Examples include depreciation expense and interest on municipal bonds. U.S. tax law requires all firms to depreciate assets using the same methods and assumptions. U.S. GAAP allows firms to customize the calculation of depreciation expense to better convey information to users of the financial statements. Interest on municipal bonds is not included on the tax return but is included as revenue on the income statement. Examples of tax avoidance at the abusive extreme include attempts to shelter income from tax authorities via underreporting income, overstating deductions, non-filing, underpayment, and abusive tax shelters (Slemrod, 2004). Abusive tax shelters are defined as "complicated transactions promoted to corporations and wealthy individuals to exploit tax loopholes and provide large, unintended tax benefits" (Brostek, 2003, p. 1).

Recent examples of tax avoidance through tax loopholes include Google and Apple using the "Double Irish" and "Dutch Sandwich" to move profits to Bermuda, a country without corporate income tax. Employing these and other methods have enabled Google to lower its tax bill by $3.1 billion over a three year period (2007-09), reducing its overall effective tax rate to 22.2% and its tax rate on overseas income to 2.4%. It is estimated that if Google had paid the full 35% U.S. statutory rate, then its stock price would be around $100 lower per share (Drucker, 2010). Using similar methods, Apple is estimated to have reduced its U.S. federal tax bill by $2.4 billion in 2011, resulting in worldwide cash payments for taxes of only 9.8% of profits. Off the record, an Apple executive has said, "If Apple volunteered to pay more in taxes, it would put itself at a competitive disadvantage…and do a disservice to its shareholders" (Duhigg & Kocieniewski, 2012). Firms may also be able to take advantage of the "Killer B" and "Deadly

D" techniques to repatriate funds to the U.S. without paying U.S. federal taxes.[1] These and other methods can help firms drastically reduce their overall tax payments.

Research is beginning to support the idea that firms may focus on tax avoidance, earnings management, both, or neither. Dyreng, et al. (2008) have examined the cash ETRs of publically traded firms and have found that around 25% of sample firms maintained a cash ETR significantly less than the mean over a ten year period, indicating that some firms are able to avoid (or delay) tax payments in the long run. Armstrong, Blouin, and Larcker (2012) have found a strong negative relationship between GAAP ETR and the compensation of the tax director, consistent with an earnings management focus. From a survey of 600 executives, Graham, Hanlon, and Shevlin (2011) have found that avoiding income tax expense on the income statement (i.e., earnings management) is as important as avoiding income tax payments when deciding where to locate operations and whether to repatriate foreign earnings.[2]

Prior studies have suggested that a managerial focus on tax avoidance may be top-down and incentivized. Dyreng, et al. (2010) have found that top executives have a large impact on the tax avoidance of their firms that ends when the executive moves to a new firm; moreover, the executive's impact on tax avoidance carries over from the old firm to the new firm. These top executives are able to set the "tone at the top" and as a result the "executive is a significant determinant of cash ETR" (Dyreng, et al., 2010, pp. 1164, 1166). Rego and Wilson (2012) have found a positive relationship between equity risk incentives and tax avoidance, suggesting that a tax avoidance focus is valuable to managers who have options as part of their compensation. Regarding the payoff from a tax avoidance focus, Mills, Erickson, and Maydew (1998) have found that for each dollar spent on tax planning, firms are able to reduce tax liabilities by four dollars.

Firms with a tax avoidance focus have characteristics that differ from other firms. Ayers, Jiang, and Laplante (2009) have found that the incremental value of taxable income over book income for explaining annual stock returns is lower for tax avoiders and higher for earnings managers compared to other firms. Among firms with large book-tax earnings differences, Blaylock, et al. (2012) have found a significantly greater persistence of earnings and accruals for tax avoiders, indicating higher quality earnings compared to firms that focus on earnings management and, to a lesser extent, firms that focus on neither earnings management nor tax avoidance. Ayers, et al. (2010) have found that tax avoiders' credit ratings are not affected by large changes in book-tax differences while non-tax avoiders' credit ratings are negatively affected by large changes in book-tax differences. Desai and Dharmapala (2009) have found that tax avoidance positively influences firm value, but the effect is sensitive to the quality of firm governance. The market views changes in book-tax differences as a sign of an overall tax avoidance focus for firms with a high quality of governance but as an isolated, single tax avoidance choice for firms with a low quality of governance.

To summarize, tax avoidance may range from legal, normal recognition of revenues and expenses, to the use of loopholes, to illegal tax noncompliance (tax evasion). Such activities may result in delayed or permanently eliminated payments of taxes. Prior studies have suggested

[1] The Killer B involves the parent company giving its foreign subsidiary stock in exchange for cash. In the Deadly D the parent buys a third company and then transfers ownership to the subsidiary, receiving cash from the subsidiary equal to the purchase price. Both of these types of transactions are tax free. A more detailed explanation is provided in Hicks and Sotos (2008).

[2] The declaration of foreign earnings as "permanently reinvested" allows firms to manage earnings and avoid tax payments. For permanently reinvested income, firms do not have to record income tax expense on the financial statements or pay income taxes.

that firms may engage in tax avoidance or earnings management (e.g., Graham, et al., 2011), where managers are possibly incentivized to engage in either or both activities (Rego & Wilson, 2012; Armstrong, et al., 2012). While there is no conclusive evidence that some firms always favor tax avoidance over earnings management or vice versa, recent research treats tax avoidance or earnings management as a predominant managerial focus at different times where the firm's focus tends to drive economic outcomes (e.g. Blaylock, et al., 2012; Rego & Wilson, 2012).

This paper examines how the focus of general tax avoidance (i.e., tax avoidance for any reason) influences capital structure. The link between general tax avoidance and the firm's capital structure is relatively unexplored, but has a theoretical foundation in the trade-off theory of capital structure. In the trade-off theory, a firm chooses its target capital structure by trading off the tax benefits of additional debt with the increased costs associated with financial distress. If management's focus is on tax avoidance, then management is rationally expected to take advantage of opportunities to reduce tax payments, including interest deductions from debt. In the context of the trade-off theory, ex ante general tax avoiders are expected to use relatively more debt as part of their strategy to achieve and maintain lower cash effective tax rates.

Empirical support for the notion that general tax avoiders use more leverage in their capital structures is from Dyreng, et al. (2008) who have observed that firms with low long-run cash ETRs (less than or equal to 20% over a 10-year window) have more leverage on average compared to firms with higher cash ETRs. However, much of the existing work in understanding how tax avoidance influences capital structure concentrates on abusive tax avoidance. Prior research generally supports the substitution hypothesis in DeAngelo and Masulis (1980), in which firms with non-debt tax offsets are predicted to use less debt in their capital structures (Graham & Tucker, 2006; Wilson, 2009; Lisowsky, 2010).

In a small sample of firms with known tax shelters collected from court records, Graham and Tucker (2006) have found that firms utilizing tax shelters have lower leverage and a lower probability of issuing debt during years in which the shelters are effective.[3] Expanding Graham and Tucker's sample, Wilson (2009) has found that the mean (and median) shelter firm has significantly less leverage compared to a control sample of matched firms. Lisowsky (2010) has found similar results for shelter firms. For a sample of small firms randomly selected for tax audits in 1987, the regression results in Joulfaian (2011) indicate that underreporting of income is significantly inversely related to leverage. Joulfaian (p. 13) has concluded that his results "suggest that the influence of debt policy on tax evasion is substantial" but "there is little evidence in support of tax evasion crowding out debt". In other words, firms that use more debt are less likely to engage in abusive tax avoidance.

As discussed above, prior research has suggested that tax avoidance is an ongoing practice (Dyreng, et al., 2008; Blaylock, et al., 2012), where tax avoidance may be incentivized (Dyreng, et al., 2010; Rego & Wilson, 2012). In the context of the trade-off theory, a firm with an overall general tax avoidance strategy may more highly value the tax benefits of debt, and therefore is expected to use more debt to achieve and maintain a lower cash effective tax rate. If general tax avoidance is ongoing, then ex ante tax avoiders are expected to have higher leverage in a general cross-section of firms, ceteris paribus. Both Dyreng, et al. (2008) and Joulfaian (2011) have supported this notion. However, the presence of abusive tax avoiders in a general

[3] The firms in the Graham and Tucker (2006) sample have very large tax shelters on average (in excess of $1 billion per year, or around 9% of total assets). Graham and Tucker have noted that the average tax shelter size is equivalent to having assets supported by 90% debt with a 10% coupon.

cross-section of firms may bias against finding evidence in support of this hypothesis (Graham & Tucker, 2006; Wilson, 2009; Lisowsky, 2010). Stated in alternative form, the first hypothesis is:

> H1: Firms identified as ex ante general tax avoiders use more leverage in their capital structures, ceteris paribus.

The dynamic trade-off theory suggests that firms identify a target capital structure, but allow leverage to deviate from the target due to financing frictions (Fischer, Heinkel, & Zechner, 1989; Leary & Roberts, 2005; Strebulaev, 2007). Adjustments to capital structure are infrequent, where firms rebalance capital structure only if the expected benefits exceed the adjustment costs. If general tax avoidance influences capital structure, then it may also influence the firm's financing choices when external funds are needed. One way to measure how tax avoidance influences the firm's financing choice is at a "refinancing point", or the time at which a firm materially changes its capital structure. If an ex ante general tax avoider desires to maintain its low tax status, then the firm may be more likely to issue debt at a refinancing point. Stated in alternative form, the second hypothesis is:

> H2: Conditional on reaching a refinancing point, firms identified as ex ante general tax avoiders are more likely to issue debt, ceteris paribus.

In the context of the dynamic trade-off theory, firms may allow their leverage to deviate from target when not at a refinancing point. At a refinancing point, a firm takes a deliberate action to materially change debt or equity. If a firm uses debt as part of an ongoing strategy to reduce tax payments, then the firm is expected to have higher leverage following a refinancing. The third alternative hypothesis is:

> H3: Following a refinancing event, firms identified as ex ante general tax avoiders have higher leverage, ceteris paribus.

DATA AND RESEARCH METHOD

Tests of the above hypotheses employ accounting and stock market data from Compustat and U.S. corporate bond yields from the Federal Reserve Bank of St. Louis FRED database. Firms included in the sample are publicly traded, U.S.-incorporated, non-financial, non-utility firms. Financial firms (SIC codes 6000-6999) are excluded because their use of leverage is restricted by regulatory capital requirements. Utility firms (SIC codes 4900-4999) are excluded because regulation influences profitability. The data used to construct proxies for ex ante tax avoidance (cash taxes paid) begin in 1989 to allow for full implementation of the statement of cash flows required by SFAS 95 beginning in July 1988. Because the ex ante tax avoidance proxies are constructed with five years of cumulative data beginning in 1989, the sample for hypothesis tests spans from 1994 through 2008. The variable construction is discussed below. Compustat data mnemonics are given in parentheses for each variable.

Leverage measures

Year t book leverage and market leverage are two alternative definitions of the dependent variable for the first and third hypotheses. Book leverage is defined as total long-term debt divided by total assets [(DLTT+DLC)/AT]. Market leverage is total long-term debt divided by the market value of assets at the fiscal year end {(DLTT+DLC)/[(PRCCF*CHSO)+LT]}.

Testing the second and third hypotheses requires identifying a refinancing event, or when the firm has a significant change in debt or equity. Following prior studies (e.g., Hovakimian, Opler, & Titman, 2001), a firm has a net debt issue (retirement) in year t when the change in total long-term debt (DLTT+DLC) from year t-1 to t exceeds 5% (falls below -5%) of year t-1 total assets (AT). Similarly, year t net equity issues (repurchases) occur when the change in common stock (SSTK-PRSTKC) exceeds 5% (falls below -1.25%) of year t-1 total assets.

Approximating tax avoidance

Tests of the hypotheses require the identification of firms that engage in ex ante tax avoidance. Tax avoidance is estimated with the long-run cash ETR based on Dyreng, et al. (2008). The long-run cash ETR smooths variations in annual effective tax rates and is somewhat unaffected by upward earnings management (Hanlon & Heitzman, 2010). Lisowsky (2010) has found that the long-run cash ETR is not significantly associated with tax shelter use, supporting the notion that the cash ETR is more oriented toward measuring general tax avoidance. The long-run cash ETR is also accepted in the accounting literature as a credible method for identifying tax avoidance (e.g., Ayers, et al., 2009; Blaylock, et al., 2012; Rego & Wilson, 2012). For each firm, the long-run cash ETR is constructed as cumulative taxes paid divided by cumulative pre-tax earnings net of special items measured over the previous five years, or

$$\text{Cash ETR}_{t-1} = \frac{\sum_{t-5}^{t-1} \text{income tax paid (TXPD)}}{\sum_{t-5}^{t-1} [\text{pretax income (PI)} - \text{special items (SPI)}]} \quad (1)$$

The cash ETR is calculated over 5-year overlapping intervals beginning in 1989 and ending in 2007, producing ex ante cash ETRs from 1994 through 2008. For each 5-year interval, a minimum of 3 years of both income tax paid and pretax income must be available. The identification of ex ante tax avoiders follows Blaylock, et al. (2012). A cash ETR equal to or less than zero is reset to 35% (the U.S. federal statutory rate), and a cash ETR value exceeding one is reset to 1. All firm years are sorted into quintiles of the cash ETR distribution. Minimal data screens are applied prior to ranking the cash ETRs to help reduce misclassification of non-tax avoiders. For any given year, a firm must have positive net sales (SALE), positive total assets (AT), zero tax loss carryforwards (TLCF), positive pretax income (PI), and positive cash tax paid (TXT). Firm years falling into the lowest quintile are assigned an ex ante tax avoider indicator variable equal to 1 (0 otherwise).

The cash ETR identifies tax avoidance for any reason. In the context of the trade-off theory, leverage is expected to vary positively with the tax avoider indicator in the general cross-section (H1). At a refinancing point, ex ante tax avoidance is expected to positively influence the likelihood of issuing debt (H2). Following a refinancing, ex ante tax avoiders are expected to have higher leverage (H3). The results in Graham and Tucker (2006) and Wilson (2009) indicate that abusive tax avoiders tend to have lower leverage and issue less debt, supporting the

substitution hypothesis of DeAngelo and Masulis (1980). Joulfaian (2011) has suggested that firms employing more debt have lower tax evasion. The potential presence of abusive tax avoiders in the sample may confound the relationship between leverage, the likelihood of issuing debt, and general tax avoidance, possibly biasing against finding support for the hypotheses.

Control variables

Frank and Goyal (2009) have identified six key control variables that consistently explain the majority of the variation in the cross-section of leverage: profit, firm size, market-to-book assets ratio, asset tangibility, industry median leverage, and expected inflation.[4] To help isolate the effects of tax avoidance on leverage, this study employs an analogous set of these key variables and adds measures of financial distress risk specific to the trade-off theory. Each control variable is defined and discussed in the context of the dynamic trade-off theory.

Firm profit

Firm profit is defined as year t-1 operating return on assets, or t-1 earnings before interest, taxes, depreciation, and amortization (OIBDP) divided by t-1 total assets (AT). In the dynamic trade-off theory, more profitable firms will have a greater demand for interest tax shields to manage tax payments. However, financing frictions may cause leverage ratios to deviate from management's target, likely causing an inverse relationship between leverage and profit when the firm is not at a refinancing point (Strebulaev, 2007). At a refinancing point, the firm is expected to increase leverage in response to higher profit. Consistent with the dynamic trade-off theory, no prediction is made for the influence of profit on leverage in the general cross-section because firms both are and are not at a refinancing point (H1). The likelihood of debt issues is predicted to vary positively with profit at a refinancing point (H2). Leverage is expected to vary positively with profit following a refinancing (H3).

Firm size and growth opportunities

Firm size is measured as the natural log of year t-1 total assets (AT). Firm size approximates the degree of capital market frictions, where transactions costs are relatively lower for larger firms (Fischer, et al., 1989). The empirical results for straight bond issues in Altinkiliç and Hanson (2000) indicate that underwriter spreads are increasing in the relative size of the issue, supporting the notion that larger firms face relatively lower transactions costs. Faulkender and Petersen (2006) have documented that firms with access to public debt markets (approximated with debt ratings) are larger and more highly leveraged on average. For these reasons, the measure of firm size is expected to be positively related to leverage in the general cross-section (H1), to the likelihood of debt issues at a refinancing point (H2), and to leverage following a refinancing (H3).

Growth opportunities are measured as the prior-year market-to-book assets ratio [(total liabilities (LT)+market value of equity (PRCCF*CSHO))/total assets (AT)]. Myers (1977) has suggested that higher growth opportunities may be associated with higher loan contracting costs that may cause underinvestment and consequently lower leverage. Evidence in Baker and Wurgler (2002) suggests that market-to-book ratios may be more associated with the timing of

[4] The first four of these control variables are consistent with Rajan and Zingales (1995).

debt and equity issues than with growth opportunities, where equity issues are positively correlated with periods of relatively high valuations. In this case, an observed inverse relationship between leverage and market-to-book is mechanical, not causal. For either interpretation, leverage ratios are expected to vary inversely with the market-to-book assets ratio (H1, H3). Similarly, the likelihood of debt issues at a refinancing point is expected to vary inversely with the market-to-book assets ratio (H2).

Because the association between leverage and the market-to-book assets ratio may reflect the timing of equity issues rather than growth opportunities (Baker & Wurgler, 2002), growth opportunities are also approximated by the year t-1 ratio of R&D expense to sales (XRD/SALE). The R&D expense ratio may capture intangible assets (e.g., Frank & Goyal, 2009), assets that have yet to generate income or are related to product uniqueness (Titman & Wessels, 1988), all of which are difficult for outsiders to value and may lead to higher contracting costs.[5] Consistent with the contracting cost interpretation, leverage is expected to vary inversely with the R&D to sales ratio (H1, H3). Firms with relatively higher ratios of R&D expense to sales are less likely to issue debt at a refinancing point (H2).

Following Kayhan and Titman (2007), the regression functions used to test the hypotheses include an indicator variable for unreported (missing) R&D expense (=1, 0 otherwise). Missing observations likely indicate a zero or immaterial amount of R&D expense; however, this item is sometimes combined with other expenses, possibly resulting in an inverse relationship with leverage and debt issues. For this reason, no prediction is made for the missing R&D indicator variable.

Expected costs of financial distress

Consistent with the trade-off theory, the hypothesis tests control for expected costs associated with financial distress. Asset tangibility serves this purpose and is measured as t-1 net property, plant, and equipment divided by t-1 total assets (PPENT/AT). Tangible assets are more easily valued by outsiders and are thought to reduce the expected costs of financial distress (Frank & Goyal, 2009). The availability of collateral for loans in the form of tangible assets may also positively influence debt capacity (Kayhan & Titman, 2007; Harford, Klasa, & Walcott, 2009). These arguments suggest that asset tangibility will positively influence leverage ratios in the general cross-section and following a refinancing (H1, H3), and positively influence the likelihood of debt issues at a refinancing point (H2).

As a bankruptcy predictor, the original Z-score (Altman, 2000) is included to control for costs associated with financial distress. The Z-score is calculated as year t-1 {[1.2*working capital (WCAP)+1.4*retained earnings (RE)+3.3*earnings before interest and taxes (OIADP) +1.0*sales (SALE)]/total assets (AT)}+[0.6*market value of equity (PRCCF*CSHO)/total liabilities (LT)]. The Z-score is defined as a continuous variable, where higher Z-scores are associated with lower probabilities of bankruptcy. Rajan and Zingales (1995) have suggested that firms with lower expected bankruptcy costs may increase leverage. Therefore, a higher Z-score is expected to positively influence leverage in the general cross-section and following a refinancing (H1, H3), and positively influence the likelihood of issuing debt at a refinancing point (H2).

[5] R&D expense also represents a non-debt tax shield (e.g., Bradley, Jarrell, & Kim, 1984) that falls into the definition of general tax avoidance.

Frank and Goyal (2009) have suggested that expected inflation is a key explanatory variable for leverage. The main role of expected inflation is to capture macroeconomic conditions that may affect leverage and debt issues. Specific to the trade-off theory, the year t Baa-Aaa U.S. corporate bond yield spread is included to control for credit market conditions that may influence the expected costs of financial distress (e.g., Gomes & Phillips, 2007). Corporate bond yields are reported as monthly averages of daily yields (on a bond-equivalent basis). The difference in yields on Baa- and Aaa-rated debt is calculated for each month, and then the nominal monthly spreads are averaged over each calendar year. At a refinancing point, a higher yield spread may result in fewer debt issues. In this case, the likelihood of debt issues is expected to vary inversely with the Baa-Aaa yield spread (H2). Following a refinancing, book leverage is expected to vary inversely with the Baa-Aaa yield spread as a consequence of fewer debt issues (H3). The expected net effect of the influence of the yield spread on book leverage in the general cross-section is ambiguous. For firms that have not refinanced in the general cross-section, a change in the yield spread is not expected to significantly impact values of assets or total long-term debt. Therefore the influence of the yield spread on book leverage depends on the proportion of firms that have refinanced in the general cross-section. The expected response of market leverage to variations in the yield spread is also ambiguous in the general cross-section and following a refinancing event. The market value of equity may be sensitive to the yield spread as the market perceives a change in financial distress risk, resulting in an inverse relationship between the market value of equity and the yield spread. For some firms that refinance during the year, the relative magnitudes of changes in debt and the market value of equity are uncertain. If a firm has not refinanced then market leverage is expected to vary positively with the yield spread in the general cross-section. The net effect of the yield spread on market leverage in the general cross-section again depends on the mix of refinancing versus non-refinancing firm years.

Firm fixed effects

Frank and Goyal (2009) have suggested that the industry median leverage is a key explanatory variable for leverage. However, Lemmon, Roberts, and Zender (2008) have advanced the notion that firms tend to manage leverage toward individual long-run means, suggesting that unobservable firm fixed effects influence leverage. In related work, Harford, et al. (2009) have found that firms with leverage levels above their long-run means quickly reduce debt following acquisitions. Both of these results are consistent with the notion of leverage targets in the dynamic trade-off theory. The deviation from target leverage is included in the hypotheses tests to control for the idea that leverage targets are important to firm management. As in Lemmon, et al., a firm's target leverage is approximated by its historical average market leverage ratio. Market leverage is calculated as total long-term debt (DLTT+DLC) divided by the market value of assets [(PRCCF*CSHO)+LT]. The long-run mean market leverage ratio is estimated for each firm from all available observations from 1950 through 2008, independent of the sample selection criteria for this study. The deviation from target leverage is year t-1 market leverage minus the long-run mean market leverage. If the leverage target is a factor in the firm's financing decision, then the deviation from the leverage target is expected to vary inversely with the likelihood of debt issues (H2). The influence of the year t-1 deviation from a leverage target on year t leverage in the general cross-section is unclear. A firm not at a refinancing point in the general cross-section may allow leverage to deviate from a chosen target due to adjustment costs.

If the firm has not reached a refinancing point, and if leverage is above (below) the target in year t-1, then year t leverage is expected to be above (below) target, ceteris paribus. Since the general cross-section sample contains firm years without a refinancing event, no prediction is made for the influence of the year t-1 deviation from a leverage target on year t leverage (H1). Following a refinancing, leverage is expected to vary inversely with the deviation from target leverage if a full adjustment to target occurs. If full adjustment does not occur at a refinancing point, then the firm remains under- or over-leveraged following a refinancing, generating a positive relationship between leverage and the deviation from target leverage. Therefore, no prediction is made for the deviation from target leverage following a refinancing (H3).

Regression functions

The following regression function is used to examine the influence of ex ante tax avoidance on leverage in the general cross-section (H1) and following a refinancing event (H3):

$$\text{Leverage}_{it}=\beta_0+\beta_1\text{tax avoider}_{it-1}+\beta_2\text{operating ROA}_{it-1}+\beta_3\ln(\text{assets})_{it-1}+\beta_4\text{market-to-book}_{it-1}+\beta_5\text{R\&D}_{it-1}+\beta_6\text{missing R\&D}_{it-1}+\beta_7\text{PPE}_{it-1}+\beta_8\text{Z-score}_{it-1}+\beta_9\text{yield spread}_t+\beta_{10}\text{deviation from target}_{it-1}+\beta_{11}\text{time}_t+e_{it} \quad (2)$$

Leverage is alternatively defined as book and market leverage. Tax avoider is an indicator variable set equal to one if a firm year falls into the lowest quintile of the year t-1 cash ETR distribution (0 otherwise). Coefficients are estimated using ordinary least squares with standard errors corrected for heteroskedasticity. A time trend (calendar year) is included in the regression to approximate time fixed effects not otherwise captured by the explanatory variables.

The regression function for the second hypothesis is:

$$\text{Prob(debt issue}_{it}=1)=\beta_0+\beta_1\text{tax avoider}_{it-1}+\beta_2\text{operating ROA}_{it-1}+\beta_3\ln(\text{assets})_{it-1}+\beta_4\text{market-to-book}_{it-1}+\beta_5\text{R\&D}_{it-1}+\beta_6\text{missing R\&D}_{it-1}+\beta_7\text{PPE}_{it-1}+\beta_8\text{Z-score}_{it-1}+\beta_9\text{yield spread}_t+\beta_{10}\text{deviation from target}_{it-1}+\eta_i+\upsilon_t+e_{it} \quad (3)$$

Coefficients are estimated with a panel logistic regression. The dependent variable is equal to one if the year-over-year change in total long-term debt is positive and exceeds 5% of prior-year total assets, zero otherwise. As recommended by Petersen (2009), coefficients are estimated with and without a firm fixed effect (η=GVKEY) and a time fixed effect (υ=calendar year). The inclusion of both a firm and time fixed effect produces the highest standard error for the tax avoider indicator variable.

RESULTS

Sample description

The sample for investigating the effect of ex ante general tax avoidance on leverage in the general cross section contains 25,122 firm years, and the sample restricted to refinancing activities has 14,576 firm years. The descriptive statistics displayed in Panel A of Table 1 (Appendix) are similar for each sample. Ex ante tax avoiders (identified via an independent sort

of the data) comprise around 18% of each sample. Firms have an average market capitalization of around $3 billion. Year t long-term debt issues occur in 27% of the general sample and 46.5% of the refinancing sample. Average beginning-year book (market) leverage is 18.7% (13.8%) for the general sample and 21.0% (14.9%) for the refinancing sample. The average firm is slightly underleveraged at the beginning of the year, with the deviation from the estimated target leverage of -2.3% and -2.7% for the general and refinancing samples, respectively. The typical firm is profitable with a t-1 operating return on assets of 16.4% and 17.0% for respective general and refinancing samples, reflecting the elimination of negative pretax income firm years for the tax avoider variable construction. The average t-1 market-to-book ratio is around 2.1 for both samples. Altman (2000) has suggested that a Z-score below 1.81 is a reasonable indicator of financial distress. Based on this definition, around 8% of firm years are distressed in both samples.

The refinancing sample is split into tax avoiders and non-tax avoiders. Table 1, Panel B gives the means and difference in means t-statistics for select variables. The tax avoider subsample has a statistically higher percentage of debt issuers and a higher average amount of debt issued as a percentage of t-1 assets (t-statistics are 3.85 and 3.69). On average, tax avoiders have significantly higher book leverage for years t-1 and t (t-statistics are 3.01 and 4.25). Average t-1 market leverage is weakly higher but average year t market leverage is significantly higher for tax avoiders (t-statistics are 1.90 and 3.05). As an indicator of financial distress, the average pre-refinancing Z-score is not statistically different between the two subsamples (t-statistic=1.00). However, the tax avoider subsample contains a significantly higher proportion of distressed firms as suggested by a Z-score less than 1.81 (t-statistic=8.67). These differences in means support the notion that tax avoiders use more leverage as part of an overall strategy to maintain relatively low cash effective tax rates at the expense of possible higher financial distress costs.

Regression results

Table 2 (Appendix) shows the results from regressing two alternative definitions of leverage on the tax avoider indicator and control variables for both the general and refinancing samples. The ex ante tax avoider indicator variable is a positive and significant influence on book and market leverage in both samples, supporting H1 and H3 (t-statistics range from 3.46 to 6.65). The estimated coefficients for tax avoidance are relatively small, ranging from 0.01 to 0.02 depending on the sample and dependent variable definition. The coefficient estimates for operating ROA are negative and significant in the general cross-section sample (no prediction). Against prediction, the coefficient estimates for operating ROA are negative and significant in the sample of firms with refinancing activity. The natural log of assets is positive and significantly related to leverage except for market leverage in the refinancing sample. Market-to-book is not significant to book leverage in either sample, but is significant to market leverage in both samples with the predicted sign. The R&D to sales ratio is significantly inversely related to leverage in all cases, but the coefficient estimates are virtually zero. The indicator for missing R&D expense is significantly positively related to leverage, as in Kayhan and Titman (2007). As predicted, asset tangibility is highly significant and positively related to leverage in both samples. The Z-score is significant only to book leverage in both samples, but has an inverse relationship (against prediction). The Baa-Aaa yield spread is significantly inversely related to book leverage in the refinancing sample (as predicted) and in the general cross-section (no

prediction). The yield spread is not significant to market leverage in either sample. The deviation from target leverage is significantly positively related to both book and market leverage in the general cross-section and following a refinancing. These results may indicate that firms do not fully adjust to target at a refinancing point. The time trend is significantly inversely related to leverage across the two samples, indicating the need for additional macroeconomic controls.

The results for the influence of tax avoidance on the likelihood of debt issues at a refinancing point are given in Table 3 (Appendix). Tax avoidance is a very weak positive influence on the likelihood of debt issues (p-value=.09). Profit is significantly inversely related to the likelihood of debt issues, against prediction for the dynamic trade-off theory at a refinancing point (p-value<.0001). Firm size and the Z-score are both inversely related to the likelihood of debt issues, against prediction (p-values of <.0001 and .03, respectively). Market-to-book assets and reported R&D expense are not significant to the likelihood of debt issues. The other variables are significant determinants of the likelihood of debt issues in the predicted manner.

Sensitivity analysis

The cash ETR is the initial choice to identify firm years with a relatively high amount of general tax avoidance. The cash ETR approximates a firm's ability to maintain a relatively low tax payment rate and is accepted in the literature as a reasonable measure of tax avoidance (e.g., Ayers, et al., 2009; Blaylock, et al., 2012; Rego & Wilson, 2012). To test the robustness of the influence of tax avoidance on leverage and the likelihood of debt issues at a refinancing point, nine alternative methods of identifying tax avoidance presented in Hanlon and Heitzman (2010, Table 1) are initially considered. The only suitable alternative method of identifying tax avoiders is the current effective tax rate (ETR) in Ayers, et al. (2009).[6]

Similar to Ayers, et al. (2009), the current ETR is calculated as cumulative current tax expense (income statement) net of deferred tax expense over the previous 5 years divided by the sum of pretax book income net of special items over the same period:

$$\text{Current ETR}_{t-1} = \frac{\sum_{t-5}^{t-1} [\text{total tax expense (TXT)} - \text{deferred tax expense (TXDI)}]}{\sum_{t-5}^{t-1} [\text{pretax income (PI)} - \text{special items (SPI)}]} \quad (4)$$

A firm must have a minimum of three years of observations to be included in the sample. The same minimal screening (as described for the cash ETR) is applied to the data prior to ranking firm years into quintiles of the current ETR distribution. Firm years in the lowest quintile of the current ETR distribution are assigned a tax avoider indicator equal to 1 (0 otherwise).

The regressions for the three hypotheses are repeated using the current ETR as an alternative method of identifying tax avoidance and the results in Tables 2 and 3 are highly robust to this alternative method. In the cross-sectional regressions, the marginal effect of tax avoidance on leverage remains small (coefficient estimates are around 0.03) but highly significant (t-statistics range from 9.85 to 13.84). Tax avoidance remains a positive and weakly

[6] Three methods are eliminated because these do not include deferral strategies. Two other methods are excluded because these require hand collection of data. Three methods employing book-tax differences are excluded because of the difficulty (and duplicity) in separating tax avoiders from earnings managers.

significant effect on the likelihood of debt issues at a refinancing point (coefficient estimate=0.12, p-value=0.01).

The cash ETR results are checked for robustness to alternate cutoffs for debt and equity issues that define a refinancing event. As in prior studies (e.g., Hovakimian, et al., 2001) financing activity cutoffs are changed to 3% and 7% for net debt and equity issues (-3% and -7% for net retirements, -0.5% and -3% for net repurchases). The regression results for the tax avoider indicator in Table 2 are robust to the alternative refinancing cutoffs (t-statistics range from 2.74 to 5.13). The results in Table 3 are supported by the alternative refinancing cutoffs, for which ex ante tax avoidance remains a weak positive influence on debt issues at a refinancing point (p-values are 0.08 and 0.07).

Additional sensitivity analysis includes defining tax avoiders via alternative divisions of the cash ETR distribution, including the lowest quartile, decile, and quintile after eliminating firms with cash ETRs less than or equal to zero. For the general cross-section, the regression results are robust to tax avoiders defined on quartiles, deciles, and quintiles of positive cash ETRs (t-statistics range from 3.61 to 7.49). For firm years at a refinancing, the second hypothesis is supported for quartiles (p-value=0.02), but not for deciles and quintiles of positive cash ETR firm years (p-values are 0.83 and 0.61, respectively). For the cross-section of firm years following a refinancing, the third hypothesis is supported for tax avoiders defined on quartiles and quintiles of positive cash ETR firm years (t-statistics range from 3.41 to 4.85), but not for deciles (t-statistics are 1.55 and 0.60 for book and market leverage, respectively).

The final sensitivity test is to identify tax avoider firms by controlling for industry differences as in Ayers, et al. (2009). This method may help to reduce error in identifying firms focused on tax avoidance. The average cash ETR may vary across industries due to differences in transfer pricing, technology, use and location of subsidiaries, location of markets, repatriation, permanent reinvestment, tax treaties, etc. Selection by industry decreases the chance of misclassifying a firm as a tax avoider (non-tax avoider) as a consequence of its membership in a low (high) tax industry. Drawbacks of this approach are that the sample size for some industries may be small and it is possible that some industries do not have any companies that focus on tax avoidance.

Each year, firms are ranked on the cash ETR by 2-digit SIC code. Firms in the lowest quintile of each 2-digit SIC code are classified as tax avoiders for that year. To be included in the sample, a minimum of 10 firms are required for each 2-digit SIC code in each year. The industry-defined tax avoider variable produces a general cross-section with 24,367 firm years, and the refinancing sample of 14,117 firm years. The new samples are comparable to the original samples represented in Tables 1-3. Coefficients in eqs. (2) and (3) are estimated with the original assumptions that define a refinancing event.

The results for the industry-defined tax avoidance indicator support the notion that ex ante tax avoidance influences leverage in the manner predicted. The tax avoider indicator is positive and significant to book and market leverage in the general cross-section (t-statistics are 8.32 and 8.23, respectively). The influence of the industry-defined tax avoidance indicator on the likelihood of debt issues at a refinancing point is positive and significant (p-value=0.001). Following a refinancing, tax avoidance positively and significantly influences leverage (t-statistics are 5.0 and 4.45 for book and market leverage, respectively).

In summary, ex ante tax avoidance is a robust explanatory variable for leverage in a general cross-section of firms that may or may not have had a refinancing event (H1), and is robust for leverage following a refinancing (H3). Although ex ante tax avoidance is statistically

significant to leverage, its marginal effect is small. The significance of the influence of ex ante tax avoidance on the likelihood of issuing debt at a refinancing point is sensitive to alternative definitions of tax avoidance and is weak overall (H2).

CONCLUSION

This paper considers how a focus on general tax avoidance influences leverage choices, contributing to the understanding of capital structure. Empirical tests support the idea that firms focusing on a general tax avoidance strategy value the interest deductions from debt and are willing to maintain higher leverage, in line with the trade-off theory. General tax avoidance may capture both benign and abusive practices. The main method of identifying tax avoider firms in this paper is based on the long-run cash ETR, a measure that is more likely to be associated with general rather than highly abusive tax avoidance (Lisowsky, 2010). Abusive tax avoidance in the form of tax shelters has been found to substitute for the tax benefits of debt in prior studies (e.g., Graham & Tucker, 2006). Although no attempt is made to distinguish abusive from non-abusive tax avoidance, inclusion of abusive tax avoiders may generate a downward bias in the results. The empirical results for the influence of ex ante general tax avoidance on leverage are highly robust (and generally stronger) using alternative methods to identify tax avoiders. This study does not find strong support for the notion that ex ante general tax avoider firms are more likely to issue debt at a refinancing event compared to other firms. However, general tax avoiders have higher average leverage prior to a refinancing, a higher percentage of debt issues at a refinancing point, and higher average leverage following a refinancing event. Overall, the results in this study suggest that firms with an ex ante focus on general tax avoidance use relatively more debt in their capital structures.

The empirical results in this study are generally stronger when tax avoider firms are identified by controlling for industry and year, as in Ayers, et al. (2009). This study offers possible reasons for expecting an industry influence on long-run cash ETRs (e.g., differences in transfer pricing, technology, subsidiaries, etc.). Formal tests of these potential influences on the long-run cash ETRs are left for future research.

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Table 1

Sample Means

The general sample includes all firms with requisite observations from 1994-2008. The refinancing sample includes firms with year t net debt issues (repayments) and net equity issues (repurchases) defined as exceeding 5% (-5% for debt reductions, -1.25% for equity repurchases) of t-1 total assets from 1994-2008. Tax avoiders are firm years in the lowest quintile of the t-1 cash ETR distribution. LT debt issued/assets is the change in total long-term debt (long-term debt+debt in current liabilities) from t-1 to t divided by t-1 total assets. Book leverage is total long-term debt divided by total assets. Market leverage is total long-term debt divided by the market value of assets (total liabilities+market value of equity). Deviation from target is the difference between t-1 market leverage and the long-run mean market leverage. Operating ROA is t-1 EBITDA scaled by t-1 total assets, ln(assets) is the natural log of t-1 total assets. Market-to-book is the t-1 market value of assets divided by total assets. R&D/sales is t-1 research and development expense divided by t-1 sales for firms that report R&D expense. PPE/assets is t-1 net property, plant, and equipment divided by total assets. Z-score is t-1 [(1.2*working capital+1.4*retained earnings+3.3*EBIT+1.0*sales) /total assets]+[0.6*market value of equity/total liabilities]. Baa-Aaa yield spread is the year t difference between the nominal yields on Baa and Aaa rated corporate debt (basis points).

Panel A: Overall sample statistics

	General sample N=25,122		Refinancing sample N=14,576	
	Mean	Standard deviation	Mean	Standard deviation
% Tax avoiders	18.2%	38.6%	18.7%	39.0%
Market cap (t-1, millions U.S.)	$2,762	$15,038	$3,291	$17,256
% Sample with debt issues	27.0%	44.4%	46.5%	49.9%
Book leverage (t-1)	18.7%	17.4%	21.0%	17.4%
Market leverage (t-1)	13.8%	14.9%	14.9%	14.7%
Deviation from target	-2.3%	9.6%	-2.7%	10.2%
Operating ROA	16.4%	9.4%	17.0%	9.1%
ln(assets)	5.39	1.93	5.49	1.94
Market-to-book	2.06	1.87	2.10	1.87
R&D/sales	59.9%	1,252.1%	50.7%	1,079.5%
% Sample with missing R&D expense	42.4%	49.4%	44.2%	49.7%
PPE/assets	28.8%	21.9%	29.7%	22.3%
Z-score	6.44	11.17	5.98	9.86
% Z-score<1.81	8.1%	27.3%	8.1%	27.3%
Baa-Aaa yield spread	0.80	0.21	0.80	0.21

Panel B: Select refinancing sample means split by tax avoiders and non-tax avoiders

	Tax avoiders n_1=2,724	Non-tax avoiders n_2=11,852	Difference in means t-statistic
% Sample with debt issues	49.8%	45.7%	3.85
LT debt issued/assets	13.9%	11.7%	3.69
Book leverage (t-1)	21.9%	20.8%	3.01
Book leverage (t)	24.2%	22.5%	4.25
Market leverage (t-1)	15.4%	14.8%	1.90
Market leverage (t)	18.0%	16.9%	3.05
Z-score	6.15	5.94	1.00
% Z-score<1.81	13.0%	7.0%	8.67

Table 2

OLS Regressions of Leverage on General Tax Avoidance

OLS regressions of leverage ratios from 1994-2008. LT book (market) leverage is year t total long-term debt divided by total assets (market value of assets). Missing R&D dummy is an indicator set equal to one if t-1 R&D expense is not reported (0 otherwise). All other independent variables are defined in Table 1. The Baa-Aaa yield spread is measured in year t. The time trend is the calendar year. All other independent variables are year t-1 values. Asymptotic t-statistics are in parentheses.

	General sample N=25,122		Refinancing sample N=14,576	
	(1) LT book leverage	(2) LT market leverage	(3) LT book leverage	(4) LT market leverage
Intercept	8.686	8.208	9.793	9.067
	(13.76)	(15.60)	(11.10)	(12.68)
Tax avoider	0.018	0.015	0.016	0.011
	(6.65)	(6.25)	(4.32)	(3.46)
Operating ROA	-0.166	-0.252	-0.215	-0.328
	(-5.96)	(-8.25)	(-4.70)	(-7.93)
ln(assets)	0.014	0.005	0.009	0.001
	(24.85)	(9.53)	(12.28)	(1.52)
Market-to-book	-0.001	-0.013	0.000	-0.016
	(-0.52)	(-7.46)	(0.14)	(-7.33)
R&D/sales	0.000	0.000	0.000	0.000
	(-3.62)	(-5.57)	(-2.10)	(-3.16)
Missing R&D dummy	0.044	0.042	0.046	0.042
	(19.24)	(20.44)	(14.71)	(15.41)
PPE/assets	0.177	0.153	0.164	0.143
	(24.29)	(23.04)	(16.40)	(15.98)
Z-score	-0.003	-0.001	-0.003	0.000
	(-3.25)	(-1.18)	(-2.67)	(-0.37)
Baa-Aaa yield spread	-0.015	0.008	-0.019	0.009
	(-2.65)	(1.61)	(-2.40)	(1.32)
Deviation from target	0.380	0.413	0.210	0.240
	(28.71)	(32.30)	(12.35)	(14.93)
Time trend	-0.004	-0.004	-0.005	-0.004
	(-13.51)	(-15.26)	(-10.83)	(-12.34)
Adj. R^2	0.24	0.26	0.18	0.23

Table 3

Panel Logistic Regressions of Debt Issues on General Tax Avoidance

Logistic regressions of debt issues from 1994-2008. The sample includes only firms with year t net debt issues (repayments) and net equity issues (repurchases) defined as exceeding 5% (-5% for debt reductions, -1.25% for equity repurchases) of t-1 total assets. The dependent variable is set to 1 if year t net long-term debt issues (change in total long-term debt from the balance sheet) are positive, 0 otherwise. Missing R&D dummy is an indicator set equal to one if t-1 R&D expense is not reported (0 otherwise). All other independent variables are defined in Table 1. The Baa-Aaa yield spread is measured in year t. All other independent variables are year t-1 values. Standard errors are adjusted for clustering by year and firm. P-values relate to Wald statistics, and the pseudo-R^2 is not rescaled.

	Refinancing sample N=14,576	
	Estimate	p-value
Intercept	0.818	<.0001
Tax avoider	0.077	0.0913
Operating ROA	-2.113	<.0001
ln(assets)	-0.052	<.0001
Market-to-book	0.005	0.7894
R&D/sales	-0.002	0.5857
Missing R&D dummy	0.159	<.0001
PPE/assets	1.236	<.0001
Z-score	-0.024	0.0311
Baa-Aaa yield spread	-1.010	<.0001
Deviation from target	-5.850	<.0001
Firm effects	Yes	
Time effects	Yes	
Pseudo R^2	0.11	