EXECUTIVE COMPENSATION, CORPORATE TAX AGGRESSIVENESS, AND FINANCIAL REPORTING AGGRESSIVENESS: EVIDENCE FROM SFAS 123R

by

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Abstract

EXECUTIVE COMPENSATION, CORPORATE TAX AGGRESSIVENESS AND FINANCIAL REPORTING AGGRESSIVENESS: EVIDENCE FROM SFAS 123R

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Using a variety of research methods, prior empirical research finds that executive compensation influences the behavior of managers, particularly with decisions involving risk. These studies show that, when executive compensation is more sensitive to stock price volatility, firms implement riskier investment and financial policies and take more aggressive positions in financial and tax reporting.

The sensitivity of executive compensation to stock price volatility is largely due to stock option compensation. Prior studies provide evidence that companies reduced the stock option grants to executives following the introduction of the Statement of Financial Accounting Standard 123R – Share-Based Payment (SFAS 123R). The reduced stock option grants lead to executive compensation being less sensitive to stock price volatility. Because SFAS 123R is unrelated to a manager's inherent risk aversion, this paper uses the introduction of SFAS 123R as a natural experiment to further explore the relationship between executive compensation and managerial risk taking, in the form of aggressive positions taken in financial and tax reporting. This paper's focus on changes in corporate tax aggressiveness and financial reporting aggressiveness complements the work of Hayes et al. (2012), Cohen et al. (2010), Chava and Purnanandam (2010), and Bakke et al. (2016), which examine changes in the riskiness of corporate financing and investment policies following SFAS 123R.

I fail to find evidence that firms affected by SFAS 123R have a more pronounced decline in corporate tax or financial reporting aggressiveness following SFAS 123R than firms not affected by SFAS 123R. These findings are consistent with Cohen et al. (2009) and Hayes et al. (2012) who examines changes in vega following SFAS 123R and the riskiness of firms' investment and financing policies (research and development, capital investments, leverage, and acquisitions). Hayes et al. (2002) and Cohen et al. (2010) fail to find consistent evidence that managerial risk taking decreases following SFAS 123R.

These findings are inconsistent with Chava and Purnanandam (2010) and Bakke et al. (2016) who examine changes in vega following SFAS 123R and the association with corporate financial policies (the former considers book leverage and debt; the latter, corporate hedging in the oil and gas industry). Chava and Purnanandam (2010) and Bakke et al. (2016) find evidence that managerial risk taking decreases following SFAS 123R.

The lack of evidence of decreased aggressiveness in tax and financial reporting in my study add to the mixed results from other studies using SFAS 123R as a natural experiment to evaluate the relation between vega and aggressive corporate financing and risk policies. As concluded by Hayes et al. (2012), understanding the effects of vega on managerial risk taking continues to be a challenge for empirical research.

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Chapter 1

Introduction

Executive compensation influences the behavior of managers, particularly with decisions involving risk. A number of empirical studies have examined the relationship between executive compensation and managerial risk taking. Despite a variety of research approaches, these studies provide evidence of a positive relationship between the sensitivity of executive compensation to stock price volatility and managerial risk taking. Specifically, these studies show that, when executive compensation is more sensitive to stock price volatility, firms implement riskier investment and financial policies and take more aggressive positions in financial and tax reporting.

The sensitivity of executive compensation to stock price volatility is largely due to stock option compensation. In 2005, a change in the accounting standards caused an exogenous shock to stock option compensation. Prior to this new accounting standard, Statement of Financial Accounting Standard 123R – Share-Based Payment (SFAS 123R), companies disclosed the stock option compensation in the footnotes of the financial statements but, in most cases, no expense was reported. Since SFAS 123R, companies report stock option compensation as an expense in the financial statements based on the grant date fair value. Because of SFAS 123R, firms began reducing stock option grants (Carter et al., 2007; Ferri and Sandino, 2009; Hayes et al., 2012; Skantz, 2012). Thus, after SFAS 123R, the structure of the executive compensation changed, resulting in fewer stock option grants and, consequently, executive compensation became less sensitive to stock price volatility. Since this change is unrelated to a manager's inherent risk aversion, SFAS 123R sets a natural experiment to examine the relationship between executive compensation and managerial risk taking.

Hayes et al. (2012) begin to address this issue by examining managerial risk taking in the form of investment and financial policy choices. However, they fail to find consistent evidence of a decrease in managerial risk taking after SFAS 123R despite the reduction in sensitivity of executive compensation to stock price volatility. Hayes et al. (2012) conclude that it "remains a challenge to understand the conditions under which convexity in compensation contracts affects managerial behavior." Using the introduction of SFAS 123R as a natural setting, this paper further explores the relationship between executive compensation and managerial risk taking, in the form of aggressive positions taken in financial and tax reporting.

The remainder of this paper is organized as follows. Chapter 2 reviews the literature and develops the hypotheses. Chapter 3 describes the sample selection and research design. Chapter 4 reports the results, and, finally, Chapter 5 concludes the paper.

Chapter 2

Literature Review

Literature Review for Hypotheses Development

This section provides a literature review for the hypotheses development, including information on the tax and financial reporting requirements for stock option compensation.

Executive Compensation and Managerial Risk Taking

Today's assumption that executive compensation provides incentives influencing the behaviors of executives arises from the accounting research of the 1970s. In 1976, Jensen and Meckling examine how best to align the interests of management with the interests of shareholders. In 1979, using a principal-agent model where the CEO takes unobservable actions, which affect observable outcomes, Holmstrom recommends using firm stock performance measures and firm accounting performance measures as proxies for unobservable actions. However, despite economic theories of a relationship between executive compensation and firm performance, early empirical efforts were largely unsuccessful in substantiating such a relationship until Murphy (1985). By examining each component of compensation separately, Murphy (1985) finds a positive relationship between executive compensation and firm accounting performance and between executive compensation and firm stock performance. Murphy (1999) further explains that aligning the interests of management with the interests of shareholders comes from explicit and implicit links. Executive compensation is explicitly linked to creating shareholder wealth when executives hold firm equity (e.g., stock or stock options) and is implicitly linked to firm stock performance when executive cash bonuses are based on

firm accounting performance. Murphy (1999) documents the origins of the variations in executive compensation in their explicit components.

The executive compensation disclosure rules of the Securities and Exchange Commission require managers to disclose many components of their annual compensation packages. These components include salaries, bonuses, stock grants, stock option grants, and long-term incentives. Salaries are fixed regular payments for professional services rendered. Bonuses are cash payments added to the salaries and determined by the achievement of a firm as measured by its sales, profit, cash flow, return on assets, etc. Stock grants are payments in the form of corporate stock. Grants of a firm's stock are often restricted. The transfer of the full ownership rights only occurs at the end of a period of future continued employment for a specific time (i.e., what counts is the lapse of time rather than the achievement of firm accounting or stock performance). Stock option grants provide the executives with the right to purchase the shares of the firm at a fixed price during a specific period. This fixed price, called the exercise price or the strike price, is usually the market value of the firm's stock at the time it authorizes the stock option. The specific period typically begins with a grant date, includes a vesting schedule based on a specific lapse of time, and ends with a fixed expiration date. Long-term incentive plans associate the compensation of the executives to the performance of the firm. These plans have a longer performance horizon (generally, 3 years or more) of firm accounting and/or stock performance and reward the executives with a combination of cash, stock, and stock options.

Each component of executive compensation acts as an incentive. Stock holdings (i.e., the current year stock grants and the prior year stock grants still held by the executives) are explicitly linked to the stock price because the firm's stock price determines the value of the stock holdings. As a result, stock holdings incentivize

executives to take actions to increase the firm's stock price. Likewise, stock option holdings (i.e., the current year stock option grants and the unexercised, unexpired prior year stock option grants) are also explicitly tied to stock price. However, stock price is only one determinant of the value of stock option holdings. Despite some limitations, the Black-Scholes (1973) valuation model assigns a value to the stock options granted to the executives. In addition to the stock price, the Black-Scholes valuation model includes the exercise price, the time to expiration, the risk-free rate, and the stock price volatility. As stock price volatility increases, the value of the stock option holdings also increases, which provides an additional incentive to the executives. Therefore, the stock option holdings incentivize the executives to take actions to increase the firm's stock price volatility as well.

Guay (1999) compares two CEOs with similar changes in stock price and similar changes in stock price volatility but with different composition of their holdings: one holding has a much higher value in stock and the other in stock options. Guay (1999) shows that changes in stock price affect the wealth of the two CEOs similarly but changes in stock price volatility have a greater impact on the wealth of the CEO holding more stock options and only a minimal impact on the wealth of the CEO holding more stock.

In summary, stock holdings and stock option holdings provide incentives for executives to take actions that potentially increase their firm's stock price. The accounting literature commonly measures this incentive as the sensitivity of executive compensation to changes in stock price and refers to this measure as "delta." The delta of stock equals one because an increase/decrease in stock price has a corresponding increase/decrease in the value of a share held by the executive. However, the delta of a stock option is less than one because an increase/decrease in the stock price results in a

smaller increase/decrease in the value of a stock option held by the executive since stock price is only one component considered in valuing stock options.

However, stock option holdings provide an additional incentive over stock holdings, which is to take actions that potentially increase their firm's stock price volatility. The accounting literature commonly measures this incentive as the sensitivity of executive compensation to changes in stock price volatility and refers to this measure as "vega." Stock holdings typically have a vega at or near zero.

Prior managerial risk taking literature has used a variety of executive compensation measures. In early studies, executive compensation measures focus on cash variable compensation, such as after-tax cash bonus plans and cash bonus percentages (Phillips, 2003). Consistent with Murphy (1999), the literature quickly expands to include equity based compensation. The literature examines measures like the number of shares/options granted/held, the in-the-money value of stock options held (i.e., the net cash received if stock options are exercised and the underlying shares are immediately sold), and the delta on shares/options granted/held (Chen and Warfield, 2005; Efendi et al., 2007; Burns and Kedia, 2006; Erickson et al., 2006; Jiang et al., 2010; Armstrong et al., 2012).

The studies examining these measures of executive compensation and managerial risk taking bring mix results until researchers introduce vega as an executive compensation measure (Coles et al, 2006; Rego and Wilson, 2012; Armstrong et al., 2013). Several studies focus on measures of firm risk as proxies for managerial risk taking. Using the oil and gas industry, Rajgopal and Shevlin (2002) find a positive association between vega and the exploration risk, the variation in expected future cash flows arising from exploration. Coles et al. (2006) find a higher vega associated with a higher risk investments (less investment in tangible assets such as property, plant, and

equipment, and more investment in intangible assets such as research and development), a higher firm risk (lower diversification or more concentrated market and industry focus) and a higher financial risk (more leverage).

Prior to Rego and Wilson (2012), empirical studies focusing on the relationship between corporate tax aggressiveness and executive compensation are few, and the results are mixed. Rego and Wilson (2012) explain that tax aggressiveness provides the potential benefits of increases in after-tax net income and increases in cash flow but that these benefits come with a cost. The cost can be the consulting fees for the tax-planning advice, the resources consumed in tax audits, the loss of reputation with the tax authorities, and the loss of reputation with the investors (Rego and Wilson, 2012). Because of the costs associated with tax aggressiveness, Rego and Wilson (2012) predict that vega motivates managers to undertake aggressive tax positions expected to generate net benefits for the firm and the shareholders. They explain that riskier tax positions increase the uncertainty of future tax outcomes, leading to greater dispersion in investor expectations and, thus, increased stock price volatility. Rego and Wilson (2012) propose that sensitivity of executive compensation to stock price volatility, vega, is a potential missing link in prior corporate tax aggressiveness research, and their research findings support the association between higher CEO vega and corporate tax aggressiveness.

Similarly, prior to Armstrong et al. (2013), accounting research examining the relationship between financial reporting aggressiveness and executive compensation used a variety of incentive measures. The measures included the number of stock and stock options holdings (Chen and Warfield, 2005), the intrinsic value of stock option holdings (Efendi et al., 2007), the value of stock and stock options current year grants (Cornett et al., 2008) and, most commonly, delta (Burns and Kedia, 2006; Erickson et al.,

2006, Jiang et al., 2010, Armstrong et al., 2012). Using these various measures, the findings of these prior studies are mixed. Armstrong et al. (2013) propose that financial misreporting is an example of a risky project affecting not only stock price but also stock price volatility. They extend prior research by showing that including vega in the model produces a consistently positive association between vega and financial misreporting and renders delta insignificant.

In summary, when examining the relationship between vega and managerial risk taking, prior research findings are significant and positive and hold across multiple proxies for managerial risk taking such as investment and financing policies, financial reporting aggressiveness, and corporate tax aggressiveness (Coles et al., 2006; Rego and Wilson, 2012; Armstrong et al., 2013). Therefore, the remainder of this paper focuses on stock option compensation and the related vega as the relevant measure of executive compensation.

Tax Reporting of Stock Options

For tax purposes, two types of stock options exist – qualified and nonqualified. Qualified stock options must meet specific requirements (e.g., type of recipients, exercise price, or waiting period) for favorable tax treatment (Internal Revenue Code Section 421 to 424). Qualified stock options are generally not taxable at the time of grant, vesting, or exercise. Instead, taxation occurs when selling the underlying stock that resulted from the stock option exercise. The sales price less the amount paid to exercise the stock option (i.e., exercise or strike price) is a capital gain to the employee. No corporate tax deduction exists for qualified stock options.

Nonqualified stock options are stock options that do not meet all the requirements of a qualified stock option. Nonqualified stock options are generally not

taxable at the time of grant or vesting. Taxation occurs at exercise and when the employee sells the underlying stock. At exercise, the market value of the stock less the amount paid to exercise (i.e., exercise or strike price) is taxed as compensation to the employee. At sale, the sales price less the exercise price less the amount taxed as compensation at exercise is a capital gain or loss to the employee. The corporate tax deduction at the time of exercise essentially equals the compensation amount taxed to the employee. No corporate tax deduction exists when the employee sells the underlying stock.

Qualified stock options became less popular in the early 1990s because of the convergence of the marginal tax rates for income and capital gains. As the number of firms providing stock option compensation to employees increased, many companies steered away from qualified stock options because of the higher costs (e.g., administrative, lack of corporate tax deduction, etc.) compared to nonqualified stock options. The remainder of this paper focuses on nonqualified stock options only.

Financial Reporting of Stock Options

Two terms commonly used when discussing the financial reporting of stock options are intrinsic value and fair value. The intrinsic value of a stock option is the market value of the stock less the related exercise price or strike price. A stock option with an exercise price equal to the market price of the underlying stock at the time of grant would have an intrinsic value of zero at grant date.

The fair value of a stock option is the estimated price the holder would receive upon a hypothetical sale and may be calculated using a variety of valuation tools, including Black and Scholes (1973). A stock option with an exercise price equal to the

market price of the underlying stock at the time of grant would have a positive fair value at grant because of the potential future stock price increases.

Since the fiscal years beginning after June 15, 2005, the Statement of Financial Accounting Standard 123R – Share-Based Payment (SFAS 123R) requires firms to report an expense in the firm financial statements for the fair value of stock options. The fair value of stock options is calculated at the date of grant and deducted as compensation expense pro-rata over the vesting period of the stock options. Between 1995 and 2005, the previous standard, Statement of Financial Accounting Standard 123 – Accounting for Stock-Based Compensation (SFAS 123) required firms to disclose the fair value of stock options at grant in the footnotes of their financial statements and provided them the flexibility to use either the intrinsic value or the fair value of the stock options for financial statement reporting. The firms that chose the intrinsic value of the stock options were typically not required to report an expense for financial accounting purposes because most stock options had an intrinsic value of zero. Instead, these firms were required to record stock options exercised to stockholder's equity. Prior to SFAS 123, Accounting Principles Board Opinion 25 (APO 25) required firms to report according to the intrinsic value rule. Firms were not required to disclose the fair value of the stock options in the footnotes prior to the promulgation of SFAS 123. This paper uses the term "stock option expensing" to represent a period where the stock options are reported as an expense equal to their fair value in the financial statements (i.e., voluntarily under SFAS 123 or mandatory under SFAS 123R).

Because of the differences in tax reporting and financial reporting of stock options in terms of amount and timing, the financial reporting implications of stock options extend beyond SFAS 123 and SFAS 123R to also include SFAS 109, Accounting for Income Taxes. Prior to stock option expensing, stock options were a stockholder's equity

transaction for financial reporting but an expense for tax purposes. Since the stockholders were recording the stock options as equity, they were also recording the related tax savings to the stockholder's equity instead of recording the savings as a reduction in income tax expense. (Appendix B provides an example including journal entries for the pre-stock option expensing period.)

After stock option expensing, the grant date fair value of the stock options becomes an expense for financial reporting pro-rata from grant to vesting. However, the related expense for tax purposes only occurs during the year of exercise. Thus, under SFAS 109, a deferred tax asset is recognized in the years from grant to vesting. The deferred tax asset represents the anticipated tax savings on unexpired, unexercised stock options. In the years from grant to vesting, the recording of the deferred tax asset results in a decrease to deferred income tax expense. Current income tax expense remains at the same level as if the stock option grant did not occur.

The deferred tax asset reverses in the year of exercise, resulting in an increase to deferred income tax expense, when the tax deduction and the actual tax savings occur. However, the amount of the actual tax savings and the amount recorded to the deferred tax asset typically differ. If the actual tax savings resulting from the stock option exercise is less than the amount recorded to the deferred tax asset, the difference is a tax shortfall. If the actual tax savings resulting from the stock option exercise is greater than the amount recorded to the deferred tax asset, the difference is a tax windfall. For financial reporting, tax shortfalls are an increase to current income tax expense. Tax windfalls are recorded to stockholder's equity (instead of reducing the current income tax expense) for financial reporting in 2016 (and in prior years). For fiscal years beginning after December 15, 2016, tax windfalls are a decrease to current income tax expense in accordance with the FASB Accounting Standards Update No. 2016-09. (Appendix C

provides a post-stock option expensing example including journal entries - scenario A is a tax shortfall and scenario C is a tax windfall.)

Impact of Stock Option Expensing on Executive Compensation

The accounting treatment of stock option compensation was more favorable before stock option expensing (i.e., intrinsic value) than after stock option expensing (i.e., fair value). Many studies have examined whether firms granted higher levels of stock options because of the favorable accounting treatment. These studies posed that if stock option granting practices remain unchanged after stock option expensing, the evidence would suggest that favorable accounting treatment had no bearing on executive compensation practices. However, if executive compensation practices changed, specifically if stock option grants declined, the evidence would suggest that favorable accounting treatment provided firms with incentives to grant higher levels of stock option compensation than would have been granted otherwise.

Research finds the latter to be the case for voluntary expensing under SFAS 123 and mandatory expensing under SFAS 123R. Using data from 1995 to 2001, Carter et al. (2007) find that, as firms begin to expense the fair value of stock options voluntarily, they begin to shift CEO equity compensation away from stock options and towards restricted shares. Similarly, Ferri and Sandino (2009) find a reduction in stock option utilization at the CEO level for firms that approved shareholder proposals to expense stock options in 2003 and 2004 voluntarily. Using data from 2002 to 2008, Hayes et al. (2012) find that the percentage of CEO compensation provided as stock option grants decreases and the percentage provided as long-term incentive awards increases following the implementation of SFAS 123R. Skantz (2012) finds the growth rate of CEO stock option compensation decreases and the growth rate of CEO restricted stock

compensation increases after stock option expensing. In summary, many firms decreased the use of stock options and increased the use of other forms of equity compensation (e.g., shares, restricted shares, or long-term incentives) after stock option expensing.

Hypotheses

As previously mentioned, a higher vega is associated with higher managerial risk taking (Coles et al, 2006; Rego and Wilson, 2012; Armstrong et al., 2013). However, some studies, with mixed results, explore the association between vega and managerial risk taking in the context of stock option expensing regulations. Hayes et al. (2012) fail to find significant evidence of changes in the riskiness of firms' investment and financing policies (including research and development, capital expenditures, and leverage) before and after stock option expensing. Likewise, Cohen et al. (2009) explore the association between vega and risky investments (i.e., research and development, capital investments, and acquisitions) and fail to find a significant association between vega and stock option expensing. However, they do find a negative association between vega and Sarbanes-Oxley (SOX). Chava and Purnanandam (2010) and Bakke et al. (2016) examine changes in vega around stock option expensing and corporate financial policies (the former considers book leverage and debt; the latter, corporate hedging in the oil and gas industry). Contrary to Cohen et al. (2009) and Hayes et al. (2012), both studies find significant, positive associations between the change in vega and the change in corporate financing and risk policies.

This study further explores the relationship between vega and managerial risk taking. With a focus on corporate tax aggressiveness and financial reporting aggressiveness, the study uses the environment created by the significant change in

stock option granting practices brought forth by stock option expensing. Examining the effect of changes in vega on managerial risk taking in the context of stock option expensing, rather than in the context of SOX, presents some advantages. The governance aspect of Sarbanes-Oxley may influence managerial risk taking independently of the changes in the structure of executive compensation. Stock option expensing and the associated changes in stock option practices affect vega but have no mandated effect on governance. In other words, expensing stock options should affect managerial risk taking only through its effect on vega. As a result, the stock option expensing provides a unique environment to examine the relationship between vega and managerial risk taking. This paper's focus on changes in corporate tax aggressiveness and financial reporting aggressiveness also complements the work of Hayes et al. (2012), Chava and Purnanandam (2010) and Bakke et al. (2016), which consider changes in the riskiness of corporate financing and investment policies following stock option expensing.

Empirical studies provide evidence that higher vega is associated with higher managerial risk taking (Coles et al, 2006; Rego and Wilson, 2012; Armstrong et al., 2013) and that vega declines following stock option expensing (Carter et al., 2007; Ferri and Sandino, 2007; Hayes et al., 2012; Skantz, 2012). By combining these two streams of literature, my hypotheses are as follows:

> H1: Firms affected by SFAS 123R will see a more pronounced decline in corporate tax aggressiveness following SFAS 123R than firms not affected by SFAS 123R.

H2: Firms affected by SFAS 123R will see a more pronounced decline in financial reporting aggressiveness following SFAS 123R than firms not affected by SFAS 123R.

Evidence of a more pronounced decline in corporate tax aggressiveness and/or financial reporting aggressiveness for firms impacted by SFAS 123R, if found, is interesting because it contradicts the findings of Hayes et al. (2012) for financing and investment choices and supports the findings of Chava and Purnanandam (2010) and Bakke et al. (2016). Likewise, lack of evidence is also interesting because, as concluded by Hayes et al. (2012), it questions whether the conditions under which managerial risk taking and vega are associated are fully understood. In either case, this paper allows for a better understanding of the relationship between managerial risk taking and executive compensation.

Literature Review for Measures Development

This section provides a literature review for the measures of corporate tax aggressiveness and financial reporting aggressiveness used in prior studies. Chapter 3 provides the measures used in this study.

Corporate Tax Aggressiveness

Corporate tax aggressiveness is one proxy for managerial risk taking. For some, tax planning is any activity that reduces the firm's income taxes (Slemrod, 2004; Dyreng et al., 2008). However, other empirical research further refines the definition to better capture aggressive tax planning in terms of tax risk or tax compliance. Tax risk is the level of uncertainty regarding the outcome of a tax-planning activity and the costs

associated with said activity (e.g., professional fees, financial penalties, or reputational penalties) (Blouin, 2014). Tax compliance is the production and submission of tax information and payment to the relevant tax authorities properly and on time. Hanlon and Heitzman (2010) discuss the concept of aggressiveness in tax planning by explaining that those activities fall along a continuum of tax compliance. Activities that are clearly within the scope of tax legislation, such as investing in municipal bonds that provide tax-exempt interest, fall on one end of the continuum. On the other end of the continuum are activities clearly disallowed by tax legislation, such as deducting expenses that did not occur or failing to report revenue that did occur. These disallowed activities are difficult to observe until challenged by the tax authorities. However, most tax-planning activities fall somewhere between the two extremes, and where, along the continuum, tax-planning activities should be labeled aggressive is a challenge.

Perhaps because of these challenges, prior research uses a variety of proxies to measure corporate tax aggressiveness. Tax returns and financial statements are two main sources of tax data. Tax return data is unavailable publicly; therefore, most studies, including this paper, use income tax disclosures from financial statements. In the corporate tax aggressiveness literature, income taxes are typically cash income taxes paid, current income tax expense, or total income tax expense, as discussed below.

Cash income taxes paid is the sum of payments (refunds) of income tax made (received) during the current period without regard to which period the payments (refunds) relate. Current income tax expense is income tax resulting from taxable income in the current period, with a few exceptions noted in Appendix D (i.e., stock option compensation and uncertain tax benefits). Total income tax expense is the sum of current income tax expense and deferred income tax expense. Deferred income tax

expense is future income tax consequences of items included in the current period's pre-tax accounting income that will not be included in taxable income until a future period.

To determine which definition of income tax should be used when measuring corporate tax aggressiveness, considering how different activities impact the various definitions of income taxes is helpful. First, activities can affect income taxes by influencing pre-tax accounting income and taxable income concurrently.

Second, activities can create differences between pre-tax accounting income and taxable income. These differences are book-tax differences. A temporary book-tax difference captures differences in the timing (not the amount) of income or deductions for pre-tax accounting and taxable income over the life of the firm. For example, the book-tax difference arising from different depreciation methods (e.g., straight-line for accounting purposes or accelerated for tax purposes) is temporary because differences are observed each year but the total depreciation expense over the life of the asset is the same for both accounting and tax purposes. I refer to any book-tax difference that is not temporary as a permanent book-tax difference. A permanent book-tax difference captures differences in the amount of income or deductions recognized in pre-tax accounting income versus taxable income when observed over the life of the firm. An example of a permanent book-tax difference is the tax-exempt interest income from municipal bonds. The book-tax difference arising from tax-exempt interest income is permanent because the interest income must be reported in pre-tax accounting income but will never be reported in taxable income.

Third, tax planning can affect income taxes through tax rates or tax credits without influencing pre-tax accounting income or taxable income. Transfer pricing, for example, often moves income from a high tax rate jurisdiction to a low tax rate jurisdiction through selective pricing of goods and services sold between subsidiaries within a

multinational firm. Although the income for the total firm remains unchanged, shifting income from high to low tax rate jurisdictions can reduce the total income taxes for the firm. For the purposes of this paper, I refer to these types of activities as having "below taxable income impact," which visually represents the order on a U.S. income tax return (i.e., the tax liability and tax credits are below the line for taxable income).

In general, activities that have "below taxable income impact" and/or result in permanent book-tax differences reduce cash income taxes paid, current income tax expense, and total income tax expense by the same amount but have no impact on deferred income tax expense. Activities that result in temporary book-tax differences are more complex than those that result in "below taxable income impact" and permanent book-tax differences. Temporary book-tax differences are future taxable or future deductible amounts. Income taxes related to future taxable amounts and future deductible amounts appear on the balance sheet as deferred tax assets and deferred tax liabilities. Changes in deferred tax assets and deferred tax liabilities during the year are recorded to deferred income tax expense because the underlying income (or deduction) is reported in current financial income whereas the taxable income consequences will occur in the future. (Appendix E demonstrates the impact that a temporary difference has on various definitions of income taxes.) Income taxes on temporary book-tax difference appear as deferred income tax expense resulting in a corresponding increase/decrease in total income tax expense each year. However, because of the reversing nature of temporary differences, total income tax expense over the life of the temporary difference will be the same amount as if there were no temporary book-tax difference.

Deciding which tax-planning activities should be considered aggressive and measuring them appropriately are challenges when discussing proxies for corporate tax

aggressiveness. The most common proxies for corporate tax aggressiveness from prior literature are book-tax differences (Desai and Dharmapala, 2006; Wilson, 2009; Frank et al., 2009), effective tax rates (Phillips, 2003; Gaertner, 2014; Armstrong et al., 2012), tax sheltering (Graham and Tucker, 2006; Wilson, 2009; Lisowsky, 2010) and uncertain tax positions (Rego and Wilson, 2012; Armstrong et al., 2015).

Book-Tax Differences

Book-tax differences are one proxy for corporate tax aggressiveness used in prior research (Desai and Dharmapala, 2006; Frank et al., 2009; Rego and Wilson, 2012; Armstrong et al., 2012) because tax-planning activities reduce taxable income relative to pre-tax accounting income. Generally, larger book-tax differences, where book income exceeds taxable income, provide evidence of aggressive tax planning. Prior research provides two basic measures of book-tax differences: total book-tax differences and discretionary permanent book-tax differences.

Total book-tax differences

Total book-tax differences are typically measured as pre-tax accounting income (Compustat pi) less estimated taxable income, scaled by total assets (Compustat at) lagged by one year. Estimating taxable income is challenging because, as mentioned previously, taxable income does not appear in financial statements and because tax return data is not publicly available. Taxable income is usually estimated using information disclosed in financial statements and the marginal statutory income tax rate. The most basic estimate of taxable income is to gross-up the current U.S. federal income tax expense (Compustat txfed) by dividing by the marginal statutory U.S. federal income tax rate (i.e., 35% for my sample period). I refer to the current U.S. federal income tax

expense (Compustat txfed) as “current U.S. income tax expense” and to the statutory U.S. federal income tax rate (35% for my sample period) as “statutory U.S. tax rate” for the remainder of this paper.

Estimating taxable income using the above gross-up calculation raises several concerns. The first concern arises from using the statutory U.S. tax rate to gross-up the current U.S. income tax expense. Estimated taxable income is understated (overstated) for firms that have an actual U.S. tax rate lower (higher) than the statutory U.S. tax rate. Nevertheless, research commonly use the statutory U.S. tax rate to calculate the gross-up of income tax expense in research (Hanlon, 2003) because of a limited availability of data.

Second, current U.S. income tax expense is a poor estimator of a firm’s actual tax liability because of foreign income, tax loss carryforwards, and stock option compensation.

Foreign entities consolidated for financial reporting purposes are not always consolidated for tax purposes. Pre-tax accounting income can include foreign income subject to foreign tax but not to U.S. tax. However, the current U.S. income tax expense does not include foreign taxes. Frank et al. (2009) address this concern by adding current foreign income tax expense (Compustat txfo) to the current U.S. income tax expense then dividing the sum by the statutory U.S. tax rate. This adjustment treats foreign income as if taxed at a foreign tax rate equal to the statutory U.S. tax rate. Because foreign income tax rates are generally lower than the statutory U.S. tax rate (Armstrong et al., 2012), this approach improves the accuracy of the estimated taxable income by including foreign income, but the accuracy is likely to remain understated. An alternative approach (Armstrong et al., 2012) is to estimate taxable income by adding pre-tax foreign income (Compustat pifo) and estimated U.S. taxable income (Compustat

txfed divided by 0.35). As Armstrong et al. (2012) discuss, both estimating procedures assume that no foreign book-tax differences exist (i.e., that foreign taxable income is equal to foreign pre-tax accounting income).

Tax losses that cannot be used in the current year or carried back to prior years may be carried forward and used to offset taxable income in future years. In a year when a firm generates a tax loss, the current U.S. income tax expense is very likely equal to zero or negative, representing previously paid taxes that are expected to be refunded. The anticipated tax saving related to the tax loss carryforward is recorded as a deferred tax asset (equal to, approximately, Compustat tlcf * statutory U.S. tax rate) and reduces the deferred U.S. income tax expense (Compustat txdfed). In the future, when the tax loss carryforward is used, the current U.S. income tax expense decreases and the deferred U.S. tax expense increases because of the reversal of the deferred tax asset. Because the estimate of taxable income is a gross-up of the current U.S. income tax expense, the estimated taxable income is overstated in the year a tax loss carryforward is generated and understated in the years the tax loss carryforward is utilized. For this reason, prior research (Wilson 2009) estimates taxable income as the gross-up of current U.S. income tax expense and then subtracts any changes in tax loss carryforwards (Compustat tlcf).

Financial reporting and tax reporting account for stock option compensation differently. However, because of special accounting regulations for stock option compensation, the current U.S. income tax expense does not accurately reflect a firm's actual U.S. tax liability.

Prior to stock option expensing, stock option compensation resulted in a permanent book-tax difference in the year of exercise (i.e., a deduction for tax purposes but no deduction for book purposes). However, the tax savings related to stock options

did not reduce the current U.S. income tax expense. As shown in Appendix C, the current U.S. income tax expense is $20 in the year of exercise under all scenarios; whereas, the income tax payable is $16-$18 in the year of exercise, depending on the intrinsic value of the stock options. The tax savings on stock option compensation in year of exercise (i.e., $2-$4, depending on the scenario) is recorded to stockholder's equity, specifically additional paid-in capital.

After stock option expensing, stock option compensation results in a temporary book-tax difference during the vesting period, which reverses in the year of exercise. The temporary difference occurs because the grant date fair value is deducted pro-rata over the vesting period for book purposes, and the deduction for tax reporting occurs only at the exercise date. Additionally, a permanent book-tax difference will usually arise in the year of exercise. The permanent difference arises because the tax savings in year of exercise will almost certainly differ from the deferred tax asset established during the vesting period. (The deferred tax asset is based on the grant date fair value; whereas, the tax deduction is equal to the intrinsic value at exercise.) The current U.S. income tax expense in the year of exercise is reduced by the actual U.S. tax savings to the extent that those tax benefits were anticipated (i.e., the deferred tax asset established during the vesting period). Any windfall tax benefits above the amount anticipated are recorded to additional paid-in capital. Any shortfall in tax savings increases the current U.S. income tax expense. In Appendix C, in all three scenarios, $3 of the tax savings was anticipated via the deferred tax asset and reduced the current income tax expense; whereas, in Scenario C, $1 of the tax savings is not anticipated (tax windfall) and is recorded to additional paid-in capital rather than reducing the current U.S. income tax expense.

Appendix F demonstrates that the calculation of the total book-tax differences includes the temporary book-tax differences on stock option compensation but ignores

the permanent book-tax difference (i.e., the additional tax savings on stock option exercises). In summary, the complications from stock option compensation for estimating the total book-tax differences occur when the tax consequences are recorded to additional paid-in capital at exercise rather than reducing the current U.S. income tax expense. In the pre-stock option expensing regime, the remedy is to reduce the current U.S. income tax expense by the tax benefit recorded in additional paid-in capital. In the post-stock option expensing regime, the remedy is the same – to reduce the current U.S. income tax expense by the tax benefit recorded in additional paid-in-capital (i.e., tax windfall). Unfortunately, the information necessary to make these adjustments is not readily available for all years. Armstrong et al. (2012) state that the additional tax savings on stock option compensation is not related to aggressive tax planning and, therefore, can be disregarded.

Additionally, Frank et al. (2009) point out that the total book-tax differences include several nondiscretionary items or statutory items not related to corporate tax aggressiveness. Frank et al. (2009) narrow the focus to discretionary permanent book-tax differences as their proxy for corporate tax aggressiveness.

Discretionary permanent book-tax differences

Frank et al. (2009) first calculate permanent book-tax differences. They estimate the total book-tax differences (pre-tax accounting income less estimated U.S. and foreign taxable income), subtract temporary book-tax differences (Compustat txdi divided by .35), and scale the result by lagged total assets.

Focusing on permanent book-tax differences also solves the issue of comparability between the pre- and post- stock option expensing periods that exists for total book-tax differences. Frank et al. (2009) do not mention this advantage because all

the years of their sample are pre-stock option expensing. Appendix F shows that the total book-tax differences are lower during the years of vesting (i.e., -$5 versus $0) and higher in the year of exercise (i.e., $15 versus $0) in the post-stock option expensing period compared to the pre-stock option expensing period. If the total book-tax differences are a proxy for corporate tax aggressiveness, the change in the total book-tax differences would be viewed as a change in corporate tax aggressiveness when, in reality, it is the result of changes in accounting regulations unrelated to corporate tax aggressiveness. Appendix F also shows that the permanent book-tax differences are comparable between the pre- and post-stock option period periods.

To narrow the focus from all the permanent book-tax differences to those that are discretionary, Frank et al. (2009) regress permanent book-tax differences on six independent variables, which result in permanent book-tax differences that are unrelated to corporate tax aggressiveness. The six independent variables, identified in prior research, are changes in tax loss carryforwards, state income taxes, intangibles, equity method investments, non-controlling interests (aka, minority interests), and lagged permanent book-tax differences. All six independent variables, calculated as described below, are scaled by total assets lagged by one year. The residual of this regression equation is their proxy for corporate tax aggressiveness.

The first independent variable is tax loss carryforwards. Tax losses that cannot be utilized in the current year or carried back to prior years may be carried forward to offset taxable income in future years. As discussed earlier, the estimated taxable income is overstated in the year a tax loss carryforward is generated and understated in the years the tax loss carryforward is utilized. Because tax loss carryforwards are not a typical book-tax difference, some tax researchers adjust the estimated taxable income for the change in the tax loss carryforward (Wilson, 2009). However, Frank et al. (2009)

view tax loss carryforwards as a permanent book-tax difference unrelated to corporate tax aggressiveness. Thus, they include the change in the tax loss carryforward (Compustat tlcf) as an independent variable in their model.

State income taxes are treated differently for accounting and tax purposes resulting in permanent book-tax differences that are not normally associated with corporate tax aggressiveness (Frank et al., 2009). State income tax expense is a deduction to arrive at a taxable income on the tax return, which results in a lower current income tax expense, the basis for estimating taxable income. On financial statements, state income taxes are included in income tax expense and, therefore, deducted below pre-tax accounting income. Because pre-tax accounting income does not include a deduction for state income tax expense but estimated taxable income does include a deduction, state taxes are captured in the calculation of the permanent book-tax differences. To remove this non-discretionary element from the permanent book-tax differences, Frank et al. (2009) use the current state income tax expense (Compustat txs) as an independent variable in their model.

Intangibles are often recorded differently for accounting and tax purposes resulting in permanent book-tax differences, and these differences are not typically related to corporate tax aggressiveness (Frank et al., 2009). Using goodwill as an example, several differences emerge, and those differences vary over time with the changes in tax regulations and accounting standards. In 1993, the tax legislation stopped allowing a deduction of goodwill amortization. However, the deduction of goodwill amortization was not eliminated for financial accounting purposes until 2002 with the implementation of SFAS 142, Goodwill and Other Intangibles. Frank et al. (2009) capture this nondiscretionary permanent book-tax difference through the inclusion of the

balance sheet account, intangibles (Compustat intan), as an independent variable in their model.

Investments in entities with less than 100 percent ownership are subject to different consolidation rules for accounting and tax purposes. The entities included in the pre-tax accounting income and the estimated taxable income are generally the same because of the method used to estimate taxable income in empirical research. However, these investments are often recorded differently for accounting and tax purposes resulting in permanent book-tax differences, and these differences are not typically related to corporate tax aggressiveness (Frank et al., 2009). For financial accounting, an investment can be recorded under three approaches - fair value, equity method, or consolidation. The fair value approach (generally for investments of less than 20 percent) recognizes dividend income, unrealized holding gains/losses, and gains/losses at sale. The equity method (generally for investments between 20 percent and 50 percent) recognizes the ownership percentage of the other entity's net income as a one line item. Consolidation (generally for investments of more than 50 percent) recognizes 100 percent of the other entity's revenue and expenses then, after income from continuing operations, deducts the other entity's after-tax net income attributed to the percentage of the entity not owned. The consolidated entity is reported on the parent's books before consolidation under the cost or equity method. For tax reporting, consolidation is a choice only available for investments in domestic entities where the ownership interest is at least 80 percent. The independent variable for equity method investments is the firm's portion of unremitted earnings from an unconsolidated subsidiary (Compustat esub). The independent variable for non-controlling interests is the consolidated subsidiary's income not attributable to the parent (Compustat mii).

The last control variable of the Frank et al. (2009) model is the permanent book-tax differences lagged by one year. This captures the permanent book-tax differences that are persisting through time (e.g., tax-exempt interest income or tax credits).

Effective Tax Rates

Another proxy for corporate tax aggressiveness from prior literature is effective tax rates, the ratio of income taxes to pre-tax accounting income. The definitions of income taxes and pre-tax accounting income are below. Essentially, effective tax rates measure the average rate of tax per dollar of earnings (Hanlon and Heitzman, 2010). The theory for using effective tax rates as a proxy for corporate tax aggressiveness is that tax planning reduces income tax relative to pre-tax accounting income (Rego, 2003). Prior research provides two basic measures of effective tax rates, Cash ETR and GAAP ETR, and two variations, standard deviation and industry/size adjusted, in an attempt to capture tax aggressiveness.

Cash ETR and GAAP ETR

Prior research provides two basic measures of effective tax rates – Cash ETR and GAAP ETR. The most commonly used denominator for the effective tax rate ratio is the pre-tax accounting income (Compustat pi) either unadjusted or adjusted to the amount before consideration of special items (Compustat spi). Special items are significant non-recurring items (e.g., restructuring charges, gains/losses on sales, charges related to natural disasters, litigation contingences, goodwill impairments, or inventory write-downs). Because special items may or may not have a tax impact (Dyreng et al., 2008), the decision to use unadjusted pre-tax accounting income or to adjust for special items is open to debate. Dyreng et al. (2008) state that an adjustment

for special items is needed to reduce volatility in a single year effective tax rate. However, Dyreng et al. (2008) examine whether one-year effective tax rates are representative of longer-term effective tax rates. Armstrong et al. (2012), who do not adjust for special items, perform an analysis on special items, find most special items income decreasing, and explain that adjusting pre-tax accounting income to the amount before special items produces consistently lower ETRs.

Two commonly used numerators for the effective tax rate ratio exist – cash income taxes paid (Compustat txpd) and total income tax expense (Compustat txt). When cash income taxes paid is the numerator, it is called Cash ETR. When total income tax expense is the numerator, it is called GAAP ETR. There are advantages and disadvantages to using GAAP ETR versus Cash ETR as a proxy for corporate tax aggressiveness. A main disadvantage of Cash ETR is a mismatch in timing because the numerator, cash income taxes paid, is a cash-based measure and the denominator, pre-tax accounting income, is an accrual-based measure (Blouin, 2014). For GAAP ETR, the numerator, total income tax expense, and the denominator, pre-tax accounting income, are both accrual-based measures. However, as Dyreng et al. (2008) point out, with GAAP ETR, the accounting accruals affect total income tax expense (e.g., valuation allowances for deferred tax assets not likely to be realized, uncertain tax benefits not likely to be upheld, etc.), which introduces management discretion in the numerator of GAAP ETR, a disadvantage.

In addition to defining the numerator and denominator of the effective tax rate ratio, two other issues require consideration: the number of years and the comparability between periods (pre- and post-stock option expensing periods). Prior research considers a variety of time periods ranging from one year to ten years. Multi-year ETRs are typically calculated by adding the numerator for all years in the multi-year period and

the denominator for all years in the same multi-year period then dividing the sums. This is done because averaging one year ETRs can overweight or underweight years with unusually high or low ETRs (Dyreng et al., 2008).

As with the book-tax differences, changes in accounting regulations also create comparability issues between the pre- and post-stock option expensing periods for effective tax rates. Appendix G shows that Cash ETR is higher during the years of vesting (i.e., 21 percent versus 20 percent) in the post-stock option expensing period compared to the pre-stock option expensing period. The numerator of the Cash ETR remains the same, so the difference is in the pre-tax accounting income. Cash ETR is the same in the year of exercise (i.e., 17 percent or 16 percent depending on the scenario) when comparing the two periods. If Cash ETR is a proxy for corporate tax aggressiveness, the increase in Cash ETR in the vesting period would be viewed as a decrease in corporate tax aggressiveness when, in reality, it is the result of changes in accounting regulations unrelated to corporate tax aggressiveness. Appendix G also shows that GAAP ETR is comparable between the pre- and post-stock option period periods for during vesting and year of exercise.

To neutralize the effect of the change in accounting regulations for Cash ETR, Armstrong et al. (2012) suggest adjusting the numerator, cash income taxes paid. They add cash income taxes paid and the tax benefit of stock options from the statement of cash flows, operating section (Compustat txbco) and financing section (Compustat txbcof), to arrive at the numerator. Essentially, the adjusted numerator is an estimate of the income tax that would have been paid had there been no stock option exercises during the year. The cash flow data necessary to make this adjustment is available in Compustat starting in 2005, so Armstrong et al. (2012) hand collected the data for all prior years.

GAAP ETR adjusted for industry and firm size

Some industries have a lower ETR because of the nature of the industry not because of corporate tax aggressiveness (Armstrong et al., 2015). Armstrong et al. (2015) calculate GAAP ETR adjusted for industry and firm size. They calculate the differential of a firm's three-year GAAP ETR relative to a peer group of firms of similar size and industry as their proxy for corporate tax aggressiveness. They define similar size and industry as firms in the same quintile of total assets within the same Fama-French 48 industry.

Cash ETR standard deviation

Blouin (2014) focuses on tax-planning uncertainty and suggests that, when a firm has a high level of uncertainty in its tax-planning activities, the firm's income tax payments are more volatile. She calculates the standard deviation of the firm's one-year Cash ETRs over the sample period as a proxy for corporate tax aggressiveness.

Uncertain Tax Benefits

Uncertain tax benefits are a third proxy for corporate tax aggressiveness used in prior research (Rego and Wilson, 2012; Blouin, 2014; Armstrong et al., 2015). Uncertain tax benefits are accruals of income tax expense representing additional tax liabilities expected if tax authorities challenge and overturn tax positions taken on the firm's tax return. FASB Interpretation No. 48 (FIN 48) provides guidance for accounting for uncertainty in income taxes not addressed in SFAS 109, Accounting for Income Taxes, and is effective for the fiscal years beginning after December 15, 2006. Under FIN 48, if a firm's tax position would be "more likely than not" upheld upon examination of the tax authorities, a tax benefit may be recognized in the financial statements through a

reduction of current income tax expense (or deferred income tax expense if the uncertainty is specifically related to a timing difference). If a tax position is evaluated and fails to meet the "more likely than not" test, current/deferred income tax expense is not reduced, and a liability, often referred to as a FIN 48 liability, must be reported and disclosed in the financial statements.

For sample periods after the implementation of FIN 48, empirical research measure uncertain tax benefits at the end of the financial reporting period (Compustat txtubend) scaled by total assets (Blouin, 2014; Armstrong et al., 2015). Because FIN 48 was not in effect for the entire sample period, Rego and Wilson (2012) estimate uncertain tax benefits. Using a prediction model from a working paper (Cazier et al., 2009) and hand-collected data, Rego and Wilson (2012) estimate coefficients on the separate group of firms and apply those coefficients to observations in their sample to estimate uncertain tax benefits.

Financial Reporting Aggressiveness

Financial reporting aggressiveness is another proxy for managerial risk taking. Deciding which financial reporting activities should be considered aggressive and measuring them appropriately are challenges for empirical studies. From prior literature, the most common proxies for financial reporting aggressiveness are discretionary accruals (Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Larcker et al., 2007; Cornett et al., 2008; Jiang et al., 2010; Armstrong et al., 2013), accounting restatements (Burns and Kedia, 2006; Efendi et al., 2007; Larcker et al., 2007; Cheng and Farber, 2008; Armstrong et al., 2010), litigation (Armstrong et al., 2010; Jayaraman and Milbourn, 2015), and SEC accounting and auditing enforcement releases (Erickson et al., 2006; Feng et al., 2011).

Accruals Management

Accruals management is one proxy for financial reporting aggressiveness used in prior research (Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Larcker et al., 2007; Cornett et al., 2008; Jiang et al., 2010; Armstrong et al., 2013). Accruals capture the difference between the firm's cash flow and reported earnings (Bergstresser and Philippon, 2006). Accruals management is a proxy for financial reporting aggressiveness because firms exercise discretion when recording accruals and that discretion can be used to manage reported earnings upward or downward. Generally, larger accruals provide evidence of aggressive financial reporting. Prior research provides two basic measures of accruals management: total accruals and discretionary accruals.

Total accruals

Total accruals are the difference between earnings and cash flow from operations. Using a balance sheet approach, early empirical studies estimate total accruals as the change in current assets (Compustat act), less the change in current liabilities (Compustat lct), less the change in cash (Compustat che), plus the change in long-term debt reported in current liabilities (Compustat dlc), less the depreciation and amortization expense (Compustat dp), and the result is scaled by total assets (Compustat at) lagged by one year (Healy, 1985; Dechow et al., 1995). Because non-operating events (e.g., mergers and acquisitions, divestitures, foreign currency translations, etc.) impact current assets and current liabilities but do not impact income and expenses, these events introduce measurement errors into the estimated total accruals when using the balance sheet approach (Hribar and Collins, 2002). Using a cash flow approach,

Hribar and Collins (2002) estimate total accruals as earnings before extraordinary items and discontinued operations (Compustat ibc), less operating cash flows from continuing operations (Compustat oancf), and the result is scaled by total assets (Compustat at) lagged by one year.

However, because a portion of total accruals is related to the economic circumstances of the firm (Kaplan, 1985), most empirical studies narrow the focus from total accruals to discretionary accruals as a proxy for financial reporting aggressiveness.

Discretionary accruals

Discretionary accruals are total accruals less non-discretionary accruals. Jones (1991) estimate non-discretionary accruals as the accruals normally expected based on the firm's economic situation. The Jones (1991) model regresses total accruals on changes in sales revenue (Compustat sale) and gross property, plant, and equipment (Compustat ppegt). Changes in sales revenues consider the changes in working capital necessary to support the changes in sales revenue. Property, plant, and equipment consider the expected depreciation expense. Both independent variables are scaled by total assets (Compustat at), lagged by one year. The residual of this regression equation is the estimated discretionary accruals.

Prior literature suggests several modifications to the Jones (1991) model. Two of these modifications are Dechow et al. (1995) and Kothari et al. (2005). Dechow et al. (1995) point out that executives may exercise discretion over credit sales by offering different credit terms. They modify the Jones (1991) model by subtracting the changes in accounts receivable (Compustat rect) from the changes in sales revenue.

Using two approaches, Kothari et al. (2005) demonstrate the importance of controlling for firm performance when estimating discretionary accruals. For performance

adjusted discretionary accruals, they add return on assets (Compustat ni divided by lagged total assets) as a third independent variable in the Jones (1991) model and in the modified Jones model. For performance-matched discretionary accruals, also using the Jones (1991) model or the modified Jones model, they calculate the difference of the firm's estimated discretionary accrual less the estimated discretionary accrual of a matching firm in the same industry with the closest return on assets.

Accounting Restatements

Accounting restatements are another proxy for financial reporting aggressiveness used in prior research (Burns and Kedia, 2006; Armstrong et al., 2010; Armstrong et al., 2013). When previously issued financial statements include material inaccuracies, the firm is required to revise and republish its financial statement to correct the inaccuracy. Restatements cover a wide variety of issues ranging from fraud to disagreements over the application of GAAP (Erickson, Hanlon, and Maydew, 2006) and include changes in accounting practices, mergers and acquisitions, stock splits, or errors (Burns and Kedia, 2006). Not all reasons for restatements stem from aggressive financial reporting.

Based on firm disclosures or subsequently issued SEC accounting and auditing enforcement releases (AAER), Palmrose et al. (2004) provide evidence that controlling for the type of restatement can have substantial impact on stock market reactions to restatements. Similarly, Hennes et al. (2008) classify restatements as irregularities when the firm's restatement announcement mentions irregularity or fraud. In addition, they classify restatements as irregularities when the restatement is associated with an investigation (e.g., Securities and Exchange Commission, U.S. Department of Justice, or another independent group such as an audit committee or a forensic firm) when evaluating the association of restatements and executive turnover. Armstrong et al.

(2013) and Burns and Kedia (2006) use restatements as a proxy of financial reporting aggressiveness and restrict their samples to restatements from irregularities. Burns and Kedia (2006) assume all restatements included in the General Accounting Office reports are due to irregularities but Hennes et al. (2008) do not support this assumption. Armstrong et al. (2013) restrict their sample to fraud and SEC investigations by using AuditAnalytics' restatement reasons.

The data sources for those restatements have varied in prior literature: from searches in the Lexis-Nexis databases (Palmrose et al., 2004; Burns and Kedia, 2006), in the General Accounting Office (GAO) reports (Burns and Kedia, 2006; Efendi et al., 2007; Cheng and Farber, 2008), in the SEC Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database (Hennes et al., 2008), via consulting or advisory firms (Larcker et al., 2007; Armstrong et al., 2010), and in the Audit Analytics database (Armstrong et al., 2013).

In many of the studies cited above, the absence or presence of restated financial statements determines the placement of a firm in a control or treatment group (Efendi et al., 2007; Larcker et al., 2007; Cheng and Farber, 2008). In other studies, the focus is exclusively on firms that restated their financial statements, so whether the restatements involve fraud or not determines the placement in the control or treatment group (Palmrose et al., 2004; Hennes et al., 2008). The financial reporting aggressiveness studies of Burns and Kedia (2006) and Armstrong et al. (2013) use an indicator variable for restatements that is equal to 1 if the financial statements for the respective firm-year observation were restated because of irregularities.

Chapter 3

Sample Selection and Research Design

Sample

The sample comprises executive compensation data from Execucomp for the years 2004 to 2007 (Execucomp year) for CEOs (Execucomp ceoann) with total compensation greater than zero (Execucomp tdc1). I delete firm-year observations that do not have sufficient data to calculate delta and vega on current year equity grants and equity holdings. The calculation of delta and vega is discussed below. Next, I add firm financial data from Compustat to the sample and delete the following: financial firms (Compustat sich = 6000 to 6999), regulated utility firms (Compustat sich = 4900 to 4999), firm-year observations with total assets or lagged total assets of less than $1 million (Compustat at), firm-year observations with pre-tax accounting income equal to zero (Compustat pi), firm-year observations that have insufficient data to calculate the proxies for corporate tax aggressiveness, specifically pre-tax accounting income, income taxes paid, and total income tax expense (Compustat pi, txpd, and txt) and firm-year observations that have insufficient data to calculate discretionary accruals, a proxy for financial reporting aggressiveness. I also add stock return information from The Center of Research in Security Prices. I require firm-year observations for all four years, 2004 to 2007, for each firm to be included in my sample. My sample includes 907 firms with 3,628 firm-year observations.

SFAS 123R took effect in the fiscal years beginning after June 15, 2005. Therefore, financial statements for firms with a full twelve-month fiscal year ending June 15, 2006 and later are reported in accordance with SFAS 123R. In Compustat, firms with fiscal year ends from January to May 2006 are assigned to Compustat fyear 2005, and firms with fiscal year ends from June to December 2006 as assigned to Compustat fyear

2006. Since firms typically use the last day of a month as their fiscal year end, I do not need to be too concerned about fiscal years ending June 1 to June 14. Therefore, Compustat fyear provides an accurate way to separate firm-year observations into pre- and post-SFAS 123R periods. Hayes et al. (2012) define fiscal year 2005 as the first year in the post-SFAS 123R period explaining that this allows for changes in compensation structures that firms may have implemented in anticipation of SFAS 123R. I have chosen to stay with the actual implementation date of SFAS 123R because my data shows only a moderate decline in stock option grants in 2005 in anticipation of the upcoming regulation changes. For my sample, I create a dummy variable, SFAS123R, and set it equal to 1 for firm-year observations with a fiscal year (Compustat fyear) of 2006 and 2007 and 0 otherwise (i.e., Compustat fyear 2004 and 2005).

Bakke et al. (2016) use the implementation of SFAS 123R as a natural experiment and create a control group by identifying firms likely to be unaffected by the implementation of SFAS 123R. Their control group consists of two subgroups of firms – firms that did not grant stock options in the pre-SFAS 123R period of their sample and firms that began voluntarily expensing stock options, under SFAS 123, prior to the first year in their sample period. Following Bakke et al. (2016), I identify firms in my sample that did not grant stock options (Execucomp socomp) to the CEO from 2004 to 2005. Additionally, following Bakke et al. (2016), I identify firms in my sample that voluntarily expensed stock options beginning prior to 2004. To establish the first year a firm expensed stock options, I follow Skantz (2012) and take the earlier of the adoption date reported by Bear Sterns (McConnell et al., 2004) and the first Compustat firm-year observation indicated as expensing stock options (Compustat stkco-fn). I designate these two subgroups of firms as my control group. I create a dummy variable, TREATMENT, and set it equal to 0 for the firms in the control group and 1 otherwise. My

sample of 907 firms with 3,628 firm-year observations consists of a control group of 195 firms with 708 firm-year observations and a treatment group of 712 firms with 2,848 firm-year observations. My control group of 195 firms consists of 129 firms that did not grant stock options from 2004 to 2005, 53 firms that voluntarily expensed stock options prior to 2004, and 13 firms that meet both criteria.

Executive Compensation Variable Definitions

The hypotheses in this paper build on the findings that risk-taking incentives are associated with managerial risk taking (Coles et al., 2006; Rego and Wilson, 2012; Armstrong et al., 2013). As discussed in Chapter 2, vega is a widely-used proxy for risk-taking incentives, and the results show a positive association between vega and managerial risk taking. Vega measures the sensitivity of executives' compensation to changes in stock price volatility. The vega of a stock option is significantly higher than the vega of the underlying share, which is minimally higher than zero (Guay, 1999).

The variable VEGA is calculated as the change in the dollar value of the CEO's equity holdings associated with a 0.01 change in volatility (i.e., the standard deviation of the firm's stock returns). Following the definitions provided by Coles et al. (2013), VEGA is defined using the Core and Guay (2002) methodology, which uses the option valuation model from Black and Scholes (1973) as modified by Merton (1973) to consider dividends. I use the SAS program provided by Coles et al. (2013) to calculate VEGA using Execucomp data. VEGAGR is the VEGA variable for the CEO's current year equity grants only.

Earlier research explored the association between executive compensation and managerial risk taking and considered a variety of executive compensation measures other than vega such as delta (Bergstresser and Philippon, 2006; Burns and Kedia, 2006;

Rego and Wilson, 2012; Armstrong et al., 2012; Armstrong et al., 2013; among others), the value of shares/options granted or held (Desai and Dharmapala, 2006; Larcker et al., 2007; Efendi et al., 2007; Armstrong et al., 2012; among others), or the number of shares/options granted or held (Cheng and Warfield, 2005). These earlier studies found somewhat mixed results, and, eventually, vega was identified as the important variable when evaluating the relationship between executive compensation and managerial risk-taking.

Delta, stock option compensation, total compensation, and pay mix of stock option compensation to total compensation are common variables presented in the descriptive statistics of prior research examining the relationship between risk-taking incentives and managerial risk-taking behavior and/or of prior research establishing the impact of SFAS 123R on executive compensation.

Delta measures the sensitivity of executive compensation to changes in stock price. The delta of a share is 1, which is considerably higher than the delta of a stock option on the same share (Guay, 1999). The variable DELTA is calculated as the change in the dollar value of the CEO's equity holdings associated with a 1 percent change in the firm's stock price (Core and Guay, 2002). Consistent with the explanations for VEGA above, the definition of DELTA follows Coles et al. (2013) and is calculated using the related SAS program. DELTAGR is the same calculation as DELTA but for the CEO's current year equity grants only.

SOCOMP is the value of current year stock option grants (prior to 2007, Execucomp option_award_blk_value; after 2006, Execucomp option_awards_fv). TOTALCOMP is the total of all compensation for the year, including current year equity grants (Compustat tdc1). SOPERC is the percentage of total compensation delivered as stock option compensation (SOCOMP divided by TOTALCOMP).

Research Design

Corporate Tax Aggressiveness

The first hypothesis (H1) predicts that firms affected by SFAS 123R will see a more pronounced decline in corporate tax aggressiveness following SFAS 123R than firms not affected by SFAS 123R. My regression model is as follows:

$$\text{Corporate Tax Aggressiveness}_{it} = \beta_0 + \beta_1 TREATMENT_i + \beta_2 SFAS123R_t + \beta_3 TREATMENT_i * SFAS123R_t + Controls_{it} + \varepsilon_{it} \quad (1)$$

TREATMENT is a dummy variable indicating if the firm is affected by SFAS 123R or not. TREATMENT is equal to 0 if the firm is in the control group and 1 otherwise. Following Bakke et al. (2016), the control group consists of two subgroups: the firms that did not grant stock options to the CEO from 2004 to 2005 and the firms that began voluntarily expensing stock options prior to 2004. SFAS123R is a dummy variable equal to 1 if the firm-year observation is after the implementation of SFAS 123R (i.e., 2006 and 2007) and 0 otherwise (i.e., 2004 and 2005). TREATMENT*SFAS123R is the difference-in-difference estimate, my variable of interest. The control variables are explained after the proxies for corporate tax aggressiveness.

I use three proxies for corporate tax aggressiveness – discretionary permanent book-tax differences, adjusted cash effective tax rates, and GAAP effective tax rates.

BTDDISC is the variable name for the discretionary permanent book-tax differences. Following Frank et al. (2009), BTDDISC is the residual from regressing the

permanent book-tax differences on six independent variables that typically result in permanent book-tax differences unrelated to corporate tax aggressiveness. The Frank et al. (2009) regression model is as follows:

$$\mathrm{BTDPERMF}_{it} = \beta_0 + \beta_1(1/AT_{it-1}) + \beta_2 \Delta \mathrm{TLCF}_{it} + \beta_3 TXS_{it} + \beta_4 INTAN_{it} + \beta_5 ESUB_{it} + \beta_6 MII_{it} + \beta_7 LagBTDPERMF_{it} + \varepsilon_{it} \quad (2)$$

The regression produces estimated coefficients for each variable which are used to calculate the expected (i.e., non-discretionary) permanent book-tax differences for each firm. The difference between the firm's permanent book-tax differences and it's expected permanent book-tax differences is assumed to be discretionary. For the regression, I use data for all Compustat firms with total assets (Compustat at) of $1 million or greater. The regression, performed by year and two digit SIC code, requires at least 10 observations. I winsorize the estimated coefficients at the 1st and 99th percentile before calculating the expected permanent book-tax differences for each firm.

BTDPERMF is the permanent book-tax differences. It is calculated as the pre-tax accounting income (Compustat pi) less the estimated U.S. taxable income (Compustat txfed /.35) less the estimated foreign taxable income (Compustat txfo /.35) less the temporary book-tax differences (Compustat txdi /.35). Following Wilson (2009), if Compustat txfed is missing, I estimate the U.S. taxable income as the total income tax expense (Compustat txt) less the deferred income tax expense (Compustat txdi) less the current state income tax expense (Compustat txs) less the current other income tax expense (Compustat txo). ΔTLCF is the change in tax loss carryforwards during the year

(Compustat tlcf less Compustat tlcf lagged by one year). TXS (state income tax expense), INTAN (intangibles such as goodwill), ESUB (the firm's portion of unremitted earnings from an unconsolidated subsidiary), and MII (the income from a consolidated subsidiary that is not attributable to the parent who has a non-controlling interest) are variable names in Compustat and defined accordingly. LagBTDPERMF is a one-year lag of BTDPERMF. The dependent variable and all the independent variables are scaled by total assets (Compustat at) lagged by one year.

Chapter 2 discusses a comparability issue with cash effective tax rates resulting from SFAS 123R. Appendix G shows that the Cash ETR is higher during the years of vesting (i.e., 21 percent versus 20 percent) in the post-stock option expensing period compared to the pre-stock option expensing period. When comparing the two periods, the Cash ETR numerator, cash taxes paid, is the same, but the denominator, pre-tax accounting income, is different because of SFAS 123R. If Cash ETR is a proxy for corporate tax aggressiveness, the Cash ETR increase in the post-stock option expensing period would be viewed as a decrease in corporate tax aggressiveness. However, this increase is the result of changes in accounting rather than aggressiveness. To achieve comparability for Cash ETR, pre-tax accounting income needs to be adjusted to either apply stock option expensing regulations to the pre-stock option expensing period or to remove the effect of stock option expensing in the post-stock option expensing period. Because of the availability of the data, I adjust the pre-tax accounting income in the post-stock option expensing period. I estimate the stock option compensation deducted during the vesting period as the average fair value of the stock options granted (Compustat optfvgr) for a three-year period, t to t-2. I use a three-year average because a three-year graded vesting schedule (i.e., 1/3 vesting each year) is a common vesting schedule for stock option grants. If a firm were to use a shorter than three year estimated

life to calculate the fair value of the stock options at grant (Compustat optlife), it would indicate that a three-year vesting period is too short. I find no firms in the post-stock option expensing period of my sample with an option life of less than three years.

My second proxy for corporate tax aggressiveness is the adjusted cash effective tax rates. CASHETRADJ is the cash income taxes paid (Compustat txpd) divided by adjusted pre-tax accounting income. Adjusted pre-tax accounting income is the pre-tax accounting income (Compustat pi) plus the average fair value of stock options granted (Compustat optfvgr) for a three-year period, t to t-2.

My third proxy for corporate tax aggressiveness is the GAAP effective tax rates. ETRGAAP is the total income tax expense (Compust txt) divided by the pre-tax accounting income (Compustat pi). Appendix G shows that the GAAP effective tax rates do not have the same comparability issue as the cash effective tax rates. Therefore, I do not adjust the pre-tax accounting income for ETRGAAP.

Controls

My control variables are the firm characteristics associated with the corporate tax aggressiveness (Gupta and Newberry, 1997; Rego, 2003; Dyreng et al., 2008; Frank et al., 2009; Wilson, 2009; Rego and Wilson, 2012, Armstrong et al., 2015).

Gupta and Newberry (1997) explain the opposing views in the literature on the topic of firm size and its positive or negative association with corporate tax planning. On the one side, larger firms have economies of scale, which may lead to increased opportunities to focus resources on tax-planning activities, influence tax legislation, and organize firm operations accordingly (Gupta and Newberry, 1997). On the other hand, larger, more visible, firms often face increased regulatory scrutiny, which may decrease tax-planning opportunities (Zimmerman, 1983; Gupta and Newberry, 1997). Firm size is

the control variable SIZE and is the natural log of total assets (Compustat at). I make no prediction for the significance and the direction of the association between SIZE and corporate tax aggressiveness.

Prior literature identifies the profitability of a firm and the variation of a firm profitability as providing increased opportunities for tax planning (Rego, 2003; Frank et al., 2009; Wilson, 2009; Armstrong et al., 2012). PTROA, pre-tax return on assets, is the control variable for firm profitability. PTROA is the pre-tax accounting income (Computstat pi) divided by the total assets (Compustat at) lagged by one year. PTROASD is the control variable for the variation in pre-tax return on assets and is the standard deviation of return on assets over a five-year period, t to t-4. I predict PTROA and PTROASD to be positively associated with corporate tax aggressiveness.

Foreign operations provide the opportunity to take advantage of tax rate differences by shifting income (expenses) to low (high) tax jurisdictions, utilizing tax agreements between countries, and locating operations in low tax jurisdictions (Rego, 2003, Rego and Wilson, 2012; Armstrong et al., 2012; Armstrong et al., 2015). Not all firm disclose foreign assets in their financial statements, so an estimation of foreign assets is necessary. By decomposing the return on asset formula into profit margin multiplied by asset turnover, Oler et al. (2007) provide an approach to estimate foreign assets.

$$\text{ROA} = \underbrace{\frac{Net\ Income}{Sales}}_{\text{Profit margin}} \times \underbrace{\frac{Sales}{Total\ Assets}}_{\text{Asset turnover}}$$

First, using the assumption of Oler et al. (2007) that a firm's worldwide asset turnover is representative of a firm's foreign asset turnover, I calculate foreign asset turnover as

sales (Compustat sale) divided by total assets (Compustat at). Next, I calculate foreign profit margin. For the numerator of foreign profit margin, foreign net income, I start with foreign pre-tax income (Compustat pifo but if pifo is missing or zero then I use Compustat txfo /.35) then subtract foreign income taxes (Compustat txfo). For the denominator of foreign profit margin, foreign sales, I subtract domestic sales from Compustat's geographic segment (dataset WRDS_SEGMERGED, stype = GEOSEG, geotype = 2, and field name sales) from worldwide sales (Compustat sale). Lastly, I multiply foreign profit margin by foreign asset turnover to get foreign return on assets. I now have three of the four variables in the above ROA formula (foreign ROA, foreign net income, and foreign sales), so I solve for foreign assets. ATFOR is the control variable for foreign assets, and a positive association with corporate tax aggressiveness is predicted.

Financing decisions have tax consequences, such as the deductible nature of interest expense versus the nondeductible nature of dividend payments, and prior literature finds these decisions to be associated with corporate tax aggressiveness (Gupta and Newberry, 1997; Mills et al., 1998; Rego, 2003; Frank et al., 2009). Financing decisions are captured in the control variable LEV, leverage, and it is calculated as total debt (Compustat dltt + dlc) divided by total assets (Compustat at) lagged by one year. I predict LEV to be positively associated with corporate tax aggressiveness.

Investment decisions also have tax consequences, such as investment tax credits or accelerated depreciation, and prior literature finds them to be positively associated with corporate tax aggressiveness (Gupta and Newberry, 1997; Mills et al., 1998; Hanlon, 2007; Rego and Wilson, 2012; Armstrong et al., 2012). Investment decisions are captured in the control variables RD, research and development (Compustat xrd), and CAPX, capital expenditures (Compustat capx). Both are divided

total assets (Compustat at) lagged by one year. I predict both to be positively associated with corporate tax aggressiveness.

All proxies for corporate tax aggressiveness and control variables that are not binary are winsorized at 1 and 99.

Financial Reporting Aggressiveness

The second hypothesis (H2) predicts that firms affected by SFAS 123R will see a more pronounced decline in financial reporting aggressiveness following SFAS 123R than firms not affected by SFAS 123R. My regression model is as follows:

$$\text{Financial Reporting Aggressiveness}_{it} = \beta_0 + \beta_1 TREATMENT_i + \beta_2 SFAS123R_t + \beta_3 TREATMENT_i * SFAS123R_t + Controls_{it} + \varepsilon_{it} \quad (3)$$

TREATMENT is a dummy variable indicating if the firm is affected by SFAS 123R or not. TREATMENT is equal to 0 if the firm is in the control group and 1 otherwise. Following Bakke et al. (2016), the control group consists of two subgroups: the firms that did not grant stock options to the CEO from 2004 to 2005 and the firms that began voluntarily expensing stock options prior to 2004. SFAS123R is a dummy variable equal to 1 if the firm-year observation is after the implementation of SFAS 123R (i.e., 2006 and 2007) and 0 otherwise (i.e., 2004 and 2005). TREATMENT*SFAS123R is the difference-in-difference estimate, my variable of interest. The explanations for the control variables come after the proxies for financial reporting aggressiveness.

I use one proxy for financial reporting aggressiveness – discretionary accruals (Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Larcker et al., 2007; Cornett et al., 2008; Jiang et al., 2010; Armstrong et al., 2013).

DACCR is the variable name for discretionary accruals. Following the Jones (1991) model, the discretionary accrual is the residual from regressing total accruals on independent variables controlling for the economic conditions of the firm. The Jones (1991) model regresses total accruals on two independent variables - sales revenue and property and plant and equipment. I make two modifications to the Jones (1991) model based on Dechow et al. (1995) and Kothari et al. (2005). Dechow et al. (1991) subtract the changes in accounts receivable from the changes in sales revenue. Kothari et al. (2005) control for firm performance using several approaches. I control for firm performance by adding return on assets as a third independent variable. My regression model is:

$$\mathrm{TACCR}_{it} = \beta_0 + \beta_1(1/AT_{it-1}) + \beta_2(\Delta\mathrm{SALE} - \Delta\mathrm{RECT})_{it} + \beta_3 PPEGT_{it} + \beta_4 ROA_{it} + \varepsilon_{it} \quad (4)$$

The regression produces estimated coefficients for each variable which are used to calculate the expected (i.e., non-discretionary) accruals for each firm. The difference between the firm's total accruals and it's expected accruals is assumed to be discretionary. For the regression, I use data for all Compustat firms with total assets (Compustat at) of $1 million or greater. The regression, performed by year and two digit

SIC code, requires at least 10 observations. I winsorize the estimated coefficients at the 1st and 99th percentile before calculating the expected accruals for each firm.

TACCR is total accruals calculated as earnings before extraordinary items and discontinued operations (Compustat ibc) less operating cash flows from continuing operations (Compustat oancf). ΔSALE is the change in sales revenue during the year (Compustat sale less Compustat sale lagged by one year). ΔRECT is the change in accounts receivable during the year (Compustat rect less Compustat rect lagged by one year). PPEGT (gross property, plant and equipment) is the variable name in Compustat and defined accordingly. ROA is the return on assets (Compustat ni divided by Compustat at lagged by one year). The dependent variable and all independent variables (except ROA) are scaled by total assets (Compustat at) lagged by one year.

DACCR_ABS is the absolute value of DACCR, as calculated above.

Chapter 4

Descriptive Statistics and Regression Results

Executive Compensation

Tables 1 to 4 provide descriptive statistics for my sample, 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007. The sample includes four firm-year observations for each firm. Approximately 79% of the firms and firm-year observations in the sample are in the treatment group (i.e., firms that did not grant stock options to the CEO from 2004 to 2005 and firms that voluntarily expensed stock options prior to 2004 under SFAS 123). For the full sample, Panel A of Table 1 provides the means for total compensation (TOTALCOMP) of $5,537.29 million, stock option compensation (SOCOMP) of $1,774.15 million, vega on current year equity grants (VEGAGR) of $31.66 million and vega on equity holdings (VEGA) of $170.39 million.

In Panel A of Table 2, the mean TOTALCOMP for the treatment group and control group are similar ($5,539.81 for treatment and $5,528.07 for control). Also, in Panel A of Table 2, the treatment group has a higher mean SOCOMP, VEGAGR and VEGA compared to the control group ($2,011.12 compared to $908.91 for SOCOMP, $35.29 compared to $18.39 for VEGAGR and $179.58 compared to $136.86 for VEGA). When comparing the pre-SFAS 123R period to the post-SFAS 123R period, Panel A of Table 2 reflects decreases in the mean SOCOMP, VEGAGR and VEGA SOCOMP ($2,015.43 to $1,532.87), VEGAGR ($35.02 to $28.20) and VEGAGR ($184.68 to $156.10). This is consistent with prior empirical studies finding vega declines following stock option expensing (Carter et al., 2007; Ferri and Sandino, 2007; Hayes et al., 2012; Skantz, 2012). When observing the data separately for the treatment and control groups

(Panel A of Table 3), mean SOCOMP and VEGAGR increased from the pre-SFAS 123R period to the post-SFAS 123R period for the control group ($707.26 million to $1,110.56 million for SOCOMP and $16.20 to $20.59 for VEGAGR). These increases in SOCOMP and VEGAGR from the pre-SFAS 123R period to post-SFAS 123R period is not surprising because 73% of the firms in the control group did not grant stock options from 2004 to 2005, the pre-SFAS 123R period. Similarly, Panel A of Table 4 reflects mean ΔVEGAGR (VEGAGR for post-SFAS 123R period less VEGAGR for pre-SFAS 123R period) of negative $9,767 for the treatment group and positive $4,386 for the control group.

Corporate Tax Aggressiveness

Empirical studies provide evidence that higher vega is associated with higher managerial risk taking (Coles et al, 2006; Rego and Wilson, 2012; Armstrong et al., 2013) and that vega declines following stock option expensing (Carter et al., 2007; Ferri and Sandino, 2007; Hayes et al., 2012; Skantz, 2012). By combining these two streams of literature, I hypothesize that firms affected by SFAS 123R will see a more pronounced decline (or smaller increase) in corporate tax aggressiveness following SFAS 123R than other firms.

Discretionary permanent book-tax differences (BTDDISC) is one proxy for corporate tax aggressiveness. A decrease in BTDDISC provides evidence of a decrease in corporate tax aggressiveness. Therefore, if BTDDISC for treatment firms declines more (or increases less) than control firms from the pre- to the post-SFAS 123R period, this would provide evidence supporting my hypothesis. Panel A of Table 3 reflect an increase in mean BTDDISC from the pre-SFAS 123R period to the post-SFAS 123R for both treatment and control firms. Contrary to my hypothesis, the increase is higher for

treatment firms (increase of 65%, 0.0037 to 0.0061) than control firms (increase of 50%, 0.0036 to 0.0054).

Table 6 provides the ordinary least squares regression for Model 1 using BTDDISC as the proxy for corporate tax aggressiveness. The variable of interest, SFAS123R*TREATMENT, is predicted to be negative and significant if the treatment firms are less tax aggressive in the post-SFAS 123R period than in the pre-SFAS 123R period in comparison to the control firms. Table 6 shows an insignificant coefficient of essentially zero for SFAS123R*TREATMENT. I run the regression again for two additional book-tax difference variables used in prior research, permanent book-tax differences (BTDPERM) and total book-tax differences (BTD). For BTDPERM, the SFAS123R*TREATMENT coefficient is negative but insignificant. For BTD, the SFAS123R*TREATMENT coefficient is negative and significant. However, as demonstrated in Appendix F and discussed in Chapter 2, a portion of the change in BTD, when comparing the pre-SFAS 123R and post-SFAS 123R period, results from the change in accounting regulations rather than corporate tax aggressiveness. BTDPERM and BTDDISC do not have this comparability issue and, therefore, are more accurate proxies for corporate tax aggressiveness.

GAAP effective tax rates (ETRGAAP) and adjusted cash effective tax rates (ETRCASHADJ) are two additional proxies for corporate tax aggressiveness. An increase in ETRGAAP or ETRCASHADJ provides evidence of a decrease in corporate tax aggressiveness. Therefore, if ETRGAAP or ETRCASHADJ for treatment firms increases more (or decreases less) than control firms from the pre- to the post-SFAS 123R period, this would provide evidence supporting my hypothesis. Panel A of Table 3 reflect an increase in mean ETRGAAP from the pre-SFAS 123R period to the post-SFAS 123R for the control group (0.24 to 0.25) but ETRGAAP is essentially the unchanged for

the treatment group (both are 0.26). This is inconsistent with my hypothesis. However, Panel A of Table 3 provides evidence consistent with my hypothesis for ETRCASHADJ, increased for treatment firms (0.19 to 0.21) and decreased for control firms (0.20 to 0.19).

Table 7 provides the ordinary least squares regression for Model 1 using ETRGAAP and ETRCASHADJ as the proxies for corporate tax aggressiveness. The variable of interest, SFAS123R*TREATMENT, is predicted to be positive and significant if the treatment firms are less tax aggressive in the post-SFAS 123R period than in the pre-SFAS 123R period in comparison to the control firms. Table 7 shows statistically insignificant coefficients for SFAS123R*TREATMENT for ETRGAAP (negative coefficient) and ETRCASHADJ (positive coefficient). I perform the regression again for unadjusted Cash ETR (ETRCASH) and the variable of interest, SFAS123R*TREATMENT, is positive and insignificant. Although ETRCASH is used in prior research as a proxy for corporate tax aggressiveness, ETRCASH has comparability issues discussed in Chapter 1 and demonstrated in Appendix G. Therefore, ETRCASHADJ and ETRGAAP are more accurate proxies for corporate tax aggressiveness.

Alternative Tests

Another approach used in prior literature to examine the changes in managerial risk-taking associated with SFAS 123R (Hayes et al., 2012; Chava and Purnanandam, 2010). In Panel A of Table 4, mean ΔBTDPERM, average post-SFAS 123R period BTDDISC less average pre-SFAS 123R period BTDDISC, is essentially the same for the treatment and control groups (0.002 for both groups). This is inconsistent with my hypothesis. The mean ΔETRGAAP is positive 1.530 for the treatment group and negative 0.061 for the control group and the mean ΔETRCASHADJ is positive 0.232 for

the treatment group and positive 0.003 for the control group. Both are consistent with my hypothesis.

Alternative Test 1

For the first hypothesis (H1), I perform the following regression on changes in levels:

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + + \beta_1 TREATMENT_i + \Delta Controls_i + \varepsilon_i \quad (5)$$

I use the same proxies for corporate tax aggressiveness and controls as in Model 1. TREATMENT, my variable of interest, is predicted to be negatively associated with corporate tax aggressiveness.

Following Hayes et al. (2012), the change (Δ) for each variable is the difference in firm averages for the two periods, post-SFAS 123R less pre-SFAS 123R. For variables that are ratios, the average for each firm is the sum of the numerators for both years in the respective period divided by the sum of the denominators for both years in the same period for the same firm. For variables that are not ratios, the average for each firm is the sum of the variables for both years in the respective period divided by two (i.e., the number of years in each period). Lastly, the difference between the averages for each variable for each firm is calculated as the post-SFAS 123R average minus the pre-SFAS 123R average. The result is one observation per firm containing the change (Δ) between the two periods for each variable.

Table 8 provides the ordinary least squares regression for Model 5 using the same book-tax difference variables as Model 1 in Table 5. The variable of interest, TREATMENT, is predicted to be negative and significant if the change in tax aggressiveness from the pre-SFAS 123R period to the post-SFAS 123R period is a larger decrease (smaller increase) for the treatment firms than for the control firms. For ΔBTDDISC, Table 8 shows a statistically insignificant, positive coefficient for TREATMENT. The coefficient for TREATMENT is negative and insignificant for ΔBTDPERM. For ΔBTD, the coefficient for TREATMENT is negative and significant at only a 0.10 level.

Table 9 provides the ordinary least squares regression for Model 5 using the same effective tax rate variables as Model 1 in Table 6. The variable of interest, TREATMENT, is predicted to be positive and significant if the change in tax aggressiveness from the pre-SFAS 123R period to the post-SFAS 123R period is a larger increase (smaller decrease) for the treatment firms than for the control firms. For ΔETRGAAP, ΔETRCASHADJ and ΔETRCASH, Table 9 shows a statistically insignificant, positive coefficient for TREATMENT.

Alternative Test 2

I perform a second test on changes in levels for the first hypothesis (H1) following Hayes et. al. (2012):

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + \beta_1 \Delta\text{VEGAGR}_i + \Delta Controls_i + \varepsilon_i \quad (6)$$

I begin with the sample of 907 firms used for Tables 6 and 7. Then, I delete firms assigned to the control group (TREATMENT = 0). The subsample now includes 712 firms with 2,848 firm-year observations.

I use the same proxies for corporate tax aggressiveness and controls as Model 1 plus one additional control variable, ΔDELTAGR. DELTAGR is the change in the dollar value of the CEO's current year equity grants associated with a 1 percent change in the firm's stock price. The calculation of DELTAGR is in Chapter 3. The change (Δ) for each variable is the difference in the firm average for the two periods, post-SFAS 123R less pre-SFAS 123R, as described for Model 5.

My variable of interest is ΔVEGAGR. VEGAGR is the change in the dollar value of the CEO's current year equity grants associated with a 0.01 change in volatility. The calculation of VEGAGR is in Chapter 3. ΔVEGAGR is predicted to be positively associated with corporate tax aggressiveness.

Table 10 provides the ordinary least squares regression for Model 6 using the same book-tax difference variables as Model 1 in Table 5. The variable of interest, ΔVEGAGR, is predicted to be positive and significant if tax aggressiveness declines from the pre-SFAS 123R period to the post-SFAS 123R period. For ΔBTDDISC, Table 10 shows a statistically insignificant positive coefficient for ΔVEGAGR. For ΔBTDPERM and ΔBTD, the ΔVEGAGR coefficient is negative and insignificant.

Table 11 provides the ordinary least squares regression for Model 6 using the same effective tax rate variables as Model 1 in Table 6. The variable of interest, ΔVEGAGR, is predicted to be negative and significant if tax aggressiveness declines from the pre-SFAS 123R period to the post-SFAS 123R period. For ΔETRGAAP,

ΔETRCASHADJ and ΔETRCASH, Table 11 shows a statistically insignificant, positive for coefficient for ΔVEGAGR.

Financial Reporting Aggressiveness

Empirical studies provide evidence that higher vega is associated with higher managerial risk taking (Coles et al, 2006; Rego and Wilson, 2012; Armstrong et al., 2013) and that vega declines following stock option expensing (Carter et al., 2007; Ferri and Sandino, 2007; Hayes et al., 2012; Skantz, 2012). By combining these two streams of literature, I hypothesize that firms affected by SFAS 123R will see a more pronounced decline (or smaller increase) in financial reporting aggressiveness following SFAS 123R than other firms.

The absolute value of discretionary accruals (DACCR_ABS) is a proxy for financial reporting aggressiveness. A decrease in DACCR_ABS provides evidence of a decrease in financial reporting aggressiveness. Therefore, if DACCR_ABS for treatment firms declines more (or increases less) than control firms from the pre- to the post-SFAS 123R period, this would provide evidence supporting my hypothesis. Panel B of Table 3 reflect a decrease in mean DACCR_ABS from the pre-SFAS 123R period to the post-SFAS 123R for both treatment and control firms. The decrease is larger for treatment firms (decrease of 7%, 0.0510 to 0.0476) than control firms (decrease of 5%, 0.0492 to 0.0470). This is consistent with my hypothesis.

Table 12 provides the ordinary least squares regression for Model 3 using the absolute value of discretionary accruals as the proxy for financial reporting tax aggressiveness. The variable of interest, SFAS123R*TREATMENT, is predicted to be negative and significant if the treatment firms are less aggressive in the post-SFAS 123R period than in the pre-SFAS 123R period in comparison to the control firms. For

SFAS123R*TREATMENT, Table 12 shows insignificant coefficients (negative for DACCR_ABS, positive for DACCR).

Alternative Tests

Another approach used in prior literature to examine the changes in managerial risk-taking associated with SFAS 123R (Hayes et al., 2012; Chava and Purnanandam, 2010). Panel B of Table 4 reflects the mean ΔDACCR_ABS is lower for treatment firms than control firms (negative 0.003 for treatment and 0.002 for control) and the mean ΔDACCR is also lower for treatment firms (0.014 for treatment and 0.015 for control). This is consistent with my hypothesis.

Alternative Test 3

Like the Alternative Test 1 performed for the first hypothesis (H1), I perform the following regression for the second hypothesis (H2) based on changes in levels:

$$\Delta\text{Financial Reporting Aggressiveness}_i = \beta_0 + + \beta_1 TREATMENT_i + \quad \Delta Controls_i + \varepsilon_i \tag{7}$$

I use the same proxies for financial reporting aggressiveness and controls as in Model 3. The change (Δ) for each variable and my variable of interest, TREATMENT, are defined in the same manner as Model 5 for the corporate tax aggressiveness. TREATMENT is predicted to be negatively associated with financial reporting aggressiveness.

Table 13 provides the ordinary least squares regression for Model 7 using the same discretionary accruals variables as Model 3 in Table 12. The variable of interest, TREATMENT, is predicted to be negative and significant if the change in financial reporting aggressiveness from the pre-SFAS 123R period to the post-SFAS 123R period is a larger decrease (smaller increase) in the treatment firms than in the control firms. For TREATMENT, Table 12 shows insignificant coefficients (negative for DACCR_ABS, positive for DACCR).

Alternative Test 4

Like the Alternative Test 2 performed for the first hypothesis (H1), I perform the following regression for the second hypothesis (H2) based on changes in levels:

$$\Delta\text{Financial Reporting Aggressiveness}_i = \beta_0 + \beta_1 \Delta\text{VEGAGR}_i + \Delta Controls_i + \varepsilon_i \quad (8)$$

I begin with the sample of 907 firms used for Tables 6 and 7. Then, I delete firms assigned to the control group (TREATMENT = 0). The subsample now includes 712 firms with 2,848 firm-year observations.

I use the same proxies for financial reporting aggressiveness and controls as Model 3 plus one additional control variable from Model 6, ΔDELTAGR. The change (Δ) for each variable is the difference in the firm average for the two periods, post-SFAS 123R less pre-SFAS 123R, as described in Model 5.

My variable of interest, ΔVEGAGR, is also from Model 6. ΔVEGAGR is predicted to be positively associated with corporate tax aggressiveness.

Table 14 provides the ordinary least squares regression for Model 8 using the same discretionary accruals variables as Model 3. The variable of interest, ΔVEGAGR, is predicted to be positive and significant if the financial reporting aggressiveness declines from the pre-SFAS 123R period to the post-SFAS 123R. For ΔDACCR_ABS, Table 14 shows a statistically insignificant, negative coefficient for ΔVEGAGR. For ΔDACCR, the ΔVEGAGR coefficient is positive and insignificant.

Chapter 5

Conclusion

This study utilizes the natural experiment created by the significant change in stock option granting practices brought forth by SFAS 123R to further explore the relationship between vega and managerial risk taking. This paper's focus on changes in corporate tax aggressiveness and financial reporting aggressiveness complements the work of Hayes et al. (2012), Cohen et al. (2010), Chava and Purnanandam (2010), and Bakke et al. (2016), which examine changes in the riskiness of corporate financing and investment policies following SFAS 123R.

I fail to find evidence that firms affected by SFAS 123R have a more pronounced decline in corporate tax or financial reporting aggressiveness following SFAS 123R than firms not affected by SFAS 123R. These findings are consistent with Cohen et al. (2009) and Hayes et al. (2012) who examines changes in vega following SFAS 123R and the riskiness of firms' investment and financing policies (research and development, capital investments, leverage, and acquisitions). Both studies fail to find consistent evidence that managerial risk taking decreases following SFAS 123R.

However, my findings are contrary to Chava and Purnanandam (2010) and Bakke et al. (2016) who examine changes in vega following SFAS 123R and the association with corporate financial policies (the former considers book leverage and debt; the latter, corporate hedging in the oil and gas industry). Both studies find evidence that managerial risk taking decreases following SFAS 123R.

The lack of evidence of decreased aggressiveness in tax and financial reporting in my study add to the mixed results from other studies using SFAS 123R as a natural experiment to evaluate the relation between vega and aggressive corporate financing

and risk policies. As concluded by Hayes et al. (2012), understanding the effects of vega on managerial risk taking continues to be a challenge for empirical research.

Table 1: Descriptive Statistics for Full Sample

The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007. Variables are defined in Appendix A.

PANEL A	FULL SAMPLE N = 3628 907 Firms						
Variable	Mean	Std Dev	Min	25th Pctl	Median	75th Pctl	Max
SFAS123R	0.50	0.50	-	-	0.50	1.00	1.00
TREATMENT	0.79	0.41	-	1.00	1.00	1.00	1.00
Executive Compensation							
TOTALCOMP	5,537.29	5,775.34	402.54	1,791.64	3,642.04	6,968.48	32,372.49
SOCOMP	1,774.15	2,705.72	-	-	775.69	2,283.34	15,340.84
SOPERC	0.28	0.26	-	-	0.25	0.47	0.88
DELTAGR	61.48	94.55	-	7.28	27.54	74.61	574.38
DELTA	765.86	1,549.05	2.74	103.45	283.64	720.20	11,418.00
VEGAGR	31.66	51.49	-	-	10.36	38.95	281.39
VEGA	170.39	255.32	-	27.04	74.36	198.72	1,451.53
Corporate Tax Aggressiveness							
BTDDISC	0.0048	0.0747	(0.3329)	(0.0185)	0.0043	0.0341	0.2553
BTDPERM	0.0103	0.0907	(0.3766)	(0.0087)	0.0085	0.0283	0.4094
BTD	0.0129	0.0855	(0.3224)	(0.0148)	0.0099	0.0383	0.3719
ETRGAAP	0.26	0.35	(1.69)	0.22	0.32	0.37	1.64
ETRCASHADJ	0.20	0.32	(1.33)	0.06	0.21	0.32	1.77
ETRCASH	0.20	0.33	(1.29)	0.06	0.22	0.33	1.67
PTROA	0.10	0.11	(0.31)	0.04	0.09	0.16	0.42
NOL	0.46	0.50	-	-	-	1.00	1.00
SIZE	7.57	1.52	4.34	6.53	7.45	8.53	11.70
ATFOR	0.29	0.31	-	-	0.22	0.52	1.27
LEV	0.23	0.21	-	0.06	0.20	0.33	1.09
RD	0.03	0.05	-	-	0.01	0.05	0.24
CAPX	0.06	0.06	0.00	0.02	0.04	0.07	0.32
DACCR	(0.02)	0.06	(0.21)	(0.05)	(0.01)	0.02	0.16
PTROASD	0.06	0.07	0.00	0.02	0.04	0.07	0.47

Table 1: Descriptive Statistics for Full Sample (continued)

PANEL B	FULL SAMPLE N = 3628 907 Firms						
Variable	Mean	Std Dev	Min	25th Pctl	Median	75th Pctl	Max
Financial Reporting Aggressiveness							
DACCR_ABS	0.0491	0.0449	0.0006	0.0170	0.0375	0.0660	0.2363
DACCR	(0.0155)	0.0628	(0.2142)	(0.0514)	(0.0139)	0.0211	0.1619
MKTVAL	7.71	1.60	3.83	6.64	7.60	8.75	11.75
BKMKT	0.44	0.29	(0.36)	0.26	0.39	0.58	1.60
DEBT	0.56	0.27	0.08	0.39	0.55	0.69	1.69
FIRMAGE	27.61	16.54	6.00	13.00	22.00	42.00	57.00
ROA	0.06	0.09	(0.31)	0.03	0.06	0.11	0.30
STKRET	0.12	0.34	(0.59)	(0.08)	0.07	0.29	1.34
CAPITAL	0.29	0.24	0.01	0.11	0.21	0.39	1.11
INTANG	0.06	0.08	-	0.00	0.02	0.07	0.42
CFOSD	0.04	0.03	0.01	0.02	0.03	0.05	0.21
SALESD	0.19	0.15	0.02	0.09	0.14	0.23	0.88

Table 2: Descriptive Statistics for Full Sample

The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007. PRE is the pre-SFAS123R period, defined as fiscal years 2004 and 2005. POST is the post-SFAS 123R period, defined as fiscal years 2006 and 2007. The CONTROL group is the firms that did not grant stock options to the CEO from 2004 to 2005 and the firms that voluntarily expensed stock options before 2004. The TREATMENT group is the remaining firms. Variables are defined in Appendix A.

PANEL A	FULL SAMPLE					FULL SAMPLE			
	PRE		POST			TREATMENT		CONTROL	
	N = 1814		N = 1814			N = 2848		N = 780	
	907 Firms		907 Firms			712 Firms		195 Firms	
Variable	Mean	Median	Mean	Median		Mean	Median	Mean	Median
SFAS123R	-	-	1.00	1.00		0.50	0.50	0.50	0.50
TREATMENT	0.79	1.00	0.79	1.00		1.00	1.00	-	-
Executive Compensation									
TOTALCOMP	5,405.66	3,484.49	5,668.91	3,790.41		5,539.81	3,716.67	5,528.07	3,378.31
SOCOMP	2,015.43	962.88	1,532.87	604.93		2,011.12	1,067.34	908.91	-
SOPERC	0.32	0.32	0.23	0.19		0.32	0.31	0.11	-
DELTAGR	57.30	26.99	65.67	28.28		63.38	30.82	54.57	14.61
DELTA	788.05	301.80	743.68	258.24		807.29	301.33	614.61	216.88
VEGAGR	35.02	13.61	28.30	6.42		35.29	14.86	18.39	-
VEGA	184.68	79.37	156.10	68.96		179.58	84.39	136.86	31.70
Corporate Tax Aggressiveness									
BTDDISC	0.0037	0.0035	0.0060	0.0057		0.0049	0.0046	0.0045	0.0032
BTDPERM	0.0113	0.0085	0.0094	0.0087		0.0103	0.0085	0.0106	0.0087
BTD	0.0177	0.0140	0.0081	0.0073		0.0123	0.0098	0.0151	0.0105
ETRGAAP	0.25	0.33	0.26	0.32		0.26	0.32	0.25	0.33
ETRCASHADJ	0.19	0.19	0.21	0.23		0.20	0.21	0.20	0.21
ETRCASH	0.19	0.20	0.21	0.24		0.20	0.22	0.20	0.22
PTROA	0.10	0.09	0.09	0.10		0.10	0.10	0.08	0.08
NOL	0.44	-	0.49	-		0.47	-	0.43	-
SIZE	7.48	7.35	7.66	7.55		7.53	7.44	7.71	7.53
ATFOR	0.28	0.20	0.31	0.24		0.31	0.25	0.25	0.11
LEV	0.22	0.20	0.24	0.21		0.23	0.20	0.24	0.21
RD	0.03	0.01	0.03	0.01		0.04	0.01	0.02	-
CAPX	0.06	0.04	0.06	0.04		0.06	0.04	0.06	0.04
DACCR	(0.02)	(0.01)	(0.02)	(0.01)		(0.02)	(0.02)	(0.01)	(0.01)
PTROASD	0.07	0.04	0.06	0.04		0.06	0.04	0.06	0.04

Table 2: Descriptive Statistics for Full Sample (continued)

PANEL B	FULL SAMPLE					FULL SAMPLE			
	PRE		POST			TREATMENT		CONTROL	
	N = 1814		N = 1814			N = 2848		N = 780	
	907 Firms		907 Firms			712 Firms		195 Firms	
Variable	Mean	Median	Mean	Median		Mean	Median	Mean	Median
Financial Reporting Aggressiveness									
DACCR_ABS	0.0506	0.0396	0.0475	0.0358		0.0493	0.0383	0.0481	0.0355
DACCR	(0.0154)	(0.0141)	(0.0156)	(0.0139)		(0.0174)	(0.0165)	(0.0084)	(0.0054)
MKTVAL	7.66	7.50	7.77	7.68		7.75	7.62	7.58	7.39
BKMKT	0.43	0.39	0.46	0.39		0.43	0.38	0.49	0.45
DEBT	0.56	0.54	0.57	0.55		0.55	0.54	0.61	0.58
FIRMAGE	26.62	20.50	28.60	22.50		26.89	21.00	30.25	26.50
ROA	0.06	0.06	0.06	0.07		0.06	0.07	0.05	0.06
STKRET	0.15	0.09	0.09	0.03		0.11	0.06	0.13	0.08
CAPITAL	0.29	0.22	0.28	0.21		0.27	0.20	0.33	0.26
INTANG	0.06	0.02	0.06	0.02		0.07	0.03	0.03	0.01
CFOSD	0.04	0.03	0.04	0.03		0.04	0.03	0.04	0.03
SALESD	0.19	0.14	0.18	0.15		0.18	0.14	0.21	0.15

Table 3: Descriptive Statistics for Treatment Firms and Control Firms

The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007. The CONTROL group is the firms that did not grant stock options to the CEO from 2004 to 2005 and the firms that voluntarily expensed stock options before 2004. The TREATMENT group is the remaining firms. PRE is the pre-SFAS123R period, defined as fiscal years 2004 and 2005. POST is the post-SFAS 123R period, defined as fiscal years 2006 and 2007. Variables are defined in Appendix A.

PANEL A	TREATMENT FIRMS					CONTROL FIRMS			
	N = 1424					N = 390			
	712 Firms					195 Firms			
	PRE		POST			PRE		POST	
Variable	Mean	Median	Mean	Median		Mean	Median	Mean	Median
SFAS123R	-	-	1.00	1.00		-	-	1.00	1.00
TREATMENT	1.00	1.00	1.00	1.00		-	-	-	-
Executive Compensation									
TOTALCOMP	5,496.22	3,686.91	5,583.41	3,796.57		5,075.02	2,554.65	5,981.12	3,730.90
SOCOMP	2,373.71	1,292.91	1,648.52	785.58		707.26	-	1,110.56	-
SOPERC	0.39	0.40	0.26	0.23		0.08	-	0.14	-
DELTAGR	62.67	32.48	64.09	28.90		37.70	4.90	71.43	26.40
DELTA	839.06	330.37	775.52	275.60		601.80	238.07	627.42	188.02
VEGAGR	40.18	19.56	30.41	9.88		16.20	-	20.59	-
VEGA	190.57	88.68	168.58	79.82		163.17	42.03	110.55	21.92
Corporate Tax Aggressiveness									
BTDDISC	0.0037	0.0039	0.0061	0.0058		0.0036	0.0019	0.0054	0.0048
BTDPERM	0.0121	0.0085	0.0085	0.0085		0.0085	0.0079	0.0128	0.0091
BTD	0.0192	0.0154	0.0054	0.0055		0.0123	0.0092	0.0179	0.0114
ETRGAAP	0.26	0.33	0.26	0.32		0.24	0.34	0.25	0.32
ETRCASHADJ	0.19	0.19	0.21	0.23		0.20	0.20	0.19	0.22
ETRCASH	0.19	0.20	0.21	0.24		0.20	0.20	0.19	0.23
PTROA	0.10	0.09	0.10	0.10		0.08	0.08	0.09	0.08
NOL	0.45	-	0.49	-		0.41	-	0.45	-
SIZE	7.43	7.34	7.63	7.53		7.63	7.37	7.78	7.64
ATFOR	0.29	0.23	0.32	0.27		0.24	0.10	0.26	0.13
LEV	0.22	0.19	0.23	0.21		0.23	0.21	0.24	0.21
RD	0.04	0.01	0.04	0.01		0.02	-	0.02	-
CAPX	0.05	0.04	0.06	0.04		0.06	0.04	0.06	0.04
DACCR	(0.02)	(0.02)	(0.02)	(0.02)		(0.01)	(0.00)	(0.01)	(0.01)
PTROASD	0.07	0.04	0.06	0.04		0.06	0.04	0.06	0.04

Table 3: Descriptive Statistics for Treatment Firms and Control Firms (continued)

PANEL B	TREATMENT FIRMS					CONTROL FIRMS			
	N = 1424					N = 390			
	712 Firms					195 Firms			
	PRE		POST			PRE		POST	
Variable	Mean	Median	Mean	Median		Mean	Median	Mean	Median
Financial Reporting Aggressiveness									
DACCR_ABS	0.0510	0.0404	0.0476	0.0362		0.0492	0.0374	0.0470	0.0338
DACCR	(0.0178)	(0.0174)	(0.0171)	(0.0156)		(0.0066)	(0.0025)	(0.0103)	(0.0087)
MKTVAL	7.70	7.56	7.80	7.70		7.50	7.32	7.66	7.51
BKMKT	0.41	0.38	0.45	0.39		0.50	0.45	0.48	0.44
DEBT	0.55	0.53	0.56	0.55		0.61	0.59	0.60	0.57
FIRMAGE	25.90	20.00	27.87	22.00		29.26	25.50	31.25	27.50
ROA	0.07	0.07	0.06	0.07		0.05	0.05	0.05	0.06
STKRET	0.15	0.09	0.08	0.03		0.15	0.09	0.11	0.05
CAPITAL	0.28	0.20	0.27	0.20		0.34	0.27	0.32	0.25
INTANG	0.07	0.03	0.07	0.03		0.03	0.01	0.02	0.01
CFOSD	0.04	0.04	0.04	0.03		0.04	0.03	0.04	0.03
SALESD	0.18	0.14	0.18	0.14		0.20	0.13	0.21	0.17

Table 4: Descriptive Statistics for Treatment Firms and Control Firms – Change Variables

The sample consists of 907 observations (907 firms) for fiscal years 2004 to 2007. Variables are defined in Appendix A.

PANEL A	TREATMENT FIRMS					CONTROL FIRMS			
	N = 712					N = 195			
	712 Firms					195 Firms			
Variable	Mean	Median	25th Pctl	75th Pctl		Mean	Median	25th Pctl	75th Pctl
Executive Compensation									
ΔDELTAGR	1.423	(0.763)	(19.525)	15.312		33.726	10.786	-	42.652
ΔDELTA	(63.538)	(8.694)	(126.101)	80.997		25.627	(7.467)	(122.220)	99.142
ΔVEGAGR	(9.767)	(3.902)	(18.538)	3.135		4.386	-	-	5.317
ΔVEGA	(21.993)	(4.355)	(45.423)	20.605		(52.622)	(8.826)	(42.991)	4.198
Corporate Tax Aggressiveness									
ΔBTDDISC	0.002	0.003	(0.024)	0.032		0.002	0.003	(0.022)	0.027
ΔBTDPERM	(0.005)	0.001	(0.022)	0.021		(0.001)	0.002	(0.020)	0.026
ΔBTD	(0.014)	(0.010)	(0.038)	0.015		0.002	(0.001)	(0.027)	0.032
ΔETRGAAP	1.530	0.031	(0.029)	0.113		(0.061)	0.021	(0.052)	0.111
ΔETRCASHADJ	0.232	(0.004)	(0.047)	0.040		0.003	(0.006)	(0.045)	0.046
ΔETRCASH	(1.201)	(0.012)	(0.057)	0.033		(0.045)	(0.009)	(0.066)	0.031
ΔPTROA	(0.003)	(0.002)	(0.023)	0.017		(0.002)	(0.002)	(0.024)	0.022
ΔNOL	(0.022)	-	-	-		(0.021)	-	-	-
ΔSIZE	(0.004)	-	-	-		(0.005)	-	-	-
ΔATFOR	(0.002)	0.002	(0.039)	0.037		0.004	0.004	(0.029)	0.040
ΔLEV	0.052	-	-	-		0.021	-	-	-
ΔRD	0.198	0.156	0.028	0.318		0.146	0.114	-	0.274
ΔCAPX	0.028	-	(0.000)	0.057		0.020	-	-	0.029
ΔDACCR	0.014	-	(0.045)	0.056		0.015	(0.003)	(0.050)	0.045
ΔPTROASD	0.002	-	(0.000)	0.001		(0.001)	-	(0.000)	-

Table 4: Descriptive Statistics for Treatment Firms and Control Firms – Change Variables (continued)

PANEL B	TREATMENT FIRMS					CONTROL FIRMS			
	N = 712					N = 195			
	712 Firms					195 Firms			
		-		-			-		-
Variable	Mean	Median	25th Pctl	75th Pctl		Mean	Median	25th Pctl	75th Pctl
Financial Reporting Aggressiveness									
ΔDACCR_ABS	(0.003)	(0.002)	(0.023)	0.017		(0.002)	(0.002)	(0.024)	0.022
ΔDACCR	0.014	-	(0.045)	0.056		0.015	(0.003)	(0.050)	0.045
ΔMKTVAL	0.097	0.097	(0.148)	0.349		0.159	0.159	(0.099)	0.387
ΔBKMKT	0.038	0.017	(0.043)	0.100		(0.079)	(0.005)	(0.094)	0.094
ΔDEBT	0.018	0.008	(0.058)	0.083		(0.004)	(0.011)	(0.077)	0.068
ΔFIRMAGE	1.978	2.000	2.000	2.000		1.990	2.000	2.000	2.000
ΔROA	(0.002)	0.002	(0.028)	0.026		0.003	0.004	(0.023)	0.028
ΔSTKRET	(0.070)	(0.029)	(0.244)	0.102		(0.040)	(0.006)	(0.197)	0.134
ΔCAPITAL	(0.004)	(0.003)	(0.027)	0.016		(0.013)	(0.006)	(0.040)	0.013
ΔINTANG	0.003	-	(0.002)	0.003		(0.001)	-	(0.002)	0.001
ΔCFOSD	(0.004)	(0.003)	(0.015)	0.006		(0.002)	(0.001)	(0.013)	0.011
ΔSALESD	0.133	0.103	0.048	0.185		0.165	0.134	0.051	0.217

Table 5: Correlation Matrix

Panel A contains variables for corporate tax aggressiveness and Panel B contains variables for financial reporting aggressiveness.

PANEL A															
	BTDDISC	BTDPERM	ETRGAAP	ETRCASH ADJ	VEGAGR	VEGA	PTROA	NOL	SIZE	ATFOR	LEV	RD	CAPX	DACCR	PTROASD
BTDDISC	1	0.50911	0.01661	0.02907	-0.00257	0.02373	0.08936	0.04075	0.01732	0.06372	0.01542	-0.02696	-0.02852	0.15126	-0.05571
		***		*			***	**		***			*	***	***
BTDPERM	0.50911	1	0.02274	0.05444	0.02256	0.02979	0.19642	0.10261	0.01365	0.02523	0.00122	-0.0295	0.03774	0.11353	-0.06552
	***			***		*	***	***				*	**	***	***
ETRGAAP	0.01661	0.02274	1	0.21993	0.04004	0.04104	0.22458	-0.06763	0.04961	-0.11487	-0.05747	-0.13098	0.07484	-0.02523	-0.20986
				***	**	**	***	***	***	***	***	***	***		***
ETRCASH ADJ	0.02907	0.05444	0.21993	1	0.05201	0.04615	0.21703	-0.06251	0.07474	-0.04909	-0.05061	-0.1217	0.02405	0.03336	-0.15824
	*	***	***		***	***	***	***	***	***	***	***		**	***
VEGAGR	-0.00257	0.02256	0.04004	0.05201	1	0.65511	0.19132	-0.0266	0.49869	0.09197	0.03469	0.04877	0.00841	-0.13189	-0.09992
			**	***		***	***		***	***	**	***		***	***
VEGA	0.02373	0.02979	0.04104	0.04615	0.65511	1	0.16649	-0.0504	0.57172	0.10151	0.01103	0.08787	-0.02746	-0.12512	-0.11755
		*	**	***	***		***	***	***	***		***	*	***	***
PTROA	0.08936	0.19642	0.22458	0.21703	0.19132	0.16649	1	-0.14546	0.13469	0.02393	-0.1547	-0.13382	0.2686	-0.16629	-0.21926
	***	***	***	***	***	***		***	***		***	***	***	***	***
NOL	0.04075	0.10261	-0.06763	-0.06251	-0.0266	-0.0504	-0.14546	1	-0.00412	0.15182	0.08612	0.10365	-0.11166	-0.03899	0.0898
	**	***	***	***		***	***			***	***	***	***	**	***
SIZE	0.01732	0.01365	0.04961	0.07474	0.49869	0.57172	0.13469	-0.00412	1	0.1209	0.229	-0.17947	0.05277	-0.03528	-0.25009
			***	***	***	***	***			***	***	***	***	**	***
ATFOR	0.06372	0.02523	-0.11487	-0.04909	0.09197	0.10151	0.02393	0.15182	0.1209	1	-0.04645	0.36713	-0.15491	-0.09631	0.05051
	***		***	***	***	***		***	***		***	***	***	***	***
LEV	0.01542	0.00122	-0.05747	-0.05061	0.03469	0.01103	-0.1547	0.08612	0.229	-0.04645	1	-0.14362	0.07803	0.07145	-0.0519
			***	***	**		***	***	***	***		***	***	***	***
RD	-0.02696	-0.0295	-0.13098	-0.1217	0.04877	0.08787	-0.13382	0.10365	-0.17947	0.36713	-0.14362	1	-0.19919	-0.19649	0.28801
		*	***	***	***	***	***	***	***	***	***		***	***	***
CAPX	-0.02852	0.03774	0.07484	0.02405	0.00841	-0.02746	0.2686	-0.11166	0.05277	-0.15491	0.07803	-0.19919	1	-0.07552	-0.0497
	*	**	***			*	***	***	***	***	***	***		***	***
DACCR	0.15126	0.11353	-0.02523	0.03336	-0.13189	-0.12512	-0.16629	-0.03899	-0.03528	-0.09631	0.07145	-0.19649	-0.07552	1	-0.04179
	***	***		**	***	***	***	**	**	***	***	***	***		**
PTROASD	-0.05571	-0.06552	-0.20986	-0.15824	-0.09992	-0.11755	-0.21926	0.0898	-0.25009	0.05051	-0.0519	0.28801	-0.0497	-0.04179	1
	***	***	***	***	***	***	***	***	***	***	***	***	***	**	

Table 5: Correlation Matrix (continued)

PANEL B														
	DACCR	DACCR _ABS	VEGAGR	VEGA	MKTVAL	BKMKT	DEBT	FIRMAGE	ROA	STKRET	CAPITAL	INTANG	CFOSD	SALESD
DACCR	1	-0.30148	-0.13189	-0.12512	-0.16718	0.17671	0.03425	0.08887	-0.10516	-0.06466	0.04488	-0.16383	-0.04909	0.03229
		***	***	***	***	***	**	***	***	***	***	***	***	*
DACCR _ABS	-0.30148	1	-0.00629	-0.02699	-0.06613	-0.105	0.07193	-0.15031	-0.03652	0.04116	-0.04841	0.17695	0.33425	0.1282
	***				***	***	***	***	**	**	***	***	***	***
VEGAGR	-0.13189	-0.00629	1	0.65511	0.56297	-0.19984	0.0696	0.21794	0.18214	0.03916	0.01172	0.07552	-0.14116	-0.11225
	***			***	***	***	***	***	***	**		***	***	***
VEGA	-0.12512	-0.02699	0.65511	1	0.62389	-0.18869	0.03879	0.22479	0.17054	-0.00467	-0.01402	0.13773	-0.16185	-0.16041
	***		***		***	***	**	***	***			***	***	***
MKTVAL	-0.16718	-0.06613	0.56297	0.62389	1	-0.38068	0.12477	0.32323	0.38728	0.18605	0.13959	-0.00316	-0.30924	-0.16507
	***	***	***	***		***	***	***	***	***	***		***	***
BKMKT	0.17671	-0.105	-0.19984	-0.18869	-0.38068	1	-0.22662	-0.01999	-0.32519	-0.33509	-0.04391	-0.086	0.00123	0.02975
	***	***	***	***	***		***		***	***	***	***		*
DEBT	0.03425	0.07193	0.0696	0.03879	0.12477	-0.22662	1	0.16446	-0.06995	0.09413	0.25423	-0.23909	-0.19053	-0.02382
	**	***	***	**	***	***		***	***	***	***	***	***	
FIRMAGE	0.08887	-0.15031	0.21794	0.22479	0.32323	-0.01999	0.16446	1	0.0406	0.02356	0.03969	-0.21531	-0.20629	-0.07921
	***	***	***	***	***		***		**		**	***	***	***
ROA	-0.10516	-0.03652	0.18214	0.17054	0.38728	-0.32519	-0.06995	0.0406	1	0.28615	0.13973	-0.24438	-0.13651	0.03965
	***	**	***	***	***	***	***	**		***	***	***	***	**
STKRET	-0.06466	0.04116	0.03916	-0.00467	0.18605	-0.33509	0.09413	0.02356	0.28615	1	0.09082	-0.1366	-0.02579	0.01973
	***	**	**		***	***	***		***		***	***		
CAPITAL	0.04488	-0.04841	0.01172	-0.01402	0.13959	-0.04391	0.25423	0.03969	0.13973	0.09082	1	-0.3327	-0.12575	-0.06609
	***	***			***	***	***	**	***	***		***	***	***
INTANG	-0.16383	0.17695	0.07552	0.13773	-0.00316	-0.086	-0.23909	-0.21531	-0.24438	-0.1366	-0.3327	1	0.21556	-0.18669
	***	***	***	***		***	***	***	***	***	***		***	***
CFOSD	-0.04909	0.33425	-0.14116	-0.16185	-0.30924	0.00123	-0.19053	-0.20629	-0.13651	-0.02579	-0.12575	0.21556	1	0.3649
	***	***	***	***	***		***	***	***		***	***		***
SALESD	0.03229	0.1282	-0.11225	-0.16041	-0.16507	0.02975	-0.02382	-0.07921	0.03965	0.01973	-0.06609	-0.18669	0.3649	1
	*	***	***	***	***	*		***	**		***	***	***	

Table 6: Book-Tax Differences (Model 1)

$$\text{Corporate Tax Aggressiveness}_{it} = \beta_0 + \beta_1 TREATMENT_i + \beta_2 SFAS123R_t + \beta_3 TREATMENT_i * SFAS123R_t + Controls_{it} + \varepsilon_{it} \quad (1)$$

The proxy for corporate tax aggressiveness is book-tax differences. All variables are defined in Appendix A. The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007 of which 708 firm-year observations (195 firms) are in the control group (TREATMENT = 0) and the remaining 2,848 firm-year observations (712 firms) are in the treatment group (TREATMENT = 1).

Dependent Variable	BTDDISC			BTDPERM			BTD		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	-0.001	0.918		-0.008	0.373		-0.028	0.001	***
SFAS123R	0.002	0.721		0.004	0.571		0.003	0.549	
TREATMENT	0.000	0.921		0.000	0.943		0.004	0.411	
SFAS123R * TREATMENT	0.000	0.989		-0.008	0.249		-0.019	0.004	***
PTROA	0.088	<.0001	***	0.195	<.0001	***	0.235	<.0001	***
NOL	0.008	0.002	***	0.026	<.0001	***	0.031	<.0001	***
SIZE	-0.001	0.378		-0.001	0.196		0.000	0.713	
ATFOR	0.017	0.000	***	0.003	0.551		0.000	0.939	
LEV	0.009	0.125		0.010	0.168		0.020	0.003	***
RD	-0.004	0.872		0.052	0.120		0.017	0.581	
CAPX	-0.050	0.027	**	0.008	0.773		0.146	<.0001	***
DACCR	0.208	<.0001	***	0.235	<.0001	***	0.183	<.0001	***
PTROASD	-0.031	0.090	*	-0.041	0.063	*	-0.022	0.279	
R Squared		0.048			0.084			0.145	

Table 7: Effective Tax Rates (Model 1)

$$\text{Corporate Tax Aggressiveness}_{it} = \beta_0 + \beta_1 TREATMENT_i + \beta_2 SFAS123R_t + \beta_3 TREATMENT_i * SFAS123R_t + Controls_{it} + \varepsilon_{it} \quad (1)$$

The proxy for corporate tax aggressiveness is effective tax rates. All variables are defined in Appendix A. The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007 of which 708 firm-year observations (195 firms) are in the control group (TREATMENT = 0) and the remaining 2,848 firm-year observations (712 firms) are in the treatment group (TREATMENT = 1).

Dependent Variable	ETRGAAP			ETRCASHADJ			ETRCASH		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	0.289	<.0001	***	0.178	<.0001	***	0.171	<.0001	***
SFAS123R	0.013	0.576		-0.008	0.730		-0.007	0.770	
TREATMENT	0.019	0.312		-0.011	0.540		-0.009	0.605	
SFAS123R*TREATMENT	-0.008	0.776		0.029	0.251		0.031	0.224	
PTROA	0.534	<.0001	***	0.565	<.0001	***	0.671	<.0001	***
NOL	-0.004	0.700		-0.010	0.355		-0.012	0.272	
SIZE	0.001	0.858		0.007	0.065	*	0.005	0.168	
ATFOR	-0.115	<.0001	***	-0.038	0.042	**	-0.036	0.054	*
LEV	-0.078	0.005	***	-0.063	0.018	**	-0.027	0.308	
RD	-0.245	0.053	*	-0.350	0.004	***	-0.345	0.004	***
CAPX	-0.010	0.925		-0.266	0.005	***	-0.283	0.003	***
DACCR	-0.085	0.355		0.249	0.004	***	0.224	0.010	**
PTROASD	-0.757	<.0001	***	-0.395	<.0001	***	-0.360	<.0001	***
R Squared		0.093			0.073			0.083	

Table 8: Book-Tax Differences – Change Variables (Model 5)

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + \beta_1 TREATMENT_i + \Delta Controls_i + \varepsilon_i \quad (5)$$

The proxy for corporate tax aggressiveness is book-tax differences. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 907 firms in Table 5.

Dependent Variable	ΔBTDDISC			ΔBTDPERM			ΔBTD		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	0.005	0.268		-0.002	0.787		0.001	0.931	
TREATMENT	0.002	0.763		-0.007	0.465		-0.016	0.057	*
ΔPTROA	0.103	0.000	***	0.247	<.0001	***	0.330	<.0001	***
ΔNOL	0.011	0.087	*	0.052	<.0001	***	0.048	<.0001	***
ΔSIZE	-0.023	0.007	***	-0.001	0.950		-0.012	0.382	
ΔATFOR	0.017	0.299		0.085	0.002	***	0.052	0.035	**
ΔLEV	0.038	0.016	**	0.029	0.275		0.043	0.074	*
ΔRD	-0.033	0.711		0.100	0.504		-0.167	0.223	
ΔCAPX	-0.252	0.000	***	-0.260	0.018	**	-0.044	0.660	
ΔDACCR	0.287	<.0001	***	0.405	<.0001	***	0.247	0.000	***
ΔPTROASD	0.057	0.207		0.057	0.448		0.008	0.906	
R Squared		0.079			0.094			0.116	

Table 9: Effective Tax Rates – Change Variables (Model 5)

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + + \beta_1 TREATMENT_i + \Delta Controls_i + \varepsilon_i \quad (5)$$

The proxy for corporate tax aggressiveness is effective tax rates. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 907 firms in Table 6.

Dependent Variable	ΔETRGAAP			ΔETRCASHADJ			ΔETRCASH		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	0.081	0.783		0.553	0.883		0.156	0.728	
TREATMENT	0.289	0.375		1.196	0.774		0.585	0.240	
ΔPTROA	1.313	0.430		-13.036	0.540		-2.235	0.379	
ΔNOL	-0.019	0.959		-0.112	0.982		-0.271	0.639	
ΔSIZE	-0.646	0.210		-1.931	0.769		-1.042	0.186	
ΔATFOR	1.103	0.255		3.230	0.794		0.327	0.825	
ΔLEV	-1.116	0.235		-8.746	0.467		0.144	0.920	
ΔRD	-0.303	0.955		13.169	0.847		0.379	0.963	
ΔCAPX	-1.093	0.780		19.832	0.692		-0.128	0.983	
ΔDACCR	-2.346	0.343		69.140	0.029	**	0.086	0.982	
ΔPTROASD	1.534	0.566		-2.441	0.943		2.800	0.492	
R Squared		-0.003			-0.005			-0.006	

Table 10: Book-Tax Differences – Change Variables (Model 6)

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + \beta_1 \Delta\text{VEGAGR}_i + \Delta Controls_i + \varepsilon_i \quad (6)$$

The proxy for corporate tax aggressiveness is book-tax differences. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 712 firms categorized as treatment firms (TREATMENT = 1) in Table 5.

Dependent Variable	ΔBTDDISC			ΔBTDPERM			ΔBTD		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	0.009	0.008	***	-0.009	0.079	*	-0.020	<.0001	***
ΔVEGAGR	0.00005	0.518		-0.00017	0.183		-0.00017	0.164	
ΔDELTAGR	-0.00006	0.177		0.00004	0.504		0.00006	0.340	
ΔPTROA	0.074	0.018	**	0.225	<.0001	***	0.307	<.0001	***
ΔNOL	0.010	0.146		0.058	<.0001	***	0.052	<.0001	***
ΔSIZE	-0.028	0.004	***	-0.015	0.335		-0.006	0.687	
ΔATFOR	0.024	0.163		0.107	0.000	***	0.075	0.004	***
ΔLEV	0.031	0.070	*	0.030	0.266		0.022	0.381	
ΔRD	-0.049	0.631		0.111	0.491		-0.189	0.211	
ΔCAPX	-0.236	0.002	***	-0.243	0.040	**	-0.097	0.382	
ΔDACCR	0.293	<.0001	***	0.388	<.0001	***	0.216	0.002	***
ΔPTROASD	0.076	0.132		0.044	0.583		-0.089	0.236	
R Squared		0.088			0.120			0.131	

Table 11: Effective Tax Rates – Change Variables (Model 6)

$$\Delta\text{Corporate Tax Aggressiveness}_i = \beta_0 + \beta_1 \Delta\text{VEGAGR}_i + \Delta Controls_i + \varepsilon_i \quad (6)$$

The proxy for corporate tax aggressiveness is effective tax rates. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 712 firms categorized as treatment firms (TREATMENT = 1) in Table 6.

Dependent Variable	ΔETRGAAP			ΔETRCASHADJ			ΔETRCASH		
	Parameter	p value		Parameter	p value		Parameter	p value	
Intercept	0.401	0.070	*	2.842	0.473		0.338	0.016	**
ΔVEGAGR	0.00044	0.936		0.07097	0.776		0.00843	0.889	
ΔDELTAGR	-0.00065	0.817		0.03612	0.825		0.00429	0.870	
ΔPTROA	1.244	0.557		27.296	0.548		3.244	0.397	
ΔNOL	0.023	0.963		6.197	0.976		0.736	0.693	
ΔSIZE	-0.736	0.259		8.395	0.752		0.998	0.151	
ΔATFOR	0.974	0.409		15.169	0.760		1.802	0.654	
ΔLEV	-1.262	0.277		14.935	0.503		1.775	0.902	
ΔRD	0.122	0.986		87.964	0.866		10.453	0.982	
ΔCAPX	-1.045	0.835		64.424	0.741		7.655	0.979	
ΔDACCR	-3.441	0.277		40.751	0.030	**	4.842	0.951	
ΔPTROASD	1.876	0.580		43.702	0.969		5.193	0.572	
R Squared		0.008			0.009			0.005	

Table 12: Discretionary Accruals (Model 3)

$$\text{Financial Reporting Aggressiveness}_{it} = \beta_0 + \beta_1 TREATMENT_i + \beta_2 SFAS123R_t + \beta_3 TREATMENT_i * SFAS123R_t + Controls_{it} + \varepsilon_{it} \quad (3)$$

The proxy for financial reporting aggressiveness is discretionary accruals. All variables are defined in Appendix A. The sample consists of 3,628 firm-year observations (907 firms) for fiscal years 2004 to 2007 of which 708 firm-year observations (195 firms) are in the control group (TREATMENT = 0) and the remaining 2,848 firm-year observations (712 firms) are in the treatment group (TREATMENT = 1).

Dependent Variable	DACCR_ABS			DACCR		
	Parameter	p value		Parameter	p value	
Intercept	0.013	0.021	**	0.027	0.001	***
SFAS123R	-0.001	0.838		-0.004	0.400	
TREATMENT	-0.001	0.732		-0.002	0.531	
SFAS123R * TREATMENT	-0.001	0.862		0.003	0.566	
MKTVAL	0.000	0.423		-0.007	<.0001	***
BKMKT	-0.004	0.126		0.018	<.0001	***
DEBT	0.029	<.0001	***	0.001	0.735	
FIRMAGE	0.000	<.0001	***	0.000	<.0001	***
ROA	0.017	0.070	*	-0.039	0.005	***
STKRET	0.004	0.058	*	-0.003	0.397	
CAPITAL	-0.002	0.545		0.007	0.126	
INTANG	0.080	<.0001	***	-0.092	<.0001	***
CFOSD	0.422	<.0001	***	-0.117	0.001	***
SALESD	0.012	0.021	**	0.006	0.418	
R Squared		0.161			0.081	

Table 13: Discretionary Accruals – Change Variables (Model 7)

$$\Delta\text{Financial Reporting Tax Aggressiveness}_i = \qquad (7)$$

$$\beta_0 + + \beta_1 TREATMENT_i + \quad \Delta Controls_i + \varepsilon_i$$

The proxy for financial reporting aggressiveness is discretionary accruals. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 907 firms in Table 12.

	ΔDACCR_ABS			ΔDACCR		
	Parameter	p value		Parameter	p value	
Intercept	-0.030	0.082	*	0.082	0.001	***
TREATMENT	-0.001	0.713		0.003	0.462	
ΔMKTVAL	0.006	0.048	**	-0.010	0.027	**
ΔBKMKT	-0.002	0.641		0.005	0.311	
ΔDEBT	0.037	<.0001	***	-0.022	0.024	**
ΔFIRMAGE	0.015	0.072	*	-0.044	0.000	***
ΔROA	-0.073	0.000	***	0.181	<.0001	***
ΔSTKRET	0.010	0.019	**	-0.014	0.022	**
ΔCAPITAL	0.033	0.013	**	-0.015	0.426	
ΔINTANG	0.012	0.005	***	-0.002	0.722	
ΔCFOSD	0.371	<.0001	***	-0.409	<.0001	***
ΔSALESD	-0.010	0.300		0.011	0.437	
R Squared		0.116			0.085	

Table 14: Discretionary Accruals – Change Variables (Model 8)

$$\Delta\text{Financial Reporting Aggressiveness}_i = \beta_0 + \beta_1 \Delta\text{VEGAGR}_i + \Delta Controls_i + \varepsilon_i \quad (8)$$

The proxy for financial reporting aggressiveness is discretionary accruals. Each Δ variable is calculated as the average for the post-SFAS 123R period less the average for the pre-SFAS 123R period. All variables are defined in Appendix A. The sample consists of one observation for each of the 712 firms categorized as treatment firms (TREATMENT = 1) in Table 12.

	ΔDACCR_ABS			ΔDACCR		
	Parameter	p value		Parameter	p value	
Intercept	-0.035	0.054	*	0.072	0.004	***
ΔVEGAGR	0.00002	0.660		-0.00003	0.692	
ΔDELTAGR	0.00000	0.949		-0.00001	0.762	
ΔMKTVAL	0.009	0.019	**	-0.010	0.049	**
ΔBKMKT	0.001	0.917		-0.005	0.549	
ΔDEBT	0.035	<.0001	***	-0.024	0.027	**
ΔFIRMAGE	0.017	0.057	*	-0.037	0.003	***
ΔROA	-0.089	0.000	***	0.176	<.0001	***
ΔSTKRET	0.012	0.015	**	-0.015	0.031	**
ΔCAPITAL	0.029	0.078	*	-0.016	0.459	
ΔINTANG	0.012	0.007	***	-0.002	0.723	
ΔCFOSD	0.389	<.0001	***	-0.533	<.0001	***
ΔSALESD	-0.010	0.388		0.004	0.784	
R Squared		0.104			0.085	

Appendix A

Variable Definitions

SFAS 123R	Indicator variable equal to 1 for firm-year observations with a fiscal year (Compustat fyear) of 2006 and 2007 and 0 otherwise (i.e., Compustat fyear 2004 and 2005).
TREATMENT	Indicator variable equal to 1 for firms affected by SFAS 123R (i.e., treatment firms) and 0 otherwise (i.e., control firms). Following Bakke et al. (2016), control firms consist of two groups: the firms that did not grant stock options to the CEO from 2004 to 2005 and the firms that began voluntarily expensing stock options prior to 2004.
Δ…	This symbol may appear in front of a variable name. The amount reported is the change in firm averages for the two periods, pre- and post-SFAS 123R. For variables that are ratios, the average for each firm is the sum of the numerators for both years in the respective period divided by the sum of the denominators for both years in the same period for the same firm. For variables that are not ratios, the average for each firm is the sum of the variables for both years in the respective period divided by two (i.e., the number of years in each period). Lastly, the change for each variable for each firm is calculated as the post-SFAS 123R average minus the pre-SFAS 123R average.

Executive Compensation

TOTALCOMP	Total compensation of the CEO, including equity grant values (Execucomp tdc1), in thousands of dollars.
SOCOMP	Value of the CEO's current year stock option grants (prior to 2007, Execucomp option_award_blk_value; after 2006, Execucomp option_awards_fv).

SOPERC	Percentage of the CEO's total compensation delivered as stock options (SOCOMP divided by TOTALCOMP).
DELTA	Change in the dollar value of the CEO's equity holdings associated with a 1% change in the firm's stock price. Definitions and calculations follow Coles et al. (2013) based on the methodology of Core and Guay (2002).
DELTAGR	Same calculation as DELTA but for the CEO's current year equity grants rather than equity holdings.
VEGA	Change in the dollar value of the CEO's equity holdings associated with a 0.01 change in the standard deviation of the firm's stock returns. Definitions and calculations follow Coles et al. (2013) based on the methodology of Core and Guay (2002), which uses the option valuation model from Black and Scholes (1973) as modified by Merton (1973) to consider dividends.
VEGAGR	Same calculation as VEGA but for the CEO's current year equity grants rather than equity holdings.

Corporate Tax Aggressiveness - Proxies

BTD	Book-tax differences is pre-tax accounting income (Compustat pi) less estimated taxable income. Estimated taxable income is U.S. taxable income (Compustat txfed/.35) plus foreign taxable income (Compustat pifo; if Compustat pifo is missing then txfo/.35) minus the change in tax loss carryforwards (Compustat tlcf less Compustat tlcf lagged one year). Scaled by total assets (Compustat at) lagged by one year. If Compustat txfed is missing, I calculate the missing amount as total tax expense (Compustat txt) less deferred tax expense (Compustat txdi) less foreign tax expense (Compustat txfo) less state tax expense (Compustat txs) less other tax expense (Compustat txo).

BTDPERM	Permanent book-tax differences is BTD, as calculated above but before scaling by lagged total assets, less temporary book-tax differences (Compustat txdi/.35). Scaled by total assets (Compustat at) lagged by one year).
BTDDISC	Following Frank et al. (2009), the discretionary permanent book-tax difference, BTDDISC, is the residual from regressing the permanent book-tax differences on six independent variables that typically result in permanent book-tax differences not related to corporate tax aggressiveness. The regression produces estimated coefficients for each variable which are used to calculate the expected (i.e., non-discretionary) permanent book-tax differences for each firm. The difference between the firm's permanent book-tax differences and it's expected permanent book-tax differences is assumed to be discretionary. The Frank et al. (2009) regression model is in Chapter 3.
ETRGAAP	GAAP effective tax rate is income tax expense (Compustat txt) divided by pre-tax accounting income (Compustat pi).
ETRCASH	Cash effective tax rate is income taxes paid (Compustat txpd) divided by pre-tax accounting income (Compustat pi).
ETRCASHADJ	Adjusted cash effective tax rate is income taxes paid (Compustat txpd) divided by the sum of pre-tax accounting income (Compustat pi) and the average fair value stock option grant (Compustat optfvgr) for the three-year period t to t-2.

Financial Reporting Aggressiveness - Proxies

DACCR	Following the modified Jones (1991) model, the discretionary accrual, DACCR, is the residual from regressing total accruals on three independent variables that typically result in total accruals related to the economic conditions of the firm (i.e., unrelated to financial reporting aggressiveness). The regression produces estimated coefficients for each variable which are used to calculate the expected (i.e., non-discretionary) accruals for each firm. The difference between the firm's total accruals and it's expected accruals is

	assumed to be discretionary. The Jones (1991) model including modifications from Dechow et al. (1995) and Kothari et al. (2005) is in Chapter 4.
DACCR_ABS	Absolute value of discretionary accruals, DACCR.

Corporate Tax Aggressiveness – Controls

PTROA	Pre-tax accounting income (Compustat pi) divided by lagged total assets (Compustat at lagged by one year).
NOL	Indicator variable equal to 1 for firms with a tax loss carryforward (Compustat tlcf greater than zero) and 0 otherwise.
SIZE	Natural log of total assets (Compustat at).
ATFOR	Foreign assets is solved for using the return on asset calculation. Return on assets can be broken into the asset turnover multiplied by the profit margin. Following Oler et al. (2007), I assume a firm's worldwide asset turnover is representative of a firm's foreign asset turnover, which I calculate as sales (Compustat sale) divided by total assets (Compustat at). For foreign profit margin, I divide foreign pre-tax income (Compustat pifo less Compustat txfo; if pifo is missing, Compustat pifo/.35 less Compustat txfo) by foreign sales (Compustat sale less domestic U.S. sales from Compustat's geographic segment data). Foreign ROA is foreign asset turnover multiplied by foreign profit margin. I now have three of the four variables in the return on asset formula (foreign ROA, foreign net income, and foreign sales), so I solve for foreign assets. A more detailed explanation is in Chapter 4.
LEV	Total long-term debt (Compustat dltt) plus total debt in current liabilities (Compustat dlc). Scaled by total assets (Compustat at) lagged by one year.
RD	Research and development expenses (Compustat xrd) scaled by total assets (Compustat at) lagged by one year.

CAPX	Capital expenditures (Compustat capx) scaled by total assets (Compustat at) lagged by one year.
DACCR	Discretionary accruals, as described above.
PTROASD	Standard deviation of pre-tax return on assets for the five-year period t to t-4. Pre-tax return on assets is pre-tax income (Compustat pi) divided by total assets (Compustat at) lagged by one year.

Financial Reporting Aggressiveness - Controls

MKTVAL	Natural log of the firm's market value. Market value is the number of shares outstanding (Compustat csho) multiplied by the stock price at the fiscal year-end (Compustat pprc_f).
BKMKT	Book value of equity (Compustat ceq) divided by the firm's market value, as defined above.
DEBT	Total liabilities (Compustat lt) scaled by total assets (Compustat at).
FIRMAGE	The year of the observation (Compustat fyear) minus the year the firm was first reported in Compustat.
ROA	Return on assets is income before extraordinary items (Compustat ib) divided by total assets (Compustat) lagged by one year.
STKRET	Buy-and-hold stock return (CRSP ret) at the fiscal year-end of the last 12 months. It is calculated as the exponential of the sum of the natural log of 1 plus the monthly return, minus 1.
CAPITAL	Net property, plant and equipment (Compustat ppent) divided by total assets (Compustat at) lagged by one year.
INTANG	Research and development expense (Compustat xrd) plus advertising expense (Compustat xad). Scaled by sales (Compustat sale).

SALESTDEV	Standard deviation of sales (Compustat sale) for the five-year period t to t-4, divided by total assets (Compustat at).
CFOSTDEV	Standard deviation of cash flow for the five-year period t to t-4, divided by total assets (Compustat at). Cash flow is the net cash flow from operating activities (Compustat oancf) less extraordinary items and discontinued operations from the cash flow statement (Compustat xidoc).

Appendix B

Accounting for Income Taxes - Stock Options (Pre-Stock Option Expensing)

Assumptions:

- The firm has pre-tax accounting income and taxable income of $100 before consideration of stock options and a tax rate of 20% each year (i.e., income tax expense of $20).
- In year 1, the firm grants stock options with a fair value of $15 and a 3-year vesting period.
- In year 4, the executives exercise all stock options granted in year 1. The exercised stock options have an intrinsic value of $10 for scenario A, $15 for scenario B, and $20 for scenario C.
- In year 4, income tax payable is $18 (100 – 10 x 20%) for scenario A, $17 (100 - 15 x 20%) for scenario B, and $16 (100 - 10 x 20%) for scenario C.

Stock options granted and exercised in pre-stock option expensing period (no expense for stock option compensation or related tax)						
	Year 1 (Grant)	**Year 2**	**Year 3**	**Year 4 Scenario A ($10)**	**Year 4 Scenario B ($15)**	**Year 4 Scenario C ($20)**
Inc Tax Exp Curr	20	20	20	20	20	20
Inc Tax Pay	20	20	20	18	17	16
APIC	-	-	-	2	3	4
Current Income Tax Expense (All Years)				80	80	80
Income Tax Payable (All Years)				78	77	76

Appendix C

Accounting for Income Taxes - Stock Options (Post-Stock Option Expensing)

Assumptions:

- All assumptions from Appendix B
- The fair value at date of grant, $15, is deducted over the 3-year vesting period. This provides a deduction of $5 for each year in the vesting period and the related tax savings is $1 ($5 x 20%) per year.

Stock options granted and exercised in post-stock option expensing period (expense equal to fair value at date of grant as well as related tax, deducted over the vesting period of the option)						
	Year 1 (Grant)	**Year 2**	**Year 3**	**Year 4 Scenario A ($10)**	**Year 4 Scenario B ($15)**	**Year 4 Scenario C ($20)**
Inc Tax Exp Curr	20	20	20	18	17	16
Inc Tax Pay	20	20	20	18	17	16
Inc Tax Exp Curr						1
APIC						1
DTA	1	1	1	3	3	3
Inc Tax Exp Def	1	1	1	3	3	3
Current Income Tax Expense (All Years)				78	77	77
Income Tax Payable (All Years)				78	77	76

Appendix D

Differences in Current Income Tax Expense and Actual Tax Liability

Hanlon (2003) points that generally a firm's current income tax expense should be representative of the firm's actual tax liability on the tax return. However, this is the case only for firms that do not have stock option compensation, accruals for aggressive tax positions, and intra-period tax allocation.

First, as mentioned under "Financial Reporting of Stock Options" and illustrated in Appendix B and C, stock option compensation creates differences between current income tax expense and income taxes payable prior to stock option expensing and, to a lesser extent, after stock option expensing through 2016. After 2016, stock option compensation no longer creates a difference between current income tax expense and income taxes payable. For stock option compensation, current income tax expense would be higher than the firm's actual tax liability by the amount of tax savings on stock option compensation that was not expensed in the financial statements.

Second, firms may accrue tax expense for aggressive positions taken on a tax return, referred to as uncertain tax benefits, and the accrual is typically recorded as current income tax expense. Only if the aggressive position is related to a temporary difference that reverses at a future time will the accrued tax expense be recorded as deferred income tax expense. The actual tax liability on the tax return does not include accruals for aggressive tax positions. Therefore, current income tax expense would be higher than the actual tax liability.

Lastly, intra-period tax allocation requires income tax expense to be allocated to four categories. Two of these categories, discontinued operations and extraordinary items (prior to elimination by FASB Accounting Standards Update No. 2015-01), are reported on the income statement net of income tax. Thus, current income tax expense does not include income tax on discontinued operations or extraordinary items. The actual tax liability on the tax return includes all categories of income tax. Therefore, current income tax expense would be lower than the actual tax liability.

Appendix E

Impact of Temporary Book-Tax Differences on Income Taxes

For the sake of simplicity, let us assume one temporary book-tax difference where the deduction for tax is larger than book in year one and reverses in year two so that the deduction for book is larger than tax. Further, let us assume that income tax related to the temporary difference $10 and, if there was no temporary difference, income taxes paid would be $100 for each year

Income Taxes	Originating Year	Reversing Year	Total
Cash income taxes paid	$90	$110	$200
Current income tax expense	$90	$110	$200
Deferred income tax expense	$10	($10)	--
Total income tax expense	$100	$100	$200

In the above example, cash income taxes paid and current income tax expense are the same amount within the same year because the temporary book-tax differences impact both in the same manner. The amount of total income tax expense is different because the income tax on the temporary book-tax difference is recorded in deferred income tax expense. The total income tax expense is the same as if there was no temporary book-tax difference.

Appendix F

Book-Tax Differences: Effects of Stock Option Compensation

Using Scenarios B and C from Appendix B and Appendix C, the below table calculates book-tax differences. For simplicity, the below table uses 20% as the statutory tax rate to gross-up current U.S. income tax expense.

	Year 1 (Grant)	**Year 2**	**Year 3**	**Year 4 Scenario B ($15)**	**Year 4 Scenario C ($20)**
Stock options granted and exercised in pre-stock option expensing period					
Pre-Tax Accounting Income	$100	$100	$100	$100	$100
Estimated Taxable Income	$100 ($20/20%)	$100 ($20/20%)	$100 ($20/20%)	$100 ($20/20%)	$100 ($20/20%)
Total Book-Tax Differences	$0	$0	$0	$0	$0
Less: Temporary Book-Tax Differences	$0	$0	$0	$0	$0
Permanent Book-Tax Differences	$0	$0	$0	$0	$0
Stock options granted and exercised in post-stock option expensing period					
Pre-Tax Accounting Income	$95	$95	$95	$100	$100
Estimated Taxable Income	$100 ($20/20%)	$100 ($20/20%)	$100 ($20/20%)	$85 ($17/20%)	$85 ($17/20%)
Total Book-Tax Differences	-$5	-$5	-$5	$15	$15
Less: Temporary Book-Tax Differences	-$5 (-$1/20%)	-$5 (-$1/20%)	-$5 (-$1/20%)	$15 ($3/20%)	$15 ($3/20%)
Permanent Book-Tax Differences	$0	$0	$0	$0	$0

Stock option expensing results in total book-tax differences that are lower in the post-stock option expensing period during the vesting period and higher in the post-stock option expensing period during the year of exercise. Permanent book-tax differences are comparable between the two periods.

Appendix G

Effective Tax Rates: Effects of Stock Option Compensation

Using Scenarios B and C from Appendix B and Appendix C, the below table calculates effective tax rates.

	Year 1 (Grant)	**Year 2**	**Year 3**	**Year 4 Scenario B ($15)**	**Year 4 Scenario C ($20)**
Stock options granted and exercised in pre-stock option expensing period					
Cash Income Taxes Paid	$20	$20	$20	$17	$16
Current / Total Income Tax Exp	$20 / $20	$20 / $20	$20 / $20	$20 / $20	$20 / $20
Pre-Tax Accounting Income	$100	$100	$100	$100	$100
Cash ETR	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)	17% ($17/$100)	16% ($16/$100)
Curr ETR	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)
GAAP ETR	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)	20% ($20/$100)
Stock options granted and exercised in post-stock option expensing period					
Cash Income Taxes Paid	$20	$20	$20	$17	$16
Current / Total Income Tax Exp	$20 / $19	$20 / $19	$20 / $19	$17 / $20	$17 / $20
Pre-Tax Accounting Income	$95	$95	$95	$100	$100
Cash ETR	21% ($20/$95)	21% ($20/$95)	21% ($20/$95)	17% ($17/$100)	16% ($16/$100)
Curr ETR	21% ($20/$95)	21% ($20/$95)	21% ($20/$95)	17% ($17/$100)	17% ($17/$100)
GAAP ETR	20% ($19/$95)	20% ($19/$95)	20% ($19/$95)	20% ($20/$100)	20% ($20/$100)

Stock option expensing results in Cash ETRs that are higher in the post-stock option expensing period during the vesting period and comparable in the year of exercise. GAAP ETRs are comparable between the two periods for all years.

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