THREE ESSAYS ON INSTITUTIONAL INVESTORS
AND INCOME TAXES

by
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ABSTRACT

This dissertation investigates the role of institutional investors in capital market tax studies. Specifically, this studies examines how institutional investors influence firms’ cost of capital and financing decisions following changes in personal tax rates on debt and equity income. The dissertation is organized into three essays that examine these topics. The first two essays examine tax rate changes in 1997 and 2003 that reduced the personal tax rates on interest, capital gains and dividends. Essay 3 summarizes relevant literature involving institutional investors and capital market tax studies.

Essay 1 investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affect firms’ capital structures and decisions to issue debt versus equity following changes in tax rates on investment income received by individuals. The study predicts that firms with high concentrations of tax disadvantaged institutional investors (institutions whose underlying shareholders are taxable) will issue more equity relative to debt than those with high concentrations of tax-advantaged institutional investors (institutions whose underlying shareholders are not taxable). The results find that the financing decisions of firms with high levels of tax-disadvantaged institutional investors are influenced by changes in individual tax rates.

Essay 2 investigates whether differences in the tax attributes of the underlying shareholders of institutional investors influences the impact of equity tax rate changes on a firm’s cost of equity. The study examines a sample period of two years (eight quarters) around the
enactment of the 1997 and 2003 Acts. The study finds that firms with high levels of tax-disadvantaged ownership experienced a decrease in their cost of equity capital following a decrease in the individual tax rate on capital gains. In addition, the interaction of the institutional investor dummy variable and a dummy variable indicating the observation is after the 2003 Act indicates that the cost of equity capital for firms with high levels of tax-disadvantaged ownership decreased following the 2003 Act. The results of Essays 1 and 2 provide evidence that institutional investors are not homogeneous with respect to their influence on firms’ cost of capital and financing decisions following changes in individual tax rates.
DEDICATION

This dissertation is dedicated to my wife, Jennifer, and my daughter, Ella.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>1993 Act</td>
<td>Revenue Reconciliation Act of 1993</td>
</tr>
<tr>
<td>1997 Act</td>
<td>The Taxpayer Relief Act of 1997</td>
</tr>
<tr>
<td>CRSP</td>
<td>Center for Research in Securities Prices</td>
</tr>
<tr>
<td>D</td>
<td>Debt</td>
</tr>
<tr>
<td>d</td>
<td>Dividends</td>
</tr>
<tr>
<td>F</td>
<td>Fishers $F$ Ratio</td>
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<tr>
<td>$G_l$</td>
<td>Gain per Dollar of Leverage</td>
</tr>
<tr>
<td>P</td>
<td>Share Price</td>
</tr>
<tr>
<td>PTP</td>
<td>Personal Tax Penalty of Debt</td>
</tr>
<tr>
<td>$R^2$</td>
<td>Coefficient of determination (the proportion of variability in the data that is accounted for by a given statistical model)</td>
</tr>
<tr>
<td>$r_d$</td>
<td>Discount Rate</td>
</tr>
<tr>
<td>$r_f$</td>
<td>Return on Tax Free Investment</td>
</tr>
<tr>
<td>$r_t$</td>
<td>Return on Taxable Investment</td>
</tr>
<tr>
<td>$r_{ts}$</td>
<td>Return on Taxable Stock Investment</td>
</tr>
<tr>
<td>SEC</td>
<td>Securities Exchange Commission</td>
</tr>
<tr>
<td>$t$</td>
<td>Personal Tax Rate on Investments</td>
</tr>
<tr>
<td>$t_c$</td>
<td>Corporate Tax Rate</td>
</tr>
</tbody>
</table>
\( t_{cg} \)  
Personal Tax Rate on Capital Gains

\( t_d \)  
Personal Tax Rate on Dividends

\( t_pb \)  
Personal Tax Rate on Income from Debt

\( t_{ps} \)  
Personal Tax Rate on Income from Equity
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INTRODUCTION

This dissertation investigates the role of institutional investors in capital market tax studies. Specifically, this studies examines how institutional investors influence firms’ cost of capital and financing decisions following changes in personal tax rates on debt and equity income. The dissertation is organized into three essays that examine these topics. The first two essays examine tax rate changes in 1997 and 2003 that reduced the personal tax rates on interest, capital gains and dividends. Essay three summarizes relevant literature involving institutional investors and capital market tax studies.

Essay one investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affect firms’ capital structures and decisions to issue debt versus equity following changes in tax rates on investment income received by individuals. The study predicts that firms with high concentrations of tax disadvantaged institutional investors (institutions whose underlying shareholders are taxable) will issue more equity relative to debt than those with high concentrations of tax-advantaged institutional investors (institutions whose underlying shareholders are not taxable). The results of this study indicate that institutional investors are not a homogenous tax-exempt group; rather they are affected by individual tax rates in a differential manner. The results show that the financing decisions of firms with high levels of tax-disadvantaged institutional investors are influenced by changes in individual tax rates and the personal tax penalty of debt.
Essay two investigates whether differences in the tax attributes of the underlying shareholders of institutional investors influences the impact of equity tax rate changes on a firm’s cost of equity. The study examines a sample period of two years (eight quarters) around the enactment of the 1997 and 2003 Acts. The study finds that firms with high levels of tax-disadvantaged ownership experienced a decrease in their cost of equity capital following a decrease in the individual tax rate on capital gains. In addition, the interaction of the institutional investor dummy variable and a dummy variable indicating the observation is after the 2003 Act indicates that the cost of equity capital for firms with high levels of tax-disadvantaged ownership decreased following the 2003 Act. These results provide evidence that institutional investors are not homogenous with respect to their influence on firm cost of equity following changes in individual tax rates.

The three essays in this dissertation investigate how institutional investors interact with personal income taxes in the capital markets. The three essays are closely related. Essay one investigates whether firm financing decisions are influenced by the tax status of its shareholder following changes in personal tax rates. A major factor in these decisions is the firm’s cost of capital and changes in its cost of capital. Essay two investigates whether a firm’s cost of capital is influenced by the tax status of its shareholders following changes in personal tax rates. Therefore, essay two’s results have a direct impact on essay one. Essay three provides a summary of literature that the theories of essays one and two are based.
CHAPTER 1
THE EFFECT OF THE TAX HETEROGENEITY OF INSTITUTIONAL INVESTORS ON
FIRM FINANCING DECISIONS FOLLOWING CHANGES IN PERSONAL TAX RATES ON
EQUITY AND DEBT INCOME

1. Introduction

Prior research (Graham, 1999; Dhaliwal et al., 2007) finds that recent tax law changes have influenced a firm’s decision to issue equity relative to debt. This effect occurs because the tax law change increases taxable investors’ preference for equity income relative to debt income and decreases a firms cost of equity relative to debt (Dhaliwal et al., 2007). Dhaliwal et al. (2007) find that institutional investors mitigate the effect of investor level tax rates on firm decisions. This research assumes that institutions are a homogenous tax-exempt group and influence firm financing decisions in the same manner. This research may assume that institutional investors are tax-exempt because some institutional investors have shareholders that do not pay tax on their investments (e.g. pension funds and charitable endowments); however, some of the underlying shareholders of institutions do pay tax on their investment (e.g. mutual funds). Chetty and Saez (2005) indicate that a firm’s collective institutional ownership is not an accurate proxy for tax-exempt investors. This study extends existing research by investigating the possibility that institutional investors are heterogeneous with respect to their influence on firm financing decisions. Therefore, these taxable institutions could exacerbate the effects of the tax law changes on a firm’s financing decision.
Tax laws enacted in 1997 and 2003 provide an ideal setting to examine how changes in investor level tax rates and composition of a firm’s institutional investors influence a firm’s capital financing decision. The Taxpayer Relief Act of 1997 (hereafter, the 1997 Act) reduced the tax rate on capital gains from 28 percent to 20 percent, while leaving the tax rates on dividend income and interest income at 39.6 percent. The Jobs and Growth Tax Relief Reconciliation Act of 2003 (hereafter, the 2003 Act) reduced the tax rate on dividend income from 38.6 percent to 15 percent, and the capital gain rate from 20 percent to 15 percent. The tax rate on interest income decreased from 38.6 percent to 35 percent. The net effect of these changes is that taxable investor preference for equity income increased and firm cost of equity decreased (Dhaliwal et al., 2007), which created an incentive for firms to issue more equity relative to debt.

While institutional investors were not the intended beneficiary of the tax rate changes, many institutional investors have taxable individual shareholders. Prior research (Usrey et al., 2007; Moser & Puckett, 2007) provides evidence that the investment decisions of institutional investors with underlying shareholders who are taxable are influenced by individual income tax rates. This study examines whether differences between the tax liability of the underlying shareholders of institutional investors affects firms’ capital structures and decisions to issue debt versus equity following decreases in tax rates on investment income received by individuals. Specifically, I investigate whether firms with greater (lesser) concentrations of tax disadvantaged (advantaged) institutional investors 1) issue more (less) equity relative to debt when individual income tax rates on equity income decrease and 2) experience significant changes in their capital structure following decreases in individual equity income tax rates.

1 The maximum tax rate on ordinary income was decreased in 2001 to 39.1 percent and to 38.6 percent in 2002. Corporate tax rates were not affected by the 1997 Act or the 2003 Act.
Financial theory indicates that a firm chooses its optimal capital structure by evaluating the benefits of debt financing, including tax benefits, versus the costs of debt financing, including financial distress and bondholder/stockholder disagreements (Kraus & Litzenberger, 1973; Scott, 1976; Bradley et al., 1984). Prior research (MacKie-Mason, 1990; Trezvant, 1992; Graham, 1996; Shum, 1996) indicates that the tax benefits a firm receives from debt financing does influence firm financing decisions and capital structure, and firms with low tax rates use less debt financing. In addition, firms choose to use more debt financing when tax rate changes favor debt (Gordon & MacKie-Mason, 1990; Givoly et al., 1992; Rajan & Zingales, 1995). Dhaliwal et al. (1992) and Graham et al. (1998) find positive correlations between tax rates and debt levels.

In addition to corporate tax rates, Miller (1977) argues that personal tax rates on equity and debt income affect the benefits a firm receives from debt financing. When individual income taxes on debt income are greater than equity income, corporations must provide higher before tax returns on debt issuances to remunerate investors for the difference in tax rates. This remuneration increases the cost of debt capital relative to the cost of equity. Graham (1999) and Dhaliwal et al. (2007) examine the impact of investor level income tax rates and changes in those tax rates on corporate financial structure and financing decisions. These studies find that corporate debt financing is influenced by investor level rates. Dhaliwal et al. (2007) also find that a firm’s collective institutional ownership, their proxy for the probability that a firm’s marginal investor is tax exempt, reduces the effect of investor level taxes on firm financing decisions.

Prior research (Usrey et al., 2007; Moser & Puckett, 2007) indicates that institutional investors are not a homogenous group with respect to their tax liabilities. In other words, certain types of institutional investors (e.g. mutual funds) are influenced by the taxability of their
underlying shareholders, while other types (e.g. pension funds, charitable endowments) exhibit investment behavior consistent with a tax-exempt entity. Usrey et al. (2007) provide evidence that mutual funds, whose primary shareholders are taxable individuals, increased their stock holdings of dividend paying firms following a decrease in personal dividend tax rates. Moser and Puckett (2007) find that, when the dividend tax penalty is high, tax-disadvantaged institutions (mutual funds and investment advisors) hold lower amounts of dividend paying stocks than tax-advantaged institutions (charitable endowments, pension funds, universities).

When investors pay higher taxes on interest income relative to equity income (i.e. dividend and capital gain income), a tax disadvantage exists with respect to interest income that conflicts with the tax benefit from the corporate interest deduction. Existing research indicates that firm financing decisions are influenced by personal tax rates and that institutional investors are heterogeneous with respect to their tax liabilities. I predict that the extent that a firm’s shares are owned by tax disadvantaged institutional owners (tax-advantaged institutional investors) will influence whether more (less) equity is issued (relative to debt issuances) following a decrease in individual taxpayer equity tax rates. I also predict that changes in debt in a firm’s capital structure will be negatively associated with a firm’s tax disadvantaged institutional ownership.

Prior research has not established a consistent approach to studying the effects of taxes on firm financing decisions. MacKie-Mason (1990) and Dhaliwal et al. (2007) investigate the effect of taxes on firm financing decisions by using new issuances of debt and equity. MacKie-Mason (1990) argues that using new issues is preferable compared to debt-to-equity ratios because new issues focus on financing decisions given the current position of the firm at the time of issuance. The use of debt-to-equity ratios is advantageous because debt-to equity ratios reflect all of a firm’s financing decisions and, by properly constructing a tax variable, the cumulative effect can
be controlled (Graham, 1999). Therefore, I examine new equity and debt issuances, and changes in debt-to-equity ratios.

The results of this study provide evidence that the tax rate changes provided in the 1997 and 2003 Acts influenced firms to issue more equity relative to debt and reduce their debt. Additionally, the results show that the individual tax rates on interest income influence firms to issue more equity and decrease debt. The results also indicate that tax-disadvantaged institutional investors do not mitigate the effects of individual income taxes on firm decisions, which is inconsistent with being a tax-exempt investor. Supplemental analysis indicates that tax-advantaged institutional investors mitigate the impact of individual income taxes on firm decisions, which is consistent with being a tax-exempt investor. Overall, the results indicate that institutional investors influence firm decisions in a differential manner and are not a homogenous tax-exempt group.

This study extends the literature examining the impact of personal taxes on firm financing decisions by investigating how specific investors influence firm financing decisions. This study also contributes to the literature examining the tax heterogeneity of institutional investors by investigating whether institutions whose underlying shareholders are taxed differently influence firm decisions in a differential manner. Prior research has documented that personal taxes can influence firm financing decisions. Institutional investors have become influential in the capital markets because of their significant market share. It is important to understand how heterogeneity among institutional investors impacts firm capital structure and financing decisions. Shevlin (2007) acknowledges the importance of understanding how the heterogeneity of institutional investors affects capital market tax studies.

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2 Graham, et al. (1998) removes this cumulative effect by using a before-financing tax variable.
The remainder of the paper proceeds as follows: The next section provides a review of applicable literature. The third section develops the hypotheses. Section four describes the study’s methodology. Section five presents the results and section six concludes.

2. Background and Literature Review

*Taxes and Financing Decisions*

Traditional financial theory holds that a firm should weigh costs and benefits of debt when making a financing decision. The benefit received from debt financing is the interest deducted from taxable earnings, while a major cost is financial distress. Financial theory assumes a firm will choose its optimal capital structure by balancing the bankruptcy costs against the tax benefits of debt. The tax benefits of debt are the product of the corporate tax rate \( t_c \), the interest rate \( r_d \), and the amount of debt, \( D \). Modigliani and Miller (1963) assert that tax benefits and debt are equally risky, therefore the tax benefit of debt is capitalized using \( r_d \) as the discount rate. Allowing that the tax benefits of debt and the debt itself are perpetual, the tax benefit of debt can be simplified to \( t_c D \).

Miller (1977) argues that the individual tax rate on income should be incorporated in the tax benefit calculation. He estimates a firm’s gain per dollar of leverage, \( G_l \), as:

\[
G_l = \left[ 1 - \frac{(1-t_c)(1-t_{ps})}{1-t_{pb}} \right],
\]

where \( t_{ps} \) is the personal tax rate on income from common stocks, and \( t_{pb} \) is the personal tax rate on income from bonds. Equation (1) shows that the corporate tax rate and the individual tax rate decrease the gain on leverage. Therefore, the corporate tax rate does reduce a firm’s cost of debt; however, individual tax rates may reduce or increase the cost of debt. When investors pay a
higher tax rate on debt income than equity income, the benefit of corporate tax rates is offset by individual income tax rates.

Miller (1977) argues that should events allow the equation $(1-t_{pb}) = (1-t_c) (1-t_{ps})$ to be satisfied, then a market equilibrium level of debt will occur. Nevertheless, prior research has examined the effect of corporate taxes on financial decisions. DeAngelo and Masulis (1980) model the relationship between corporate tax benefits of debt and firms preferred debt ratios. They show that, although firms have equal statutory marginal tax rates, the firm’s tax benefit from interest deductions depends on the firm’s level of non-debt tax shields, such as loss carryfowards and depreciation deduction. Firms with higher non-debt tax shields are less likely to benefit from interest deductions and will carry less debt (i.e. firms will substitute non-debt tax shields for interest deductions). Ultimately, variance in the firm level tax benefit of debt results in variation of optimal firm-level debt ratios.

Empirically testing DeAngelo and Masulis (1980), MacKie-Mason (1990) investigates the effects of non-debt tax shields on financing decisions. He argues that a firm’s tax loss carryfoward has an effect on the marginal tax rate and should impact the tax benefit of debt and financing decisions. Using a sample of debt and equity issues from 1977-1987, MacKie-Mason finds that firms with high tax loss carryfowards (implying a lower effective corporate tax rate) issue less debt than firms with low tax loss carryfowards (higher effective corporate tax rate). Another test of the substitution effect is the investigation of the relationship between a firm’s tax status and its capital structure by Dhaliwal et al (1992). They perform a cross-sectional analysis of the relationship between the immediate deductibility of a firm’s non-debt tax shields and its interest deductions. They find that a firm’s financing decisions are influenced by its marginal tax rate. Givoly et al. (1992) test the relationship between leverage and non-debt tax shields.

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3 The marginal tax rate is defined as the present value tax obligation resulting from earning an extra dollar.
following the Tax Reform Act of 1986. They find that financing decisions are influenced by corporate tax rates.

In addition to the corporate tax, Miller (1977) asserts that personal taxes should influence a firm’s capital structure. While the interest deduction provides a tax advantage from debt financing, the income tax on interest income at the personal level is a disadvantage to debt financing. The disadvantage of debt financing occurs because interest income is taxed at the ordinary income rate, while equity income can consist of dividends or capital gain income.\(^4\) Green and Hollifield (2003) model the relationship between the tax advantages of equity financing and firm capital structures. They show that the tax disadvantages of debt do not completely offset the advantages of debt but are large enough to create variation in firm level capital structure. Dhaliwal et al. (2007) expand equation (1) to include the personal tax rates on dividends and capital gains as follows:

\[
G_t = 1 - \left[ \frac{(1-t_c)(1-[dt_d+(1-d)t_{cg}]t_{pb})}{1-t_{pb}} \right],
\]  

where \(d\) is the firm’s dividends, \(t_d\) is the personal tax rate on dividends, and \(t_{cg}\) is the personal tax rate on capital gains.

Prior research provides support for this analytical analysis. Givoly et al. (1992) investigate the relationship between investor tax rates and firm debt policy. Using firm dividend policy as a proxy for whether the firms marginal investor has high or low tax rate, they predict that firms with high dividend yields (marginal investors with low tax rates) will increase their debt less than than firms with low dividend yields (marginal investors with high tax rates).

\(^4\) Ordinary income rates have ranged from 39.6% in 1990 to 35% in 2006. Dividends were taxed at ordinary rates until 2003 when the tax rate on dividends was lowered to 15%, while capital gain rates have ranged from 28% in 1990 to 15% in 2007.
Consistent with this prediction, Givoly et al. (1992) find that firms with high marginal tax rate investors increase their debt less than those with low marginal tax rate investors.

Graham (1999) investigates the tax disadvantages of debt from personal taxes and its effect on firm capital structure. He finds that the tax disadvantages of debt are negatively related to a firm’s debt ratio, providing evidence that personal taxes influence firm financing decisions. Graham finds that corporate and personal taxes lead to optimum capital structures, indicating that the tax disadvantages of personal taxes do not completely offset the advantages from interest deductions. While Graham finds that differences in corporate and personal tax rates influence firm debt ratios, he does not find significant evidence that time-series variation in personal taxes influences a firm’s capital structure. Graham’s explanation of this finding is that his sample period is from 1980 to 1994, when there is little variation in tax rates on interest and dividend income.

Dhaliwal et al. (2007) investigate the effect of personal taxes on a firm’s decision to issue equity or debt. They study changes in personal tax rates on dividends and capital gains following the 1997 and 2003 Acts. This sample period alleviates the problems of Graham (1999) because personal tax rates on interest and dividends varies during the sample period. Dhaliwal et al. (2007) find that, when tax rates on equity income (capital gains and dividends) were decreased by the 1997 and 2003 Acts, firms were more likely to issue equity relative to debt. This finding provides additional support that personal tax rates on debt income are a disadvantage to debt substantial enough to influence corporate financing decisions.

**Institutional Investors and Personal Taxes**

Prior research (Michaely et al., 1995; Dhaliwal et al., 1999; Grinstein & Michaely, 2005; Jin, 2006; Moser & Puckett, 2007; Usrey et al., 2007) on the relationship between capital
markets, institutional investors, and personal taxes has primarily focused institutional investors’ equity investment decisions. This research investigates Miller and Modigliani’s (1961) conclusion that, when there are differential personal tax rates on dividend and capital gain income, investors will form clienteles based on their effective marginal tax rates. Specifically, they predict that high tax rate investors will form clienteles for low dividend paying firms, while low tax rate investors will form clienteles for high dividend paying firms. Empirical research (Michaely et al., 1995; Dhaliwal et al., 1999; Grinstein & Michaely, 2005; Jin, 2006; Moser & Puckett, 2007; Usrey et al., 2007) investigates whether institutional investor investment decisions are influenced by the differential personal tax rates on dividend and capital gain income.\(^5\)

Michaely et al. (1995) examine market reactions following dividend omissions and initiations. They do not find statistically significant evidence that institutional ownership changes following dividend omissions. In contrast, Dhaliwal et al. (1999) examine institutional ownership changes for dividend initiating firms. They find a statistically significant increase in institutional ownership following a dividend initiation. Ayers et al. (2002) find that high dividend yield firms have a higher percentage of aggregate institutional ownership compared to firms that do not pay dividends.

Grinstein and Michaely (2005) examine institutional ownership and firm payout policy from 1980 to 1996 to determine whether firm payout policy influences institutional holdings and whether institutions influence firm payout policy. Consistent with Ayers et al. (2002), they find that institutions prefer firms that pay dividends and firms that repurchase shares. However, they do not find that higher concentrations of institutional ownership influence a firm’s future

\(^5\) Prior to the 2003 Act, individual tax rates on capital gains were less than individual tax rates on dividend income. The 2003 Act equalized these rates.
dividends, repurchases, or total payout. The aforementioned studies indicate that no consensus exists as to whether personal taxes influence institutional investor investment preferences.

It is possible that the lack of agreement is attributable to the aforementioned studies treating institutional investors as a homogenous group (used as a proxy for the tax-exempt marginal investor). In other words, these studies treat institutional investors as if they are influenced by personal taxes in the same manner. However, the underlying shareholders of institutional investors are not affected by taxes in the same manner. A pension fund’s shareholders defer taxes on their investment earnings. Charitable endowments do not pay taxes on their investments, whereas, a large percentage of mutual fund investors pay taxes on their earnings in the current period. Chetty and Saez (2005) state that “raw institutional ownership is clearly not a valid proxy for nontaxable status.”

It should be noted that factors other than tax differences between institutional investors could account for differential investment behaviors. Some mutual funds have stated investment policies that limit their flexibility when deciding on investing in a firm. For example, a mutual fund may have a stated policy that it will invest in utilities. There may also be legal considerations for an institution to consider. Del Guercio (1996) examines differences in the investment behavior of different types of institutions arising from the legal burden placed on them as fiduciaries. A fiduciary’s motive for meeting legal burdens is referred to as “prudence.” Del Guerico reports that banks, who are exposed to the most legal liability, invest more heavily in stocks that are considered prudent investments by courts, whereas mutual funds, which are not as exposed to legal liabilities, are less influenced by “prudence.”

Jin (2006) provides evidence that the tax status of an institution’s underlying shareholder base impacts its trading decisions. Usrey et al. (2007) provide evidence that mutual funds, whose

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6 Bergstresser and Poterba (2002) estimate the median investor in a mutual fund is subject to a 31% marginal rate.
primary shareholders are taxable individuals, increased their stock holdings of dividend paying firms following the 2003 Act. They also find that institutional investors other than mutual funds decreased their holdings of dividend paying firms during the same period. Moser and Puckett (2007) investigate the relationship between changing tax regimes and institutional preference for dividends. They find that when the dividend tax penalty is high, tax disadvantaged institutions (mutual funds and investment advisors) hold lower amounts of dividend paying stocks than tax advantaged institutions (charitable endowments, pension funds, universities). These studies indicate that institutional investors are not homogenous with respect to their tax preferences. Prior research has not investigated whether tax heterogeneity among institutional investors influences corporate financing decisions.

Prior research on the effect of institutional investors on firm capital structure indicates that institutional investors may be a substitute for the disciplinary and signaling roles of debt. Jensen (1986) suggests that firms can use debt to reduce agency problems by reducing the resources available for consumption by management. Grier and Zychowicz (1994) and Moh’d et al. (1998) show a negative correlation between a firm’s debt levels and its percentage of shares owned by institutional investors. The authors suggest institutional investor monitoring and disciplinary pressure imposed on managers may supplant the disciplinary role of debt and mitigate the effectiveness of debt as a signal. Dhaliwal et al. (2007) find that when personal tax rates on interest income are greater than rates on dividend income, firms are more likely to issue equity rather than debt. However, they find that this effect is decreased by aggregate institutional ownership, their proxy for the tax exempt marginal investor.

These studies treat institutional investors as one group and do not investigate whether differences between institutional investors impact a firm’s capital structure. This study
investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affects firms’ capital structures and decisions to issue debt versus equity. This study contributes to literature on: 1) how personal taxes affect firm financing decisions, and 2) how the tax heterogeneity of institutional investors plays a role in the relationship between personal taxes and capital markets.

3. Hypothesis Development

Firms have a choice of how to finance a project (issue debt or equity). If they issue debt, then they must pay an interest rate equal to a tax-free equivalent bond (same risk) plus compensation for the tax on their bond. Their cost of issuing debt is reduced by the fact that they get to take a deduction for the interest they pay on the bond. When firms issue equity they also have to compensate investors (in the form of higher returns) for the taxes the investor must pay on capital gains or dividends; however, the firm does not get a deduction for paying dividends or increasing the price of their shares. When tax rates on equity income equal tax rates on interest income, the interest deduction is a benefit that leads a firm to issue debt instead of equity. When tax rates on equity income are less than interest income, a firm’s cost of equity decreases, and the tax advantage of the interest deduction is partially offset by the tax-disadvantage of debt (Graham, 1999), and firms are more likely to issue equity instead of debt (Dhaliwal et al., 2007).

Dhaliwal et al. (2007) find that when the tax rate on equity income is decreased, aggregate institutional ownership, their proxy for the tax exempt marginal investor, minimizes the affects of personal taxes on a firm’s decision to issue equity or debt. This result occurs because tax-exempt investors reduce the cost of equity decrease a firm receives from the decrease in tax rates on equity income. However, Usrey et al. (2007) and Moser and Puckett (2007) provide evidence that institutional investors are not homogenous with respect to their tax.
preferences. This allows for the possibility that not all institutional investors reduce the cost of equity benefit a firm receives from a decrease in tax rates on equity income.

A decrease in personal tax rates on equity income should influence tax-disadvantaged institutional investors’ preference for equity income, whereas tax-advantaged institutions should not be influenced. Firms with high concentrations of tax-disadvantaged institutional investors should experience a greater reduction in cost of equity following a tax rate decrease than firms with high concentrations of tax-advantaged institutional investors. The 1997 Act and 2003 Act decreased the personal tax rates on equity income relative to debt income. Therefore, it is expected that, following the 1997 and 2003 Acts, firms with high concentrations of tax-disadvantaged institutional investors will issue more equity relative to debt than those with high concentrations of tax-advantaged institutional investors. Formally stated:

H1: Following decreases in the personal tax rates on equity income from the 1997 Act and the 2003 Act, firms with high concentrations of tax-disadvantaged institutional ownership will issue more equity relative to debt than firms with high concentrations of tax-advantaged institutional ownership.

Hypothesis 1 predicts that a firm’s financing decisions will be influenced by the tax status of its institutional owners following a change in personal tax rates on investment income. While the 1997 Tax Act decreased personal tax rates on capital gain income, it did not affect tax rates on dividend income. Therefore, a firm’s dividend policy should affect the magnitude of the effects of the 1997 Act on that firm’s equity or debt decision. Dhaliwal et al. (2007) find that a firm’s dividend yield is positively associated with the probability of a firm issuing debt following the 1997 Act. The 1997 Act should have greater influence on the net equity issuances of non-
dividend paying firms with high concentrations of tax-disadvantaged institutional investors than non-dividend paying firms with high concentrations of tax-advantaged institutional investors.

H2: The magnitude of the association between net equity issuance and non-dividend paying firms following the 1997 Act is greater for firms with high concentrations of tax-disadvantaged institutional ownership than firms with high concentrations of tax-advantaged institutional ownership.

Hypothesis H1 investigates a firm’s decision to issue equity or debt. Consequently, a firm’s capital structure will be influenced by this decision. Firms that are more (less) likely to issue equity relative to debt following a decrease in the personal tax rate on equity income are more (less) likely to experience negative changes in their debt to equity ratio following a decrease in the personal tax rates on equity income relative to debt income. Therefore, I predict:

H3: Following decreases in the personal tax rates on equity income from the 1997 Act and the 2003 Act, firms with high concentrations of tax-disadvantaged institutional ownership will have larger decreases in their debt to market value of equity ratio than firms with high concentrations of tax-advantaged institutional ownership.

4. Methodology

I investigate (1) new equity and debt issuances and (2) changes in capital structure around identifiable events that signal a change in personal tax rates on investment income. Proposed in March 1997 and signed in August 1997, the 1997 Act reduced the tax rate on capital gains from 28 percent to 20 percent and was made retroactive to May 7, 1997. Signed in May 2003, the 2003 Act reduced the tax rate on dividend income from 38.6 percent to 15 percent and the capital gain rate from 20 percent to 15 percent. Interest income continued to be taxed as ordinary
income, which was decreased from 38.6 percent to 35 percent. These tax acts provide an ideal
setting to test how institutional investors influence corporate financing decisions following
changes in personal investment tax rates.

**Sample and Data**

I examine changes in capital structure and new issues of equity and debt from January 1,
made effective May 6, 2003. Therefore, I segment the sample into two tax regimes:

1. The 1997 Tax Act regime from January 1, 1995 until December 31, 1999

Table 1 provides a summary of the segmented tax regimes.

I begin by collecting institutional investor ownership data for the period from January 1,
1995 until December 31, 2006. This information is gathered from 13F filings obtained through
the Thomson Financial Securities Data. Form 13F is an SEC mandated quarterly statement that
must be filed by all institutions who exercise investment discretion over greater than $100
million of securities. Form 13F requires that all common stock holdings of $200,000 or greater
than 10,000 shares must be reported. Individual fund data are collected via fund prospectuses and
SEC N30D filings.

Institutions are classified into five categories: Bank holding companies, Mutual funds,
Investment advisors, Insurance companies, and other institutional shareholders. Consistent with
prior research (Chetty & Saez, 2005; Strickland, 2002; Moser, 2007; Moser & Puckett, 2007), I
divide institutional investors into two categories based on the taxability of their underlying

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7 May 6, 2003 is the date the tax rate reduction affects capital gains sales of stock. The tax rate reduction on
dividend income was made effective on the first day of 2003. Consistent with Dhaliwal et al. (2007), I use May 6,
2003 as the cutoff for the post-enactment period.

8 Thomson Financial disclosed that classifications for year 1998 and beyond are incorrect. Approximately 1,000
mutual funds and investment advisors were misclassified as other institutional investors. Following, Moser and
Puckett (2007) institutional shareholders are manually reclassified to their pre-1998 classification.
shareholders. The first group is tax-advantaged institutions consisting of shares held by banks, charitable endowments, other corporations, pension funds, and universities. This group is advantaged because its underlying shareholders do not pay or defer taxes on their investment. The second group is tax-disadvantaged institutions consisting of shares held by mutual funds, insurance companies, and investment advisors. This group is disadvantaged because many of the underlying shareholders pay tax on their investments. In order to increase the distinction between the two groups, I eliminate firms that are not in the top three deciles of percentage of shares owned by tax-disadvantaged institutions or the top three deciles of percentage of shares owned by tax-advantaged institutions measured at the prior year-end. Firms missing an observation for any year of the sample are eliminated. Firms that are in the top three deciles of both tax-disadvantaged and tax-advantaged institutional ownership are eliminated.

Debt and equity issuance data gathered from firm’s statement of cash flows is obtained through the Compustat database. Data used to calculate firm debt ratios is also collected from the Compustat database. Other firm data is collected from the Center for Research in Security Prices (CRSP) and Compustat databases. A stock or institutional investor who does not have all of the required information is deleted from the sample. An institutional investor must file a 13F for a minimum of two consecutive periods to be included in the sample. These requirements reduce the sample to 7,200 firm-year observations (600 firms per year) for the tests of firm debt and equity issuances. The sample for firm debt ratios is 8,556 (713 firms per year). Table 2 presents a summary of the sample attrition due to data requirements.

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9 While it is not possible to identify the actual underlying shareholders, a significant number of these shareholders are subject to taxes. According to the Investment Company Institute, almost half of mutual fund assets are held by taxable entities. Bergstresser and Poterba (2002) estimate the median investor in a mutual fund is subject to a 31% marginal rate.

10 In sensitivity analysis, I test the entire sample.
Empirical Model – Issuance of Equity and Debt

The analysis begins by testing whether a firm’s equity and debt issuances are influenced by the makeup of its institutional investors following a change in tax law. For this analysis, I use net issues as the dependent variable. Consistent with Dhaliwal et al. (2007), \( \text{Issue} \) is defined as net equity issues from the statement of cash flows minus net debt issues deflated by the market value of the firm at the end of the prior year. Net equity issues is defined as issuance of common or preferred stock (Compustat data item 108) minus repurchases of common or preferred stock (Compustat data item 114). Net debt issues is defined as long-term debt issuances (Compustat data item 111) minus long-term debt reductions (Compustat data item 114). In order to formally test the effect that the proportion of a firm’s shares owned by tax disadvantaged or tax-advantaged institutional owners has on a firm’s decision to issues of equity or debt following changes in personal investment income tax rates, I estimate the following regressions:

\[
\text{Issue} = \alpha_0 + \alpha_1 \text{TRA97} + \alpha_2 \text{HT}_{i,t-1} + \alpha_3 \text{NODIV}_{i,t-1} + \alpha_4 \text{HT} \times \text{TRA97} + \alpha_5 \text{NODIV} \times \text{TRA97} + \alpha_6 \text{HT} \times \text{NODIV} + \alpha_7 \text{PPE}_{i,t-1} + \alpha_8 \text{Q}_{i,t} + \alpha_9 \text{Size}_{i,t-1} + \alpha_{11} \text{EarVar}_{i,t} + \alpha_{12} \text{Receipts} + \alpha_{13} \text{Borrow} + \alpha_{14} \text{IPO} + \alpha_{15} \Delta \text{Prc} + \alpha_{16} \text{Ind}_j + \varepsilon_t ,
\]

(3)

\[
\text{Issue} = \alpha_0 + \alpha_1 \text{TRA03} + \alpha_2 \text{HT}_{i,t-1} + \alpha_3 \text{NODIV}_{i,t-1} + \alpha_4 \text{HT} \times \text{TRA03} + \alpha_5 \text{PPE}_{i,t-1} + \alpha_6 \text{Q}_{i,t} + \alpha_7 \text{Size}_{i,t-1} + \alpha_8 \text{EarVar}_{i,t} + \alpha_9 \text{Receipts} + \alpha_{11} \text{Borrow} + \alpha_{12} \text{IPO} + \alpha_{13} \Delta \text{Prc} + \alpha_{14} \text{Ind}_j + \varepsilon_t ,
\]

(4)

where:

- \( \text{Issue} \) = net equity issues minus net debt issues divided by total assets minus book value of common equity plus market value of equity in year \( t-1 \).
- \( \text{HT} \) = 1 if the observation is in the top three deciles of percentage of shares owned by tax-disadvantaged institutions, and 0 otherwise.

20
TR$A_{97}$ = 1 if the observation is after May 7, 1997, and 0 if the observation is before May 7, 1997.

TR$A_{03}$ = 1 if the observation is after May 6, 2003, and 0 otherwise.

NODIV = 1 if the firm does not pay dividends, and 0 otherwise.

t$\_c$ = a trichotomous variable equal to -1 if the firm had a NOL carryfoward and negative taxable income in year $t$-1, 0 if the firm had either a NOL carryfoward or negative taxable income in year $t$-1, and 1 if the firm had no NOL carryfoward and positive taxable income in year $t$-1.

PPE = net property plant and equipment in year $t$-1 divided by total assets in year $t$-1;

Q = preferred stock plus the market value of equity plus net short-term liabilities in year $t$-1, the sum divided by total assets in year $t$-1 (Tobin’s q-ratio).

Size = the natural log of market value of equity in year $t$-1.

EarVar = the standard deviation of the change in earnings before interest, depreciation, and taxes from year $t$-1 to $t$ divided by the mean of total assets for the four years prior to the debt or equity issue.

Receipts = the natural log of the mean proceeds of net issues during the tax regime (pre-TR$A_{97}$, Post-1997/Pre-2003, etc.).

Borrow = the change in the interest rate on AAA corporate bonds for the prior year;

IPO = the log of the proceeds from initial public offerings during the year.

$\Delta$Prc = the change in price from $t$-2 to $t$-1.

IND = industry indicator variable based on Fama and French (1997) classifications.
Consistent with Dhaliwal et al. (2007), I use indicator variables to measure tax regimes. \( TRA97 \) equals 1 if the observation is measured after the 1997 Act, while \( TRA03 \) is 1 if the observation is measured after the 2003 Act. The 1997 Act decreased the capital gains tax rate while leaving the dividend tax rate unchanged. Thus, the 1997 Act did not apply to all equity income; however, it is expected that the 1997 Act increased the tax disadvantage of debt. I predict the coefficient on \( TRA97 \) will be positive. The 2003 Act decreased the tax rates on capital gains and dividends, which should increase the tax disadvantage of debt. Therefore, I predict that the coefficient on \( TRA03 \) will be positive.

I use an indicator variable to measure whether a firm is in the top three deciles of tax-disadvantaged ownership or the top three deciles of tax-advantaged ownership. Ownership is measured at the end of year \( t-1 \). Grier and Zychowicz (1994) and Moh’d et al. (1998) show a negative correlation between a firm’s debt levels and its percentage of shares owned by institutional investors suggesting institutional investors supplant the disciplinary role of debt. This relationship should hold true regardless of tax preference; therefore, I predict that the coefficient on \( HT \) will be positive. Hypothesis 1 predicts that tax-disadvantaged (advantaged) institutional investors will influence firms to issue more (less) equity following a decrease in the personal tax rate on equity income. I predict that the coefficients on \( HT*TRA97 \) and \( HT*TRA03 \) will be positive.

I include an indicator variable equal to 1 if the firm does not pay dividends and 0 if the firm pays dividends to control for the effect of a firm’s dividend policy on financing choices. MacKie-Mason (1990) provides evidence that firms who pay dividends are more likely to issue debt than firms who do not pay dividends. Graham (1999) finds that dividend-paying firms have
smaller debt-to-value ratios than non-dividend paying firms. Dhaliwal et al. (2007) do not find significant evidence that firm dividend-yield influences the probability of new debt or equity issuances. Therefore, I do not predict the sign of the coefficient on NODIV.

The reduction of the capital gains rate by the 1997 Act should benefit firms who do not pay dividends more than dividend-paying firms. I predict the coefficient on NODIV*TRA97 will be positive. Hypothesis 2 predicts that magnitude of the association between non-dividend paying firms and equity issuances is increasing in shares owned by tax-disadvantaged institutional owners following the 1997 Act. Therefore, I predict that the coefficient on HT*TRA97*NODIV will be positive.

Control Variables

I include the following variables in order to control for non-tax factors that prior research has found to affect firm financing decisions. Shevlin (1990) develops a trichotomous measure of corporate tax rate dependent on whether the firm has taxable income and a NOL carryforward. Prior literature indicates that the probability of issuing debt is positively related to the corporate tax rate. Dhaliwal et al. (2007) find that the corporate tax rate is positively associated with a firm’s issuance of debt. Therefore, I predict that the coefficient of \( t_c \) will be negative. PPE measures the ability of a firm to collateralize its debt. Graham (1999) suggests that firms with available assets to use as collateral should be able to have lower debt costs. Therefore, I predict that the sign on PPE will be negative.

Chung and Pruitt’s (1994) calculation of Tobin’s Q Ratio is used to control for a firm’s growth opportunities. Myers (1977) suggests that firms with riskier debt are less likely to invest in projects with positive net present value because income would accrue to bondholders rather than shareholders. I predict that the coefficient on Q will be positive.
Graham (1999) indicates that larger firms have lower probabilities of financial distress, and may have lower costs associated with debt. Rajan and Zingales (1995) suggest that larger firms are more diversified and are less likely to fail. They find that the cost of debt is negatively correlated with size. I predict that the coefficient on Size will be negative. Riskier firms are more likely to have higher debt costs. Dhaliwal et al. (2007) show that the variance of a firm’s earnings are negatively correlated with debt issuances. I predict that the coefficient on EarVar will be negative.

Dhaliwal et al (2007) use the natural log of the firm-level proceeds of new debt or equity issues to control for the size of new equity and debt issues. They show that the size of the issues is negatively correlated to debt issuances. I predict that Receipts will be positive. Borrow measures the cost of borrowing. When interest rates are higher, the cost of debt is increased; therefore, I predict that the sign of Borrow will be positive. IPO controls for the amount of IPO’s during the year. Dhaliwal et al. (2007) theorize that during periods of increased IPOs, new equity issues should have a higher cost relative to debt issuances. I predict that IPO will be negatively associated with net equity issuances. A dummy variable for industry effects is included.

ΔPRC is included to control for increases or decreases in the firm’s stock price. Myers and Majluf (1984) suggest that firms issue equity to take advantage of overpricing, and the market discounts new equity issuances due to this incentive. Bagnoli and Khanna (1987) suggest that the market discounts a new equity issuance less following a decrease in share price. It is more likely that firms issue shares following price increases, therefore the coefficient on ΔPRC is expected to be positive. IND is based on Fama and French’s (1997) classifications that segment firms into 48 separate industries.
Additional Test of Equity and Debt Issuances

Prior research investigates whether the time-series changes in the personal tax penalty of debt influences firm capital structure. Graham (1999) estimates the personal tax penalty of issuing debt as follows:

$$PTP = t_p - (1 - t_c)[d(1 - t_d) + (1 - d)(1 - t_{cg})],$$

(5)

where $t_p$ is the personal tax rate on interest, $t_c$ is the corporate income tax rate, $d$ is the dividend-payout ratio, $t_d$ is the personal tax rate on dividend income, and $t_{cg}$ is the personal tax rate on capital gains. In order to investigate whether the tax status of a firm’s institutional investors affect how changes in the personal tax penalty of debt influence a firm’s financing choice, I estimate the following regression:

$$Issue = \alpha_0 + \alpha_1 PT + \alpha_2 HT_{t-1} + \alpha_3 NODIV_{t-1} + \alpha_4 HT \cdot PTP + \alpha_5 NODIV \cdot PTP + \alpha_6 HT \cdot PTP \cdot NODIV + \alpha_7 t_c \cdot P + \alpha_8 PPE_{t-1} + \alpha_9 Q_{t-1} + \alpha_{10} Size_{t-1} + \alpha_{11} EarVar_{t-1} + \alpha_{12} Receipts + \alpha_{13} Borrow + \alpha_{14} IPO + \alpha_{15} {\Delta Pr} + \alpha_{16} Ind_{t-1} + \varepsilon_t,$$

(6)

where all variables have been previously defined. The personal tax penalty of debt offsets the benefit a firm receives from the corporate interest deduction. As the personal tax penalty of debt increases firms should issue more equity. Therefore, it is expected that the coefficient on $PTP$ will be positive. Because tax-disadvantaged institutional investors are influenced by the tax rates of the underlying shareholders, the coefficient on $HT*PTP$ should be positive.

Empirical Models - Debt Levels

Hypothesis 3 predicts that the proportion of a firm’s shares owned by different types of institutional owners will be associated with the firm’s debt to market value of equity ratio following changes in the personal tax rates on equity income. I implement multiple methods to investigate how a firm’s capital structure is influenced by the type of institutional owner. The
first analysis uses debt-levels, while the second analysis investigates changes in debt. I investigate debt levels using the following regression:

\[
\text{Debt}_{lt} = \alpha_0 + \alpha_1 \text{TRA} + \alpha_2 \text{HT}_{lt-1} + \alpha_3 \text{NODIV}_{lt-1} + \alpha_4 \text{HT} \times \text{TRA} + \alpha_5 \text{NODIV} \times \text{TRA} + \alpha_6 \text{HT} \times \text{NODIV} + \alpha_7 t_{clt} + \alpha_8 \text{PPE}_{lt-1} + \alpha_9 \text{QL}_{lt} + \alpha_1 \text{Size}_{lt-1} + \alpha_1 \text{EVar}_{lt} + \alpha_2 Z + \alpha_3 \text{Ind}_{j} + \epsilon_t, \tag{7}
\]

where \( \text{Debt} \) equals the sum of firm’s long-term debt plus debt in current liabilities divided by the market value of the firm. \( Z \) equals the modified Altman (1968) \( Z \)-score used by MacKie-Mason (1990) and Graham et al. (1998) and is defined as follows:\(^{11}\)

\[
3.3 \frac{\text{EBIT}}{\text{Total Assets}} + 1.0 \frac{\text{SALES}}{\text{Total Assets}} + 1.4 \frac{\text{Ret Earn}}{\text{Total Assets}} + 1.2 \frac{\text{Working Capital}}{\text{Total Assets}}
\]

where all other variables have been previously defined. \( Z \) is a proxy used to measure the expected costs of financial distress. Because firms trade off the benefits of debt financing with the costs of distress, it is expected that the \( Z \)-score will be negatively related to the amount of debt in the firm’s capital structure. Because the dependent variable is the amount of debt in a firm’s capital structure, it is expected that the coefficients on the interaction variables \( \text{HT} \times \text{TRA97} \) and \( \text{HT} \times \text{TRA03} \) will be negative.

**Additional Test of Debt Levels**

I also investigate how the time-series changes in the personal tax penalty of debt influences the relationship between the type of institutional investor and the level of debt in firm’s capital structure. I estimate the following regression using Graham’s (1999) estimate of the personal tax penalty of debt:

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\(^{11}\) Altman’s (1968) \( Z \)-score includes the ratio of market equity to book debt.
\[ \text{Debt}_{i,t} = \alpha_0 + \alpha_1 \text{PTP} + \alpha_2 \text{HT}_{i,t-1} + \alpha_3 \text{HT} \times \text{PTP} + \alpha_4 \text{NODIV}_{i,t-1} + \alpha_5 \text{t}_{c,i,t} + \alpha_6 \text{PPE}_{i,t-1} \]

\[ + \alpha_7 Q_{i,t} + \alpha_8 \text{Size}_{i,t-1} + \alpha_9 \text{EarVar}_{i,t} + \alpha_{11} Z + \alpha_{12} \text{Ind}_j + \varepsilon_t, \]  

\[ \text{(8)} \]

where all variables have been previously defined.

**Empirical Models - Changes in Debt**

In addition to a debt levels analysis, I investigate how the tax status of a firm’s institutional investor’s influence changes in debt ratios following changes in personal tax rates on investment income. To investigate this relationship, I estimate the following regression:

\[ \Delta \text{Debt}_{i,t} = \alpha_0 + \alpha_1 \text{TRA} + \alpha_2 \text{HT}_{i,t-1} + \alpha_3 \text{NODIV}_{i,t-1} + \alpha_4 \text{HT} \times \text{TRA} \]

\[ + \alpha_5 \text{TRA} \times \text{NODIV} + \alpha_6 \text{HT} \times \text{TRA} \times \text{NODIV} + \alpha_7 \text{t}_{c,i,t} + \alpha_8 \Delta \text{PPE}_{i,t-1} + \alpha_9 \Delta Q_{i,t} \]

\[ + \alpha_{10} \Delta \text{Size}_{i,t-1} + \alpha_{11} \Delta \text{EarVar}_{i,t} + \alpha_{12} \Delta Z_{i,t} + \alpha_{13} \text{Ind}_j + \varepsilon_t, \]  

\[ \text{(9)} \]

where variables are defined as the change in the variables previously defined.

**Additional Test of Changes in Debt**

I also estimate the previous regression using Graham’s (1999) measure for the personal tax penalty of debt:

\[ \Delta \text{Debt}_{i,t} = \alpha_0 + \alpha_1 \text{PTP} + \alpha_2 \text{HT}_{i,t-1} + \alpha_3 \text{HT} \times \text{PTP} + \alpha_4 \text{NODIV}_{i,t-1} + \alpha_5 \text{t}_{c,i,t} + \alpha_6 \Delta \text{PPE}_{i,t-1} + \alpha_7 \Delta Q_{i,t} \]

\[ + \alpha_8 \Delta \text{Size}_{i,t-1} + \alpha_9 \Delta \text{EarVar}_{i,t} + \alpha_{10} \text{Ind}_j + \varepsilon_t, \]  

\[ \text{(10)} \]

where all variables are previously defined.

5. Results

**Descriptive Statistics**

Table 3 presents descriptive statistics for the entire sample of firms, and a sample of firms consisting of firms that are in the top three deciles of tax-disadvantaged institutional ownership. The results of Table 3 indicate that tax-disadvantaged firms own a greater percentage of firms in the sample compared to tax-advantaged firms. The results also indicate that firms owned by tax-
disadvantaged institutional owners are smaller, and have fewer dividend paying firms than those owned by tax-advantaged institutional owners. Firms with high tax-disadvantaged ownership have lower corporate tax rates when compared to firms owned by tax-advantaged institutional owners. Firms with lower tax rates should benefit less from issuing debt relative to equity and should be more likely to issue equity. Overall, Table 3 indicates that firms in the top three deciles of tax-disadvantaged ownership and firms in the top three deciles of tax-advantaged ownership have similar attributes, which allows for the assumption that market wide correlated omitted variables should affect both sets of firms in a similar manner.

Tables 4 and 5 present Pearson and Spearman correlations. The correlations between Debt, tax-disadvantaged institutional ownership (TaxDis), and tax-advantaged institutional ownership (TaxAd) are negative. This supports prior research (Grier & Zychowicz (1994); Moh’d et al., 1998) that institutional investors supplant the disciplinary role of debt. The correlation between Issue and the indicator variables for tax regime (TA97 and TA03) are not significant. The correlations between Debt and TA97 are mixed. The Pearson correlation is positive indicating debt increased following the 1997 Act; however, the Spearman correlation is not significant. The correlations between Debt and TA03 are also mixed. The Spearman correlation is negative indicating debt decreased following the enactment of the 2003 Act; however, the Pearson correlation is not significant. With the exception of the Size variable’s correlation with other variables, the correlations between variables are generally low. Untabulated correlations of the interaction variables do not indicate any issues with multicollinearity.

Table 6 presents summary statistics of debt measures before and after the applicable tax regimes segregated by institutional investor type. The debt measures are Issue, Debt, and ∆Debt.
Investor type is determined by whether the firm is in the top three deciles of tax-disadvantaged ownership ($HT=1$) or not ($HT=0$). Tax regimes are pre-1997 Act or post-1997 Act and pre-2003 Act or post-2003 Act.

The results in Table 6 indicate that firms with high levels of tax-advantaged institutional ownership ($HT=0$) experienced an increase in debt following the 1997 Act. Issue decreased from -0.0123 to -0.0221, Debt increased from 0.4957 to 0.5796, and ΔDebt increased from 0.0503 to 0.1397 (significance at the .10, .01, and .01 levels, respectively). Firms with high levels of tax-disadvantaged institutional ownership also experienced an increase in debt following the 1997 Act. Issue decreased from -0.0187 to -0.023 (insignificant), Debt increased from 0.4666 to 0.5521, and ΔDebt increased from 0.0509 to 0.1144 (significance at the .01, and .10 levels, respectively). While these results suggest that tax-disadvantaged and tax-advantaged firms behaved in a similar manner, it should be noted that the changes of the 1997 Act mainly affected capital gains and not dividends. When the dividend policy of the firm is controlled for, it is possible that the results will change.

The results in Table 6 indicate that firms with high levels of tax-advantaged institutional ownership ($HT=0$) experienced an increase in debt following the 2003 Act. Issue decreased from 0.0602 to -0.0152, Debt increased from 0.6095 to 0.7603 (significance at the .01, and .05 levels, respectively), and ΔDebt increased from 0.0525 to 0.0621 (insignificant). Conversely, firms with high levels of tax-disadvantaged institutional ownership experienced a decrease in debt following the 2003 Act. Issue increased from 0.0003 to 0.0860, Debt decreased from 0.5788 to 0.4203, and ΔDebt decreased from 0.0434 to -0.0308 (all significant at the .01 level). These results suggest that tax-disadvantaged institutional owners influence firms in a differential manner and also provide support for Hypotheses 1 and 3.
Empirical Results

Table 7 presents the results of the estimation of the regression models for two years prior to and after the 1997 Act beginning with January 1, 1995 and concluding with December 31, 1999. Table 7 reports the results of using the dependent variables \textit{Issue}, \textit{Debt}, and $\Delta$\textit{Debt}. F-statistics are statistically significant, and the explanatory power (adjusted $R^2$) of the regression is 34.06 percent when the dependent variable is \textit{Issue}. The adjusted $R^2$ is 33.46 percent when the dependent variable is \textit{Debt} and 31.84 percent when the dependent variable is $\Delta$\textit{Debt}.

Prior research (Dhaliwal et al., 2007) indicates that aggregate institutional ownership minimizes the effects of tax rate changes on firm financing decisions. Because the 1997 Act’s main effect was to reduce the individual capital gains tax rate, firms that do not pay dividends should be the main beneficiary. This benefit should influence non-dividend firms to issue more equity relative to debt. If all institutional investors are homogenous with respect to their tax preferences and behave like tax-exempt investors, then non-dividend firm’s financing decisions should not be influenced by the level of tax-advantaged or tax-disadvantaged institutional ownership. However, if tax-disadvantaged firms do not behave like tax-exempt investors, then non-dividend firms’ level of tax-disadvantaged ownership should influence it to issue more equity relative to debt.

The results indicate that firm financing decisions are influenced differentially by the tax attributes of its institutional investors. This is evidenced by the positive coefficient on the interaction variable $HT*TRA97*NODIV$ when the dependent variable is \textit{Issue}, and the negative coefficients on the same variable when the dependent variables are \textit{Debt} and $\Delta$\textit{Debt} (statistical significance at the .05, .05, and .01 levels, respectively). This result indicates that non-dividend paying firms in the top three deciles of tax-disadvantaged institutional ownership experienced an
increase in equity issuances and a decrease in debt, which is consistent with expectations. If institutional investors are a tax-exempt homogenous group, then the interaction term should be either positive or statistically insignificant. The results in Table 7 provide support for Hypothesis 2.

Interestingly, the interaction terms $NODIV*TRA97$ and $HT*TRA97$ are not significant. The insignificance of the $NODIV*TRA97$ variable can be explained by the influence of the tax-advantaged ownership. Non-dividend firms with high tax-advantaged ownership were not influenced by the tax rate changes in the 1997 Act. The insignificance of the $HT*TRA97$ variable could be due to the presence of dividend-paying firms. The 1997 Act only reduced the tax rates on capital gains; therefore, dividend-paying firms did not receive a benefit from the 1997 Act and were not influenced to issue more equity relative to debt.

Several other results presented in Table 7 are of interest. The coefficient on the $HT$ variable is negative when the dependent variable is $Debt$ or $\Delta Debt$. This is consistent with prior research indicating institutional investors supplant the disciplinary role of debt. The signs of the $NODIV$ variables indicate that non-dividend paying firms had more debt and issued more debt relative to equity than dividend paying firms. Consistent with expectations, a firm’s corporate tax rate is positively associated with debt and debt issuance. This supports the theory that the tax benefits of debt influence firms to use debt financing.

Table 8 presents the results of the estimation of the regression models for three years prior to and after the 2003 Act beginning with January 1, 2000 and concluding with December 31, 2005. Table 8 reports the results of using the dependent variables $Issue$, $Debt$, and $\Delta Debt$. 31
F-statistics are statistically significant, and the adjusted $R^2$ of the regression is 23.97 percent when the dependent variable is *Issue*. The adjusted $R^2$ is 31.84 percent when the dependent variable is *Debt* and 32.82 percent when the dependent variable is $\Delta Debt$.

The 2003 Act’s main effect was to reduce the individual tax rates on both types of equity income (capital gains and dividends). This should influence both non-dividend and dividend firms to issues more equity relative to debt. If institutional investors are a homogenous tax-exempt group, then firm financing decisions following the 2003 TRA should not be influenced by the tax-status of its institutional investors. However, if the expectations of this study hold, then firms with high levels of tax-disadvantaged institutional ownership will issue more equity relative to debt following the 2003 TRA.

The results presented in Table 8 indicate that firm financing decisions are influenced differentially by the tax attributes of its institutional investors. This is evidenced by the positive coefficient on the interaction variable $HT*TRA03$ when the dependent variable is *Issue*, and the negative coefficients on the same variable when the dependent variables are *Debt* and $\Delta Debt$ (statistical significance at the .01, .01, and .05 levels, respectively). This result indicates that firms in the top three deciles of tax-disadvantaged institutional ownership experienced an increase in equity issuances and a decrease in debt, which is consistent with expectations. The signs on the coefficients of $TRA03$ are the opposite of $HT*TRA03$. This provides evidence that firms with tax advantaged institutional ownership in the top three deciles were not influenced by the 2003 Act. The results in Table 8 provide support for the Hypotheses 1 and 3.

Table 8 provides further support that institutional investors supplant the disciplinary role of debt. Table 8 shows that the coefficient on the $HT$ variable is negative when the dependent variable is *Debt* or $\Delta Debt$. Additionally, firm corporate tax rates are positively associated with
debt and debt issuance. This provides further evidence that the tax benefits of debt influence firms to use debt financing.

Table 9 presents the results of the estimation of the regression models investigating the effect of the personal tax penalty of debt on equity issuances versus debt issuances, debt levels, and changes in debt. The models are estimated for the entire sample period for the study beginning January 1, 1995 and ending December 31, 2005. Table 9 reports the results of using the dependent variables Issue, Debt, and ∆Debt. F-statistics are statistically significant, and the adjusted R² of the regression is 30.08 percent when the dependent variable is Issue. The adjusted R² is 31.90 percent when the dependent variable is Debt and 30.41 percent when the dependent variable is ∆Debt.

The personal tax penalty of debt measures the tax benefits a corporation receives from issuing debt (interest expense) versus the net costs of the individual tax rate on interest income (tax rates on interest income greater than those on equity income). Prior research (Dhaliwal et al., 2007) indicates that the personal tax penalty of debt influences firms to issue more equity relative to debt and to have lower levels of debt. Tax-exempt investors should mitigate the influence of the personal tax penalty of debt on firm financing decisions, while it is expected that firms with high levels of tax-disadvantaged institutional ownership will be influenced by the personal tax penalty of debt.

The results presented in Table 9 indicate that firm financing decisions are influenced by the personal tax penalty of debt. This is evidenced by the positive coefficient on PTP when Issues is the dependent variable and the negative coefficients on PTP when Debt and ∆Debt are the dependent variables. Additionally, firms in the top three deciles of tax-disadvantaged ownership are influenced by the personal tax penalty of debt. This is evidenced by the positive
coefficient on the interaction variable $HT*PTP$ when the dependent variable is $Issue$, and the negative coefficients on the $HT*PTP$ when the dependent variables are $Debt$ and $\Delta Debt$ (statistical significance at the .05, .01, and .10 levels, respectively). This result indicates that firms in the top three deciles of tax-disadvantaged institutional ownership experienced an increase in equity issuances and a decrease in debt, which is consistent with expectations. The results in Table 9 provide support for the study’s hypotheses. Overall, the results in Tables 7, 8, and 9 indicate that tax-disadvantaged institutional investors are influenced by changes in individual tax rates and do not mitigate the effects of tax rate changes on firm financing decisions.

**Supplemental Analysis**

In order to test whether the type of institutional owner affects a firm’s financing decision in differential manner, I use an indicator variable equal to 1 if the firm is in the top three deciles of tax-disadvantaged ownership and 0 if the firm is in the top three deciles of tax-advantaged ownership. The previous tests allow conclusions to be made whether tax-disadvantaged and tax-advantaged institutional investors are different. However, the tests do not allow conclusions to be made about the directionality of the differences. In other words, it is possible to conclude that firms with high concentrations of tax-disadvantaged owners issued significantly more equity versus debt than firms with high concentrations of tax-advantaged owners. However, it is not possible to conclude from the previous tests that firms with high concentrations of tax-advantaged ownership issued more debt than equity. In order to test the directionality of the differences between tax-disadvantaged and tax-advantaged investors, I test each of the previous regressions with a sample consisting of only firms in the top three deciles of tax-disadvantaged ownership or a sample of firms in the top three deciles of tax-advantaged ownership.
Tables 10, 11, and 12 present the results of estimating the regressions using samples segmented by institutional investor type. Consistent with previously discussed results, Table 10 indicates that non-dividend firms in the top three deciles of tax-disadvantaged institutional ownership increased equity issues relative to debt issues and decreased their debt. However, Table 10 indicates that the 1997 Act did not influence non-dividend firms in the top three deciles of tax-advantaged institutional ownership to increase equity. Instead, these firms increased issuances of debt. Results in Tables 11 and 12 are consistent with the results in Table 10. The results also indicate that firms in the top three deciles of tax-advantaged institutional ownership were not influenced to increase equity by the 2003 Act or the personal tax penalty of debt. The results provide evidence that tax-advantaged firms are not affected by individual tax rates and mitigate the effects of changes in individual tax rates on firm financing decisions.

6. Implications

This study extends the literature examining the impact of personal taxes on firm financing decisions by investigating how specific investors influence firm financing decisions. This study also contributes to the literature examining the tax heterogeneity of institutional investors by investigating whether institutions whose underlying shareholders are taxed differently influence firm decisions in a differential manner. Prior research has documented that personal taxes can influence firm financing decisions. Institutional investors have become influential in the capital markets because of their significant market share. It is important to understand how heterogeneity among institutional investors impacts firm capital structure and financing decisions. Future research on the effect of taxes on capital markets may want to examine this using only tax-advantaged institutional investors to proxy for a firm’s tax-exempt investor.
7. Conclusions

This study investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affect firms’ capital structures and decisions to issue debt versus equity following changes in tax rates on investment income received by individuals. Tax laws enacted in 1997 and 2003 reduced the individual tax rates on equity income, which 1) decreased firms’ cost of equity, 2) increased investor preference for equity income, and 3) increased equity issuances relative to debt. I investigate whether tax heterogeneity among institutional investors influences firm capital structure decisions following the rate changes in 1997 and 2003.

I predict that firms with high concentrations of tax disadvantaged institutional investors (institutions whose underlying shareholders are taxable) will issue more equity relative to debt than those with high concentrations of tax-advantaged institutional investors (institutions whose underlying shareholders are not taxable). I also predict that firms’ tax disadvantaged institutional owners will be negatively associated with changes in debt in a firm’s capital structure. The results of this study indicate that institutional investors are not a homogenous tax-exempt group; rather they are affected by individual tax rates in a differential manner. The results show that the financing decisions of firms with high levels of tax-disadvantaged institutional investors are influenced by changes in individual tax rates and the personal tax penalty of debt. The results of supplemental analysis indicate that firms with high levels of tax-advantaged institutional investors are not affected by changes in individual tax rates or the personal tax penalty of debt. This paper contributes to literature investigating how individual income taxes affect capital markets and how different types of investors impact this relationship.
REFERENCES


Table 1

*Tax Regimes and Dates*

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*Data Attrition*

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<td>-0.089*</td>
</tr>
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<td>-0.109*</td>
<td>0.372*</td>
<td>0.060*</td>
<td>0.002</td>
<td>-0.327*</td>
<td>-0.231*</td>
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<td>0.089*</td>
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<td>-0.309*</td>
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<td>Z</td>
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<td>-0.097*</td>
<td>-0.089*</td>
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<td>-0.157*</td>
<td>-0.115*</td>
<td>0.374*</td>
<td>0.047*</td>
<td>0.027**</td>
<td>-0.107*</td>
<td>-0.344*</td>
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Table 6

*Debt and Equity Measures by Institutional Investor Type Before and After Tax Regimes*

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<th>Issue</th>
<th>Debt</th>
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<tbody>
<tr>
<td><strong>HT = 0</strong></td>
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</tr>
<tr>
<td>Pre-TRA 1997</td>
<td>-0.0123</td>
<td>0.4957</td>
<td>0.0503</td>
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<tr>
<td>Post-TRA 1997</td>
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<td>0.5796</td>
<td>0.1397</td>
</tr>
<tr>
<td>Diff</td>
<td>0.0098***</td>
<td>-0.0838*</td>
<td>-0.0895*</td>
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<tr>
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<tr>
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<td>-0.0187</td>
<td>0.4666</td>
<td>0.0509</td>
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<tr>
<td>Post-TRA 1997</td>
<td>-0.0236</td>
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<tr>
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<td>0.0049</td>
<td>-0.8550*</td>
<td>-0.0635***</td>
</tr>
<tr>
<td><strong>HT = 0</strong></td>
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</tr>
<tr>
<td>Pre-TRA 2003</td>
<td>0.0602</td>
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<td>0.0525</td>
</tr>
<tr>
<td>Post-TRA 2003</td>
<td>-0.0152</td>
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<td>0.0621</td>
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<tr>
<td>Diff</td>
<td>0.0754*</td>
<td>-0.1508**</td>
<td>-0.0096</td>
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<tr>
<td><strong>HT = 1</strong></td>
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<td></td>
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<tr>
<td>Pre-TRA 2003</td>
<td>0.0003</td>
<td>0.5788</td>
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<td>Post-TRA 2003</td>
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Table 7

**OLS Regression of Debt and Equity Measures on the Interaction of Institutional Investor Type and 1997 Tax Regime**

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<tr>
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<td>0.0201</td>
<td>0.26</td>
<td>0.0117</td>
<td>0.23</td>
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<tr>
<td>HT</td>
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<td>-0.1177</td>
<td>-2.04</td>
<td>-0.1416</td>
<td>-3.79</td>
</tr>
<tr>
<td>NODIV</td>
<td>-0.2204</td>
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<td>0.3052</td>
<td>4.82</td>
<td>0.1449</td>
<td>3.67</td>
</tr>
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<td>NODIV * TRA97</td>
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<td>0.0341</td>
<td>0.34</td>
<td>0.0307</td>
<td>0.46</td>
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<tr>
<td>HT * TRA97</td>
<td>-0.1907</td>
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<td>0.1719</td>
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</tr>
<tr>
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<td>-2.39</td>
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<td>0.5382</td>
<td>2.47</td>
<td>0.2090</td>
<td>1.68</td>
</tr>
<tr>
<td>PPE</td>
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<td>-7.52</td>
<td>0.6457</td>
<td>6.65</td>
<td>1.1437</td>
<td>9.50</td>
</tr>
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<td>-12.04</td>
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<td>-0.0713</td>
<td>-5.75</td>
<td>-0.0350</td>
<td>-2.45</td>
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<tr>
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<tr>
<td>Borrow</td>
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<tr>
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Sample Size: 3,000, 3,565, 3,565
Table 8

**OLS Regression of Debt and Equity Measures on the Interaction of**

**Institutional Investor Type and 2003 Tax Regime**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Issue</th>
<th>Debt</th>
<th>∆Debt</th>
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<tr>
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<td>Coefficients</td>
<td>t-stat</td>
<td>Coefficients</td>
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<td>Intercept</td>
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<td>2.5882</td>
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Table 9

**OLS Regression of Debt and Equity Measures on the Interaction of Institutional Investor Type and the Personal Tax Penalty of Debt**

<table>
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<th>Variable Name(^b)</th>
<th>Issue Coefficients</th>
<th>t-stat(^c)</th>
<th>Debt Coefficients</th>
<th>t-stat(^c)</th>
<th>ΔDebt Coefficients</th>
<th>t-stat(^c)</th>
</tr>
</thead>
<tbody>
<tr>
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Table 10

*OLS Regression of Debt and Equity Measures on 1997 Tax Regime by Institutional Ownership*

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Table 11

**OLS Regression of Debt and Equity Measures on 2003 Tax Regime by Institutional Ownership**

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<th>Debt</th>
<th>∆Debt</th>
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<td>Coefficients</td>
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Table 12

**OLS Regression of Debt and Equity Measures on Personal Tax Penalty of Debt by Institutional Ownership**

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<td>Coefficients</td>
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</tr>
<tr>
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<td>0.1637</td>
<td>0.2173</td>
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CHAPTER 2
THE EFFECT OF THE TAX HETEROGENEITY OF INSTITUTIONAL INVESTORS ON THE COST OF EQUITY FOLLOWING CHANGES IN PERSONAL TAX RATES ON EQUITY INCOME

1. Introduction

Prior research (Dhaliwal et al., 2005; Dhaliwal et al., 2007) investigates the relation between cost of equity capital and changes in tax law. These studies find that evidence that individual investors capitalize the costs of taxes into their cost of equity valuation. Dhaliwal et al. (2007) provides evidence that, following a decrease in tax rates on equity income, the implied cost of equity capital decreased, but they also find that no-dividend paying firms experience a greater decrease in cost of equity than dividend paying firms. Dhaliwal et al. (2007) also provides evidence that a firm’s level of institutional ownership, their proxy for the firm’s tax-exempt marginal investor, mitigates the affect of taxes on a firm’s cost of equity. This study investigates whether differences in the tax attributes of the underlying shareholders of institutional investors influences the impact of equity tax rate changes on a firm’s cost of equity.

Recent research (Usrey et al., 2007; Moser & Puckett, 2007) indicates that institutional investors are not a homogenous group with respect to their tax liabilities. In other words, certain types of institutional investors (e.g. mutual funds) are influenced by the taxability of their underlying shareholders, while other types (e.g. pension funds, charitable endowments) exhibit investment behavior consistent with a tax-exempt entity. Usrey et al. (2007) provide evidence that mutual funds, whose primary shareholders are taxable individuals, increased their stock
holdings of dividend paying firms following a decrease in personal dividend tax rates. They also find that institutional investors other than mutual funds decreased their holdings of dividend paying firms during the same period. Moser and Puckett (2007) investigate the relationship between changing tax regimes and institutional preference for dividends. They find that, when the dividend tax penalty is high, tax disadvantaged institutions (mutual funds and investment advisors) hold lower amounts of dividend paying stocks than tax advantaged institutions (charitable endowments, pension funds, and universities).

Dhaliwal et al. (2007) find that a firm’s aggregate institutional ownership mitigates the reduction in cost of equity a firm experiences following a decrease in individual income tax rates on equity. However, if institutional investors consider the tax liabilities of the individual shareholders and are heterogenous with respect to the influence of individual equity taxes, then firms with tax sensitive institutional owners should experience differential effects from changes in tax rates than firms with institutional owners who are not sensitive to individual taxes. Thus, this study investigates if institutional investor type influences how individual taxes are capitalized into stock prices.

This paper specifically investigates whether tax heterogeneity among institutional investors influences firm cost of equity capital following personal tax rate changes in 1997 and 2003. The Taxpayer Relief Act of 1997 (hereafter, the 1997 Act) reduced the tax rate on capital gains from 28 percent to 20 percent. The Jobs and Growth Tax Relief Reconciliation Act of 2003 (hereafter, the 2003 Act) reduced the tax rate on dividend income from 38.6 percent to 15 percent and the capital gain rate from 20 percent to 15 percent. Interest income continued to be
taxed as ordinary income which was decreased from 38.6 percent to 35 percent.\footnote{The maximum tax rate on ordinary income decreased in 2001 to 39.1 percent and to 38.6 percent in 2002.} The corporate tax rate was not changed by the 1997 Act or the 2003 Act.

A large stream of research has been devoted to whether individual investors capitalize the costs of individual income taxes on equity income into a firm’s stock price. Some studies (Black & Scholes, 1974; Rosenberg & Marathe, 1979; Miller & Scholes, 1982) were unable to find an association between taxes and stock returns. The lack of findings has been attributed to methodological error (Litzenberger & Ramaswamy, 1980, 1982). Other studies (Blume, 1980; Naranjo et al., 1998) were unwilling to attribute the findings in their studies to tax effects.

Conversely, a number of studies have found results consistent with the differences in equity taxation affecting equity value and cost of equity. Litzenberger and Ramaswamy (1979, 1980, 1982) develop an after-tax CAPM model that accounts for the differences in $td$ and $tg$. Ayers et al. (2002), Dhaliwal et al. (2003), and Dhaliwal et al. (2007) provide evidence that differences in personal tax rates on capital gains and dividend income affect equity value and the cost of equity capital.

Similar to Dhaliwal et al. (2007), I use three ex ante measures of the cost of equity capital. The results indicate that, following the 1997 Act, the cost of equity capital decreased for non-dividend firms with high levels of tax-disadvantaged institutional ownership. Univariate tests also indicate that the cost of equity capital for the all firms decreased following the 2003 Act. Cost of equity for firms with high concentrations of tax-advantaged institutional owners decreased by 7.5% following the 1997 Act, while cost of equity for firms with high concentrations of tax-disadvantaged institutional decreased by 9%. Cost of equity for firms with high concentrations of tax-advantaged institutional owners decreased by 12% following the 2003 Act.
Act, while cost of equity for firms with high concentrations of tax-disadvantaged institutional decreased by 15%.

In order to more accurately examine how institutional investors influence the cost of equity following a change in individual tax rates on equity income, I examine a sample period of two years (eight quarters) around the enactment of the 1997 and 2003 Acts. By regressing the cost of equity estimates on the interaction of a dummy variable indicating whether the quarter is before or after the 1997 Act and a dummy variable indicating whether the observation is in the top three deciles of tax-disadvantaged institutional ownership, I find that firms with high levels of tax-disadvantaged ownership experienced a decrease in their cost of equity capital following a decrease in the individual tax rate on capital gains. In addition, the interaction of the institutional investor dummy variable and a dummy variable indicating the observation is after the 2003 Act indicates that the cost of equity capital for firms with high levels of tax-disadvantaged ownership decreased following the 2003 Act. These results provide evidence that institutional investors are not homogenous with respect to their influence on firm cost of equity following changes in individual tax rates.

This study makes three contributions to existing literature. The results of this study add to a growing body of literature that indicates that institutional investors are heterogeneous with respect to the tax liabilities of their underlying shareholders. Second, this study contributes to existing literature on how individual taxes affect firm value (Dhaliwal et al., 2005, 2007) by identifying a key group of impacted investors that had previously been classified as tax-exempt. This study also expands the window of Dhaliwal et al. (2007) and investigates an additional tax act.
The remainder of the paper proceeds as follows: The next section provides a review of applicable literature. Section three describes the study’s methodology. Section four provides the results. Section five explains the implications of the study, and the last section concludes.

2. Background and Literature Review

Much research has been devoted to studying the effects of personal income taxes on share value and a firm’s cost of capital. The majority of research investigates differences in the personal tax rates on equity income (capital gains and dividends) and the effect of these differences on the cost of equity capital. Research by Miller and Modigliani (Modigliani & Miller, 1958; Miller & Modigliani, 1961; Modigliani & Miller, 1963; Miller, 1977) argues that differences in personal tax rates on capital gains and dividends could affect the valuation of shares and an investor’s required return (also known as a firm’s cost of equity).

The relationship between personal tax rates, firm value, and firm cost of equity has been modeled by a number of studies (Modigliani & Miller, 1958; Poterba & Summers, 1985; Dhaliwal et al., 2005; Guenther et al., 2005; Dhaliwal et al., 2007). In its simplest form, the relationship can be modeled as follows:

\[ r_f = r_t (1-t) \]  

(1)

where \( r_f \) is the return on a tax-free investment, \( r_t \) is the return on a taxable stock investment, and \( t \) is the personal tax rate on the investment. This equation can be rearranged to the following:

\[ r_t = r_f / (1-t). \]  

(2)

In order for an investor to be indifferent to investing in a tax-free investment or a tax-free investment, Equation (2) indicates that the investor must be compensated for tax expense from the taxable investment. Thus, Equation (2) shows that a firm’s cost of equity will be influenced by personal taxes.
Investors who chose to invest in a taxable stock may receive income in the form of a capital gain or a dividend. In order to estimate an investor’s return on a taxable stock, the model must include the personal tax rate on dividends as well as the personal tax rate on capital gains. The estimated return on a taxable stock investment can be shown as follows:

\[ r_{ts} = \frac{d(1-t_d)+(P_{t+1}-P_t)(1-t_{cg})}{P_t} \]  

(3)

where \( r_{ts} \) is an investor’s return on investing in a taxable stock, \( d \) is dividends paid, \( t_d \) is the personal tax rate on dividends, \( P \) is the share price, and \( t_{cg} \) is the personal tax rate on capital gains. Equation (3) suggests that any change in the tax rates on dividends and capital gains directly influences an investor’s return and therefore a firm’s cost of equity. Furthermore, any difference between \( t_d \) and \( t_g \) could influence an investor’s decision to invest in a firm that derives the majority of its value from dividends or capital gains. Prior to the 2003 Act, \( t_d \) was greater than \( t_g \) and is referred to as the dividend tax penalty.

A number of studies have empirically tested Equation (3) with mixed results. Litzenberger and Ramaswamy (1979, 1980, 1982) examine whether individual equity taxes are capitalized into stock returns by deriving and testing an after tax version of the Capital Asset Pricing Model. They find a strong positive relationship between dividend yield and stock returns. This indicates that individual taxes are capitalized into stock price. In an investigation of returns on high dividend yield stocks before and after taxes, Black and Scholes (1974) and Miller and Scholes (1982) do not find a relation between stock returns and dividend yield. Blume (1980) finds an association between returns and yield, but does not attribute this association to tax effects.

Naranjo et al. (1998) examine the relation between annualized dividend yield and risk-adjusted stock returns and find a strong positive relation between dividend yield and returns.
However, they only attribute a portion of the effects to taxes. Ayers et al. (2002) investigate the effect of an increase in the individual income tax rate on stock price. They find that high dividend yield firms had a more negative reaction to a rate increase. Dhaliwal et al. (2005) examine the relationship between a firm’s implied cost of equity and the dividend tax penalty. They find a positive association between the cost of equity and the penalized portion of a firm’s dividend yield. Dhaliwal et al. (2007) find that a firm’s cost of equity decreased following a decrease in individual tax rates on equity income.

While studies have found that personal income taxes affect equity value and cost of equity, a large segment of investors are not individuals. Institutional investors such as mutual funds, pension funds, banks, endowments, and brokerage firms hold a large percentage of shares. Miller and Modigliani (1961) assert that institutional investors have the ability to offset the tax penalty of debt. Ayers et al. (2002) and Dhaliwal et al. (2003) find that institutional ownership mitigates the effects of the dividend tax penalty on stock returns. Dhaliwal et al. (2005) show that institutions reduce the effects of dividend taxes on the cost of equity. Dhaliwal et al. (2007) provides evidence that institutions reduce the benefits to a firm’s cost of equity from a reduction in the dividend tax rate. A common element in these studies is that institutional investors are treated as a homogenous tax-exempt group.

Recent research (Jin, 2006; Moser & Pucket, 2007; Usrey et al., 2008) has investigated whether institutional investors are a homogenous tax-exempt group or are a heterogenous group with different tax preferences. The logic for treating institutional investors as a heterogenous group derives from the tax preferences of an institution’s underlying shareholders. A pension fund’s shareholders defer taxes on their investment earnings. Charitable endowments do not pay

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13 NYSE Facts and Figures indicates institutional investors held 49.8 percent of corporate equity in the third quarter of 2003.
taxes on their investments, whereas, a large percentage of mutual fund investors pay taxes on
their earnings in the current period. Chaetty and Saez (2005) state that “raw institutional
ownership is clearly not a valid proxy for nontaxable status.”

Jin (2006) provides evidence that the tax status of an institution’s underlying shareholder
base impacts its trading decisions. Usrey et al. (2007) provide evidence that mutual funds, whose
primary shareholders are taxable individuals, increased their stock holdings of dividend paying
firms following the 2003 Act. They also find that institutional investors other than mutual funds
decreased their holdings of dividend paying firms during the same period. Moser and Puckett
(2007) investigate the relationship between changing tax regimes and institutional preference for
dividends. They find that when the dividend tax penalty is high, tax disadvantaged institutions
(mutual funds and investment advisors) hold lower amounts of dividend paying stocks than tax
advantaged institutions (charitable endowments, pension funds, universities). This study
investigates whether differences in the tax attributes of the underlying shareholders of
institutional investors influence the impact of equity tax rate changes on a firm’s cost of equity.

3. Methodology

Cost of Equity

Recent studies have used ex ante measures of cost of capital to measure the impact of
taxes on the cost of equity capital. Dhaliwal et al. (2007) investigate whether cost of equity
capital decreased following a decrease in individual dividend tax rates. They used ex ante
measures of cost of equity and found that the cost of equity capital decreased following a
reduction in the dividend tax rates. Three methods of estimating a firm’s implied cost of equity
capital have been developed in recent studies. The methods developed by Gebhardt, Lee and

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14 Bergstresser and Poterba (2002) estimate the median investor in a mutual fund is subject to a 31% marginal rate.
Swaminahtan (GLS) (2001), Claus and Thomas (2001), and Gode and Mohanram (2003) derive from the Feltham-Ohlson residual income model (Edwards & Bell, 1961; Ohlson, 1995; Feltham & Ohlson, 1995). The major difference in the models is their treatment of perpetual earnings growth. Assuming clean surplus accounting, the residual income method models firm value as book value plus the present value of abnormal earnings. The residual income model can be written as follows:

\[ P_t = B_t + \sum_{i=1}^{\infty} E_t \left[ NI_{t+i} - r_e B_{t+i-1} \right] \left( 1 + r_e \right)^{-i} \]  

(4)

where

- \( P_t \) = the stock price at the end of year \( t \)
- \( B_t \) = book value at time \( t \)
- \( E_t \) = expectation at time \( t \)
- \( NI_{t+i} \) = net income for the period \( t+i \)
- \( r_e \) = cost of equity capital

GLS alter Equation (4) by using analyst forecasts of earnings for years \( t+1 \) and \( t+2 \). For year \( t+3 \), analyst estimates of long-term growth are used. GLS assumes that earnings are mean reverting to the industry median return on equity for years \( t+4 \) to \( t+T \) in a linear method. GLS estimate the following:

\[ P_t = B_t + \frac{FROE_{t+1} - r_e}{(1 + r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1 + r_e)^2} B_{t+1} + TV \]  

(5)

where

- \( P_t \) = the stock price at the end of year \( t \)
- \( B_t \) = book value at the beginning of the year deflated by the number of shares outstanding at the beginning of the year
\[ FROE_{t+i} = \text{Forecasted return on equity for the year } t+i \text{ period equal to } \frac{FEPS_{t+i}}{B_{t+i-1}}. \]

\( FEPS_{t+1} \) is the IBES analyst one-year ahead earnings per share forecast. \( FEPS_{t+2} \) equals the IBES two-year ahead earnings forecast. \( FEPS_{t+3} \) is the \( FEPS_{t+2} \) times one plus the IBES consensus long-term growth rate.\(^{15}\) For years \( t+4 \) to \( t+T \), linear interpolation to the industry median return on equity is used to calculate \( FROE \).

\[ B_{t+i} = \text{Year } t+i \text{ book value deflated by the shares outstanding at the beginning of year } t. \]

\( B_{t+i} = B_{t+i-1} + FEPS_{t+i} - FDPS_{t+i} \). \( FDPS \) is the forecasted dividends per share and equals \( FEPS \) times the year \( t \) dividend payout ratio.

\[ TV = \text{terminal value} \]

\[ TV = \sum_{i=3}^{T} \frac{FROE_{t+i} - r_c}{(1 + r_c)^i} B_{t+i-1} + \frac{FROE_{t+T} - r_c}{r_c (1 + r_c)^{T-1}} B_{t+T-1} \]  \( (6) \)

Consistent with GLS, cost of equity capital is calculated for 12 periods, and firms are divided into 48 industries (using the four digit sic code) based on the Fama and French (1997) designation. The industry median return on equity is the ten-year moving median return on equity for all firms in the same industry. Firm years with negative income before extraordinary items are excluded.

Clause and Thomas (2001) estimate that abnormal earnings grow at a constant rate after year \( t+5 \). Clause and Thomas (2001) estimate the residual income model as follows:

\[ P_t = B_t + \frac{AE_{t+1}}{(1 + r_c)} + \frac{AE_{t+2}}{(1 + r_c)^2} + \frac{AE_{t+3}}{(1 + r_c)^3} + \frac{AE_{t+4}}{(1 + r_c)^4} + \frac{AE_{t+5}}{(1 + r_c)^5} + \frac{AE_{t+5} \left(1 + g_{ac}\right)}{r_c - g_{ac}} \left(1 + r_c\right)^5 \]  \( (7) \)

where

\(^{15}\) If the long-term growth rate is not provided, the long-term growth rate is estimated as \( (FEPS_{t+2}/FEPS_{t+1}) - 1 \) where \( FEPS_{t+1} \) and \( FEPS_{t+2} \) are positive.
\[ AE_t = \text{Expected abnormal earnings for year } t \text{ equal to } FEPS_t - r_e(B_{t+1}). \] If IBES does not provide earnings forecast for \( t+3, t+4, t+5 \), the prior year forecast is multiplied by the one plus the IBES consensus forecasted long-term growth rate.\(^{16}\)

\[ g_{ae} = \text{Growth rate of abnormal earnings beyond } t+5 \text{ equal to the yield on ten-year U.S. Treasury bonds minus three percent.} \]

Gode and Mohanram (2003) assume that the short-term rate approaches the risk-free rate less three percent. They estimate the residual income model using the Ohlson and Jeuttner-Nauroth (2003) model. This estimate assumes that in perpetuity, the short-term growth rate fades to the risk-free rate minus three percent (\( rf - 0.03 \)). The Gode and Mohanram (2003) estimate is as follows:

\[
    r_e = \sqrt{A^2 + \left(\frac{FEPS_{t+1}}{P_t}\right)g_2 - \left(r_f - 3\%\right)}
\]

where

\[
    A = .5\left(r_f - 3\%\right) + \frac{DPS_{t+1}}{P_t}
\]

\[
    g_2 = \text{Short-term growth rate equal to the IBES consensus long-term growth rate. If the long-term growth rate is not available, then } g_2 \text{ equals } (FEPS_{t+2}/FEPS_{t+1}) - 1.
\]

\[
    DPS_{t+1} = FEPS_{t+1} \text{ times the year } t \text{ dividend payout ratio.}
\]

\[
    r_f = \text{The risk-free rate equal to the yield on a ten-year U.S. treasury bond.}
\]

\(^{16}\) If the long-term growth rate is not provided, the long-term growth rate is estimated as \((FEPS_{t+2}/FEPS_{t+1}) - 1\) where \(FEPS_{t+1}\) and \(FEPS_{t+2}\) are positive.
Sample and Data

I investigate the cost of equity capital identifiable events that signal a change in personal tax rates on investment income. Proposed in March 1997 and signed in August 1997, the 1997 Act reduced the tax rate on capital gains from 28 percent to 20 percent and was made retroactive to May 7, 1997. Signed in May 2003, the 2003 Act reduced the tax rate on dividend income from 38.6 percent to 15 percent and the capital gain rate from 20 percent to 15 percent. Interest income continued to be taxed as ordinary income, which decreased from 38.6 percent to 35 percent. These tax acts provide an ideal setting to test how institutional investors influence the cost of equity capital following changes in personal investment tax rates.

I examine quarterly levels of the cost of equity capital from January 1, 1995 until December 31, 2006. The 1997 Act became effective May 7, 1997. The 2003 Tax was made effective May 6, 2003. Therefore, I segment the sample into two tax regimes:

1. The 1997 Tax Act regime from January 1, 1995 until December 31, 1999
2. The 2003 Tax Act regime from January 1, 2000 until December 31, 2005

Table 1 provides a summary of the segmented tax regimes.

I begin by collecting quarterly institutional investor ownership data for the period from January 1, 1995 until December 31, 2005. This information is gathered from 13F filings obtained through the Thomson Financial Securities Data. Form 13F is an SEC mandated quarterly statement that must be filed by all institutions who exercise investment discretion over greater than $100 million of securities. Form 13F requires that all common stock holdings of $200,000 or greater than 10,000 shares must be reported. Individual fund data are collected via fund prospectuses and SEC N30D filings.

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17 May 6, 2003 is the date the tax rate reduction affects capital gains sales of stock. The tax rate reduction on dividend income was made effective on the first day of 2003. Consistent with Dhaliwal et al. (2007), I use May 6, 2003 as the cutoff for the post-enactment period.
Institutions are classified into five categories: Bank holding companies, Mutual funds, Investment advisors, Insurance companies, and Other institutional shareholders.\(^{18}\) Consistent with prior research (Chetty & Saez, 2005; Strickland, 2002; Moser, 2007; Moser & Puckett, 2007), I divide institutional investors into two categories based on the taxability of their underlying shareholders. The first group is tax-advantaged institutions consisting of shares held by banks, charitable endowments, other corporations, pension funds, and universities. This group is advantaged because its underlying shareholders do not pay or defer taxes on their investment. The second group is tax-disadvantaged institutions consisting of shares held by mutual funds, insurance companies, and investment advisors. This group is disadvantaged because many of the underlying shareholders pay tax on their investments.\(^{19}\) In order to increase the distinction between the two groups, I eliminate firms that are not in the top three deciles of percentage of shares owned by tax-disadvantaged institutions or the top three deciles of percentage of shares owned by tax-advantaged institutions measured at the prior year-end.\(^{20}\) Firms missing an observation for any year of the sample are eliminated. Firms that are in the top-three deciles of both tax-disadvantaged and tax-advantaged institutional ownership are eliminated.

I estimate cost of equity capital for 44 calendar quarters from the quarter beginning January 1995 to the quarter ending December 2005 using the GLS, Clause and Thomas, Gode and Mohanram estimates. Analyst earnings forecast, long-term growth forecasts, and forecast dispersion are gathered from I/B/E/S. Stock prices are obtained from CRSP. All other data are gathered from the Compustat Industrial Annual and Quarterly database. A stock or institutional

\(^{18}\) Thomson Financial disclosed that classifications for year 1998 and beyond are incorrect. Approximately, 1,000 mutual funds and investment advisors were misclassified as other institutional investors. Following, Moser and Puckett (2007) institutional shareholders are manually reclassified to their pre-1998 classification.

\(^{19}\) While it is not possible to identify the actual underlying shareholders, a significant number of these shareholders are subject to taxes. According to the Investment Company Institute, almost half of mutual fund assets are held by taxable entities. Bergstresser and Poterba (2002) estimate the median investor in a mutual fund is subject to a 31\% marginal rate.

\(^{20}\) In sensitivity analysis, I test the entire sample.
An investor who does not have all of the required information is eliminated from the sample. An institutional investor must file a 13F for a minimum of two consecutive periods to be included in the sample. These requirements reduce the sample to 35,376 firm observations (804 firms per quarter). Table 2 presents a summary of the sample attrition due to data requirements.

**Empirical Model – Issuance of Equity and Debt**

The analysis begins by testing whether a firm’s cost of equity is influenced by the makeup of its institutional investors following a change in tax law. For this analysis, I use net issues as the dependent variable. Consistent with Dhaliwal et al. (2005), \( r_i \) is defined as the cost of equity estimates developed by GLS (\( r_{GLS} \)), Claus and Thomas (\( r_{CT} \)), Gode and Mohanram (\( r_{GM} \)), and the average of the three measures (\( r_{AVG} \)). In order to formally test the effect that the proportion of a firm’s shares owned by tax disadvantaged or tax-advantaged institutional owners has on a firm’s cost of equity following changes in personal investment income tax rates, I estimate the following regressions:

\[
r_{i,t} = \alpha_0 + \alpha_1 T R A 97 + \alpha_2 H T_{i,t-1} + \alpha_3 N O D I V_{i,t-1} + \alpha_4 H T \cdot T R A 97 \\
+ \alpha_5 N O D I V \cdot T R A 97 + \alpha_6 H T \cdot N O D I V \cdot T R A 97 + \alpha_7 B M_{i,t-1} + \alpha_8 \log G_{i,t-1} \\
+ \alpha_9 D i s p_{i,t-1} + \alpha_{10} S i z e_{i,t-1} + \alpha_{11} I n d r_j + \alpha_{12} \beta_{ERM} + \alpha_{13} \beta_{SMB} + \alpha_{14} \beta_{HML} + \epsilon_t \tag{9}
\]

\[
r_{i,t} = \alpha_0 + \alpha_1 T R A 03 + \alpha_2 H T_{i,t-1} + \alpha_3 N O D I V_{i,t-1} + \alpha_4 H T \cdot T R A 03 + \alpha_5 B M_{i,t-1} \\
+ \alpha_6 \log G_{i,t-1} + \alpha_7 D i s p_{i,t-1} + \alpha_8 S i z e_{i,t-1} + \alpha_9 I n d r_j + \alpha_{10} \beta_{ERM} + \alpha_{11} \beta_{SMB} + \alpha_{12} \beta_{HML} + \epsilon_t \tag{10}
\]

where:

\( r \) = the three implied cost of equity measures (GLS (\( r_{GLS} \)), Claus and Thomas (\( r_{CT} \)), Gode and Mohanram (\( r_{GM} \)), and the average of the three (\( r_{AVG} \)).

\( H T \) = 1 if the observation is in the top three deciles of percentage of shares owned
by tax-disadvantaged institutions, and 0 otherwise.

\[ TRA97 = 1 \] if the observation is after May 7, 1997, and 0 if the observation is before May 7, 1997.

\[ TRA03 = 1 \] if the observation is after May 6, 2003, and 0 otherwise.

\[ NODIV = 1 \] if the firm does not pay dividends, and 0 otherwise.

\[ BM = \] the log of the firm’s book to market value of assets ratio.

\[ LogG = \] the log of the long-term earnings growth forecast from I/B/E/S.

\[ DISP = \] the log of the coefficient of variation of the mean analyst one-year-ahead earnings per share forecast as of the end of the same quarter of the prior year.

\[ Size = \] the log of market value of equity.

\[ Indr = \] the median cost of equity for the firm’s industry of the entire sample period.

\[ \beta_{ERM}, \beta_{SMB}, \beta_{HML} = \] the Fama-French (1996) three factor risk loadings estimated using return data for the 48 months before the beginning of the calendar year.

**Tax Variables**

Consistent with Dhaliwal et al. (2005), I use indicator variables to measure tax regimes. \( TRA97 \) equals 1 if the observation is measured after the 1997 Tax Act, while \( TRA03 \) is 1 if the observation is measured after the 2003 Tax Act. The 1997 Act decreased the capital gains tax rate while leaving the dividend tax rate unchanged. Thus, the 1997 Act did not apply to all equity income; however, it is expected that the 1997 Act decreased the cost of equity. I predict the coefficient on \( TRA97 \) will be negative. The 2003 Act decreased the tax rates on capital gains and dividends, which should decrease the cost of equity. Therefore, I predict that the coefficient on \( TRA03 \) will be positive.
I use an indicator variable to measure whether a firm is in the top three deciles of tax-disadvantaged ownership or the top three deciles of tax-advantaged ownership. Ownership is measured at the end of quarter \( t-1 \). Amihud and Li (2006) provide evidence that the institutional investor trading provides information to other less informed investors, thereby reducing the cost of equity. This relationship should hold true regardless of tax preference; therefore, I predict that the coefficient on \( HT \) will be negative. If the 1997 and 2003 Acts reduced the cost of equity capital, then firms with high levels of tax-disadvantaged institutional owners should be influenced by the acts. The Acts’ impact on the cost of equity capital for firms with levels of tax-advantaged institutional ownership should be mitigated. Therefore, I predict that the coefficients on \( HT*TRA97 \) and \( HT*TRA03 \) will be negative.

\( NODIV \) is an indicator variable equal to 1 if the firm does not pay dividends, and 0 if the firm does pay dividends. A firm’s payment of dividends should provide investors with information and should decrease a firm’s cost of equity. Non-dividend firms do not receive this benefit. I predict that the coefficient on \( NODIV \) will be positive. The reduction of the capital gains rate by the 1997 Act should benefit firms who do not pay dividends more than dividend-paying firms. Therefore, non-dividend firms should have a greater reduction in the cost of equity compared to dividend firms. I predict the coefficient on \( NODIV*TRA97 \) will be negative. Tax-disadvantaged institutions should not mitigate the effects of the 1997 Act. Therefore, I predict that the coefficient on \( HT*TRA97*NODIV \) will be negative.

**Control Variables**

I include additional variables to control for firm characteristics affecting cost of equity as identified in prior research (Fama & French, 1996; Gebhardt et al., 2001; Gode & Mohanram, 2003; Dhaliwal et al., 2005). \( BM \) is the log of the ratio of book value of common equity to
market value of common equity as of the end of the same quarter of the prior year. LogG is the log of the long-term earnings growth forecast from I/B/E/S at the end of the same quarter of the prior year. DISP is the log of the coefficient of variation of the mean analyst one-year-ahead earnings per share forecast as of the end of the same quarter of the prior year. Size is the log of a firm’s market value of equity. Indr is the median cost of equity for the firm’s industry of the entire sample period. $\beta_{MKT}$, $\beta_{SMB}$, and $\beta_{HML}$ are the Fama-French’s (1996) three factor risk loadings estimated using return data for the 48 months before the beginning of the calendar year. Prior literature predicts that the coefficients on BM, Indr, $\beta_{MKT}$, $\beta_{SMB}$, and $\beta_{HML}$ will be positive and the coefficients on SIZE and DISP will be negative (Fama & French 1996; Gebhardt et al., 2001; Gode & Mohanram, 2003; Dhaliwal et al., 2005). No prediction is made on LogG.

4. Results

Descriptive Statistics

Table 3 presents descriptive statistics for the entire sample of firms, and a sample of firms consisting of firms that are in the top three deciles of tax-disadvantaged institutional ownership. The results of Table 3 indicate that tax-disadvantaged firms own a greater percentage of firms in the sample than tax-advantaged firms. The results also indicate that firms owned by tax-disadvantaged institutional owners are smaller, and have fewer dividend paying firms than those owned by tax-advantaged institutional owners. Larger firms tend to have a lower cost of equity, and dividends are generally negatively correlated with the cost of equity. Firms with high tax-disadvantaged ownership have lower dispersion when compared to firms owned by tax-advantaged institutional owners. Overall, Table 3 indicates that firms in the top three deciles of tax-disadvantaged ownership and firms in the top three deciles of tax-advantaged ownership
have similar attributes, which allows for the assumption that market wide correlated omitted variables should affect both sets of firms in a similar manner.

Table 4 presents Pearson and Spearman correlations. The correlations between all measures of $r$, tax-disadvantaged institutional ownership ($TAXDIS$), and tax-advantaged institutional ownership ($TAXAD$) are negative. This supports prior research from Amihud and Li (2006) that institutional investor trading provides information that reduces the cost of equity. The correlations between all measures of $r$ and the indicator variables for $TRA97$ are positive; however, not all of the correlations are significant. This provides partial evidence that the cost of equity increased following the 1997 Act. An explanation for this result is that the 1997 Act only reduced personal tax rates on capital gain income. The correlations between all measures of $r$ and the indicator variables for $TRA03$ are negative, but as with $TRA97$, not all of the correlations are significant. This provides partial evidence that the cost of equity decreased following the 2003 Act. Untabulated correlations of the interaction variables do not indicate any issues with multicollinearity.

Table 5 presents summary statistics of the mean cost of equity capital before and after the 1997 and 2003 Acts using the cost of equity estimates. It is expected that the cost of equity capital decreased following the 1997 Act. Contrary to expectations, the results in Table 5 indicate that the cost of equity capital increased following the 1997 Act. $R_{AVG}$ increased by 6% following the 1997 Act. The three other estimates have similar increases. Two possible explanations are the 1997 Act’s tax rate reduction applied to capital gain income, and the presence of tax-advantaged institutional owners. Dividend-paying firms did not benefit from the 1997 Act and should not experience a significant decrease in their cost of equity. Additionally,
tax-advantaged institutional owners should mitigate the cost of equity benefits from the 1997 Act.

The 2003 Act reduced the personal income tax rates on dividends and equity, and it is expected that the cost of equity decreased following the 2003 Act. Consistent with expectations, the cost of equity capital decreased following the 2003 Act. \( R_{AVG} \) decreased by 4.5% following the 2003 Act, while the other estimates had similar decreases. The results provide support that tax rate changes in the 2003 Act decreased the cost of equity.

Table 6 presents summary statistics of cost of equity measures before and after the applicable tax regimes segregated by institutional investor type. The results in Table 6 indicate that firms with high levels of tax-advantaged institutional ownership \((HT=0)\) experienced an increase in cost of equity to a lesser degree than tax-disadvantaged institutions \((HT=1)\) following the 1997 Act. \( r_{GLS} \) increased from 0.075 to 0.076 (difference insignificant), \( r_{CT} \) increased from 0.073 to 0.074 (difference insignificant), \( r_{GMM} \) increased from 0.081 to 0.084 \((p<.01)\), and \( r_{AVG} \) increased from 0.075 to 0.076 \((p<.01)\). For firms with high levels of tax-disadvantaged institutional ownership, \( r_{GLS} \) increased from 0.084 to 0.089 \((p<.01)\), \( r_{CT} \) increased from 0.078 to 0.083 \((p<.01)\), \( r_{GMM} \) increased from 0.091 to 0.093 \((p<.01)\), and \( r_{AVG} \) increased from 0.083 to 0.089 \((p<.01)\). While these results suggest that tax-disadvantaged and tax advantaged firms behaved in a similar manner, it should be noted that the changes of the 1997 Act mainly affected capital gains and not dividends. When the dividend policy of the firm is controlled for, it is possible that the results will change. Additionally, the cost of equity increase for tax-advantaged firms appears to be smaller than those for tax-disadvantaged firms. This result is consistent with institutional firms influencing the cost of equity in a differential manner following changes in personal tax rates.
The results in Table 6 indicate that firms with high levels of tax-advantaged institutional ownership experienced an increase in cost of equity following the 2003 Act. \( r_{GLS} \) increased from 0.084 to 0.086 (\( p < .01 \)), \( r_{CT} \) increased from 0.082 to 0.083 (difference insignificant), \( r_{GMM} \) remained constant at 0.098, and \( r_{AVG} \) remained constant at 0.089. Conversely, firms with high levels of tax-disadvantaged institutional ownership experienced a decrease in debt following the 2003 Act. \( r_{GLS} \) decreased from 0.088 to 0.077 (\( p < .01 \)), \( r_{CT} \) decreased from 0.084 to 0.077 (\( p < .01 \)), \( r_{GMM} \) decreased from 0.090 to 0.085 (\( p < .01 \)), and \( r_{AVG} \) decreased from 0.085 to 0.081 (\( p < .01 \)). These results suggest that tax-disadvantaged institutional owners influence the cost of equity in a differential manner.

**Empirical Results**

Table 7 presents the results of the estimation of the regression models for all firm-quarters beginning with January 1, 1995 and concluding with December 31, 1999. Table 7 reports the results of using the dependent variables \( r_{GLS} \), \( r_{CT} \), \( r_{GMM} \), and \( r_{AVG} \). F-statistics are statistically significant, and the explanatory power (adjusted \( R^2 \)) of the regression is 13.76 percent when the dependent variable is \( r_{GLS} \). The adjusted \( R^2 \) is 17.44 percent when the dependent variable is \( r_{CT} \), 18.40 percent for \( r_{GMM} \), and 13.72 percent when the dependent variable is \( r_{AVG} \).

Prior research (Dhaliwal et al., 2005) indicates that aggregate institutional ownership minimizes the effects of tax rate changes on the cost of equity. Because the 1997 Act’s main effect was to reduce the individual capital gains tax rate, firms that do not pay dividends should be the main beneficiary. This benefit should reduce non-dividend firms’ cost of equity more than that of dividend-paying firms. If all institutional investors are homogenous with respect to their tax preferences and behave like tax-exempt investors, then the level of tax-advantaged or tax-
disadvantaged institutional ownership should not influence non-dividend firms’ cost of equity. However, if tax-disadvantaged firms do not behave like tax-exempt investors, then non-dividend firms’ level of tax-disadvantaged ownership should influence their cost of equity.

The results indicate that the tax attributes of a firm’s institutional investors influence its cost of equity in a differential manner. This is evidenced by the negative coefficient on the interaction variable $HT^{*}TRA97*NODIV$ for all dependent variables (statistical significance at the .01 levels). This result indicates that non-dividend paying firms in the top three deciles of tax-disadvantaged institutional ownership experienced a decrease in the cost of equity, which is consistent with expectations. If institutional investors were a tax-exempt homogenous group, then the interaction term should either be positive or statistically insignificant.

Interestingly, the interaction terms on $NODIV^{*}TRA97$ are not significant, and the coefficients on $HT^{*}TRA97$ are positive. The insignificance of the $NODIV^{*}TRA97$ variable can be explained by the influence of the tax-advantaged ownership. Non-dividend firms with high tax-advantaged ownership were not influenced by the tax rate changes in the 1997 Act. The positive coefficient on the $HT^{*}TRA97$ variable could be due to the presence of dividend-paying firms. The 1997 Act only reduced the tax rates on capital gains; therefore, dividend-paying firms did not receive a benefit from the 1997 Act.

Several other results presented in Table 7 are of interest. The coefficient on the $HT$ variable is negative. This is consistent with prior research (Amihud & Li, 2006) consistent with information from institutional investor trading reducing the cost of equity. The sign of $NODIV$ indicates non-dividend firms have a higher cost of equity. This result is consistent with dividend payment providing a signal that reduces the cost of equity.
Table 8 presents the results of the estimation of the regression models for all firm quarters beginning with January 1, 2000 and concluding with December 31, 2005. Table 8 reports the results of using the dependent variables $r_{GLS}$, $r_{CT}$, $r_{GMM}$, and $r_{AVG}$. F-statistics are statistically significant, and the $R^2$ is 11.29 percent when the dependent variable is $r_{GLS}$. The adjusted $R^2$ is 9.48 percent when the dependent variable is $r_{CT}$, 14.22 percent for $r_{GMM}$, and 9.45 percent when the dependent variable is $r_{AVG}$. The 2003 Act’s main effect was to reduce the individual tax rates on both types of equity income (capital gains and dividends). This should reduce both non-dividend and dividend firms’ cost of equity. If institutional investors are a homogenous tax-exempt group, then the tax-status of a firm’s institutional investors should not influence its cost of equity following the 2003 TRA. However, if the expectations of this study hold, then the cost of equity for firms with high levels of tax-disadvantaged institutional ownership will decrease more than the cost of equity for firms with high levels of tax-advantaged institutional ownership following the 2003 TRA.

The results presented in Table 8 indicate that the tax attributes of a firm’s institutional investors differentially influence the cost of equity. This is evidenced by the negative coefficient on the interaction variable $HT*TRA03$ for all dependent variables (statistical significance at the .05 and .01 levels, respectively). This result indicates that firms in the top three deciles of tax-disadvantaged institutional ownership experienced a decrease in the cost of equity. The signs on the coefficients of $TRA03$ are also negative. This provides evidence that the 2003 Act decreased the cost of equity. Table 8 also provides further support that institutional investor trading reduces the cost of equity as evidenced by the negative coefficient on $HT$. 
Supplemental Analysis

In order to test whether the type of institutional owner affects a firm’s cost of equity in a differential manner, I use an indicator variable equal to 1 if the firm is in the top three deciles of tax-disadvantaged ownership and 0 if the firm is in the top three deciles of tax-advantaged ownership. The previous tests allow conclusions to be made whether tax-disadvantaged and tax-advantaged institutional investors are different. However, the tests do not allow conclusions to be made about the directionality of the differences. In other words, it is possible to conclude that firms with high concentrations of tax-disadvantaged owners had a more significant decrease in cost of equity compared to firms with high concentrations of tax-advantaged owners. However, it is not possible to conclude from the previous tests that the cost of equity for firms with high concentrations of tax-advantaged ownership increased. In order to test the directionality of the differences between tax-disadvantaged and tax-advantaged investors, I test each of the previous regressions with a sample consisting of only firms in the top three deciles of tax-disadvantaged ownership or a sample of firms in the top three deciles of tax-advantaged ownership.

Tables 9 and 10 present the results of estimating the regressions using samples segmented by institutional investor type. Consistent with previously discussed results, Table 9 indicates that the cost of equity for non-dividend firms in the top three deciles of tax-disadvantaged institutional ownership decreased following the 1997 Act. However, Table 9 indicates that the cost of equity for non-dividend firms in the top three deciles of tax-advantaged institutional ownership increased following the 1997 Act. Results in Table 10 are consistent with the results in Table 9. Following the 2003 Act, the cost of equity decreased for firms in the top three deciles of tax-disadvantaged institutional ownership. The results indicate that the cost of equity for firms in the top three deciles of tax-advantaged institutional ownership increased following the 2003
The results provide evidence that tax-advantaged firms are not affected by individual tax rates and mitigate the effects of changes in individual tax rates on the cost of equity. The results also indicate that institutional investors are not a homogenous tax-exempt group.

5. Implications

This study extends the literature examining the impact of personal taxes on the cost of equity capital by investigating how specific investors influence the cost of equity. This study also contributes to the literature examining the tax heterogeneity of institutional investors by investigating whether institutions whose underlying shareholders are taxed differently influence the cost of equity in a differential manner. Institutional investors have become influential in the capital markets because of their significant market share. It is important to understand how heterogeneity among institutional investors impacts the cost of equity. Future research on the effect of taxes on capital markets may want to examine this using only tax-advantaged institutional investors to proxy for a firm’s tax-exempt investor.

6. Conclusions

This study investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affect firms’ cost of equity following changes in tax rates on investment income received by individuals. Tax laws enacted in 1997 and 2003 reduced the individual tax rates on equity income, which decreased firms’ cost of equity. I investigate whether tax heterogeneity among institutional investors influences firm cost of equity following the rate changes in 1997 and 2003.

The results of this study indicate that institutional investors are not a homogenous tax-exempt group; rather, they are affected by individual tax rates in a differential manner. The results show that the cost of equity for firms with high levels of tax-disadvantaged institutional
investors decreased following decreases in individual tax rates on equity income. The results of supplemental analysis indicate that the cost of equity for firms with high levels of tax-advantaged institutional investors increased following decreases in individual tax rates on equity income. This paper contributes to literature investigating how individual income taxes affect capital markets and how different types of investors impact this relationship.
REFERENCES


Table 1

*Tax Regimes and Dates*

<table>
<thead>
<tr>
<th>Regime Segment</th>
<th>1997 Act</th>
<th>2003 Act</th>
</tr>
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<tbody>
<tr>
<td>Begin Date</td>
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<td>January 1, 2000</td>
</tr>
<tr>
<td>Effective Date</td>
<td>May 7, 1997</td>
<td>May 6, 2003</td>
</tr>
<tr>
<td>End Date</td>
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<td>December 31, 2005</td>
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Table 2

Sample Selection

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<tr>
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<td>Initial Firm Year Observations</td>
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<tr>
<td>Elimination of observations not in the top 30% of either ownership</td>
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<td>Sample</td>
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<td>Observations per Quarter</td>
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### Table 3

**Descriptive Statistics for Tax-advantaged and Tax-disadvantaged Only Sample**

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<th>Tax-disadvantaged</th>
<th>Diff</th>
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<td>Mean</td>
<td>Median</td>
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<td>0.0756</td>
</tr>
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<td>0.0709</td>
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<tr>
<td>r_{GMM}</td>
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<td>0.0847</td>
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<tr>
<td>r_{AVG}</td>
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<td>0.0786</td>
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<td>CT</td>
</tr>
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<td>-----</td>
<td>-----</td>
<td>----</td>
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Table 5

*Mean Cost of Equity Capital Before and After Tax Regimes*

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<tr>
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<th>After 1997 Act</th>
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<td>$r_{GLS}$</td>
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<td>0.084</td>
</tr>
<tr>
<td>$r_{CT}$</td>
<td>0.075</td>
<td>0.079</td>
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<tr>
<td>$r_{GMM}$</td>
<td>0.085</td>
<td>0.096</td>
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<tr>
<td>$r_{AVG}$</td>
<td>0.081</td>
<td>0.086</td>
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</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before 2003 Act</th>
<th>After 2003 Act</th>
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<tr>
<td>$r_{GLS}$</td>
<td>0.086</td>
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<td>$r_{CT}$</td>
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<td>0.079</td>
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<td>$r_{GMM}$</td>
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Table 6  

*Mean Cost of Equity Capital Before and After Tax Regime by Institutional Ownership*

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<tr>
<th></th>
<th>$\hat{r}_{GLS}$</th>
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<td>Pre-TRA 1997</td>
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<tr>
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<td>-0.002*</td>
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<tr>
<td>Pre-TRA 1997</td>
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<tr>
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<td>0.093</td>
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<td>-0.005*</td>
<td>-0.002*</td>
<td>-0.006*</td>
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<tr>
<td><strong>HT = 0</strong></td>
<td></td>
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<tr>
<td>Pre-TRA 2003</td>
<td>0.084</td>
<td>0.082</td>
<td>0.098</td>
<td>0.089</td>
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<tr>
<td>Post-TRA 2003</td>
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<td>0.089</td>
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<tr>
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<td>0.000</td>
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<tr>
<td><strong>HT = 1</strong></td>
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<tr>
<td>Pre-TRA 2003</td>
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<td>0.085</td>
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<tr>
<td>Diff</td>
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<td>-0.0209</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Adj. R$^2$</th>
<th></th>
<th>N</th>
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<tbody>
<tr>
<td><strong>Intercept</strong></td>
<td>0.1376</td>
<td>16,080</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRA97</strong></td>
<td>0.1744</td>
<td>16,080</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HT</strong></td>
<td>0.1840</td>
<td>16,080</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NODIV</strong></td>
<td>0.1372</td>
<td>16,080</td>
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Table 8

**OLS Regression of Cost of Equity Capital on Institutional Investor Type and Tax Regime**

<table>
<thead>
<tr>
<th></th>
<th>( r_{GIS} )</th>
<th>( r_{CT} )</th>
<th>( r_{GMM} )</th>
<th>( r_{AVG} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient t-stat</td>
<td>Coefficient t-stat</td>
<td>Coefficient t-stat</td>
<td>Coefficient t-stat</td>
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<tr>
<td>Intercept</td>
<td>0.0622 21.69 *</td>
<td>0.0729 15.10 *</td>
<td>0.0773 13.01 *</td>
<td>0.0784 18.52 *</td>
</tr>
<tr>
<td>TRA03</td>
<td>-0.0025 -2.99 *</td>
<td>-0.0023 -6.42 *</td>
<td>-0.0037 -2.42 **</td>
<td>-0.0075 -2.04 **</td>
</tr>
<tr>
<td>HT</td>
<td>-0.0041 -4.63 *</td>
<td>-0.0026 -4.09 *</td>
<td>-0.0029 -3.28 *</td>
<td>-0.0029 -3.51 *</td>
</tr>
<tr>
<td>NODIV</td>
<td>0.0029 3.25 *</td>
<td>0.0013 2.11 **</td>
<td>0.0072 9.83 *</td>
<td>0.0035 4.13 *</td>
</tr>
<tr>
<td>HT*TRA03</td>
<td>-0.0030 -2.19 **</td>
<td>-0.0029 -3.02 *</td>
<td>-0.0077 -7.00 *</td>
<td>-0.0049 -3.83 *</td>
</tr>
<tr>
<td>BM</td>
<td>0.0100 2.68 *</td>
<td>0.0062 2.29 **</td>
<td>0.0029 9.69 *</td>
<td>0.0061 7.27 *</td>
</tr>
<tr>
<td>LTG</td>
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<td>-0.0008 -3.05 *</td>
<td>0.0078 4.18 *</td>
<td>-0.0002 -0.67</td>
</tr>
<tr>
<td>Disp</td>
<td>-0.0067 -7.38 *</td>
<td>-0.0044 -4.92 *</td>
<td>-0.0043 -5.21 *</td>
<td>-0.0656 -7.97 *</td>
</tr>
<tr>
<td>Size</td>
<td>-0.0078 -5.45 *</td>
<td>-0.0075 -6.03 *</td>
<td>-0.0027 -19.39 *</td>
<td>-0.0021 -12.51 *</td>
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<tr>
<td>Indr</td>
<td>0.4387 16.56 *</td>
<td>0.2462 12.84 *</td>
<td>0.2407 11.14 *</td>
<td>0.3932 15.50 *</td>
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<tr>
<td>β_ERM</td>
<td>-0.0738 -9.64 *</td>
<td>-0.0693 -12.52 *</td>
<td>-0.0785 -12.58 *</td>
<td>-0.0807 -11.01 *</td>
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<tr>
<td>β_SMB</td>
<td>-0.0175 -1.77 *</td>
<td>-0.0209 -2.92 *</td>
<td>-0.0214 -2.65 *</td>
<td>-0.0251 -2.65 *</td>
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<tr>
<td>β_HML</td>
<td>-0.0225 -1.43</td>
<td>-0.0174 -1.53</td>
<td>-0.0149 -1.16</td>
<td>-0.0272 -1.81 ***</td>
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<tr>
<td>Adj. R²</td>
<td>0.1129</td>
<td>0.0948</td>
<td>0.1422</td>
<td>0.0945</td>
</tr>
<tr>
<td>N</td>
<td>19,296</td>
<td>19,296</td>
<td>19,296</td>
<td>19,296</td>
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</tbody>
</table>
### Table 9

**OLS Regression of Cost of Equity Measures on 1997 Tax Regime by Institutional Ownership**

<table>
<thead>
<tr>
<th></th>
<th>$r_{GLS}$</th>
<th></th>
<th>$r_{CT}$</th>
<th></th>
<th>$r_{GMM}$</th>
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<th>$r_{AVG}$</th>
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<tbody>
<tr>
<td><strong>Coefficient</strong></td>
<td></td>
<td></td>
<td><strong>t-stat</strong></td>
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<td><strong>Coefficient</strong></td>
<td></td>
<td><strong>t-stat</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tax Disadvantaged</strong></td>
<td></td>
<td></td>
<td><strong>Coefficient</strong></td>
<td></td>
<td><strong>t-stat</strong></td>
<td></td>
<td><strong>Coefficient</strong></td>
<td></td>
</tr>
<tr>
<td>TRA97</td>
<td>0.0092</td>
<td>5.66 *</td>
<td>0.0062</td>
<td>3.63 *</td>
<td>0.0107</td>
<td>5.45 *</td>
<td>0.0594</td>
<td>4.43 *</td>
</tr>
<tr>
<td>TRA97*NODIV</td>
<td>-0.0033</td>
<td>-1.81 ***</td>
<td>-0.0051</td>
<td>-2.61 *</td>
<td>-0.0048</td>
<td>-2.18 **</td>
<td>-0.0027</td>
<td>-1.76 ***</td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.1408</td>
<td>0.1521</td>
<td>0.1568</td>
<td></td>
<td>0.1412</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tax Advantaged</strong></td>
<td></td>
<td></td>
<td><strong>Coefficient</strong></td>
<td></td>
<td><strong>t-stat</strong></td>
<td></td>
<td><strong>Coefficient</strong></td>
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</tr>
<tr>
<td>TRA97</td>
<td>0.0033</td>
<td>1.70 ***</td>
<td>0.0029</td>
<td>1.97 **</td>
<td>0.0046</td>
<td>5.53 *</td>
<td>0.0026</td>
<td>2.77 *</td>
</tr>
<tr>
<td>TRA97*NODIV</td>
<td>0.0058</td>
<td>2.00 **</td>
<td>0.0028</td>
<td>2.39 **</td>
<td>0.0027</td>
<td>1.74 ***</td>
<td>0.0054</td>
<td>3.78 *</td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.1596</td>
<td>0.2270</td>
<td>0.2518</td>
<td></td>
<td>0.2032</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Table 10

*OLS Regression of Cost of Equity Measures on 1997 Tax Regime by Institutional Ownership*

<table>
<thead>
<tr>
<th>Tax Status</th>
<th>$r_{GLS}$ Coefficient</th>
<th>t-stat</th>
<th>$r_{CT}$ Coefficient</th>
<th>t-stat</th>
<th>$r_{GMM}$ Coefficient</th>
<th>t-stat</th>
<th>$r_{AVG}$ Coefficient</th>
<th>t-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tax Disadvantaged</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRA03</td>
<td>-0.0042</td>
<td>-3.35</td>
<td>*</td>
<td>-0.0020</td>
<td>-1.90 ***</td>
<td>-0.0034</td>
<td>-2.66 *</td>
<td>-0.0074</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.1448</td>
<td></td>
<td></td>
<td>0.0888</td>
<td>0.1297</td>
<td>0.1598</td>
<td>0.1595</td>
<td></td>
</tr>
<tr>
<td><strong>Tax Advantaged</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRA03</td>
<td>0.0044</td>
<td>3.29</td>
<td>*</td>
<td>0.0007</td>
<td>1.10</td>
<td>0.0015</td>
<td>2.09 **</td>
<td>0.0036</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.1189</td>
<td></td>
<td></td>
<td>0.1021</td>
<td>0.1598</td>
<td>0.1595</td>
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</tbody>
</table>
Figure 1. Mean cost of capital by quarter.

Panel A: Before and after the 1997 Act

Panel B: Before and After the 2003 Act
CHAPTER 3
INSTITUTIONAL INVESTORS IN TAX RESEARCH

1. Introduction

In their seminal paper on tax research in accounting, Shackelford and Shevlin (2001) aptly characterize the questions tax research attempts to address. They are as follows: Do taxes matter? If not, why not? If so, how much? These questions seem to be the motivation for much of the research investigating the effect of shareholder-level taxes on the capital markets. This research examines how individual income taxes on interest, dividends, and capital gains affect firm share price, dividend policy, and capital structure. As stated in Shackelford and Shevlin (2001), the question of this area is whether the marginal investor pays taxes. Following the Scholes and Wolfson (1992) framework of identifying all parties affected by taxes, prior research attempts to identify whether the firm’s investor is taxable or tax-exempt. The majority of this research controls for a firm’s tax-exempt investors using the level of a firm’s institutional ownership. The implied assumption of this proxy is that all institutions are affected by taxes in the same manner. Recent research investigates whether institutional investors are heterogenous with respect to shareholder-level taxes. This paper synthesizes extant literature that attempts to control for institutional investors’ impact on capital markets’ tax studies.

22 Institutions are categorized as mutual funds, brokerage firms, banks, insurance companies, and charitable endowments.
The research of personal income taxes’ role in corporate financial decision-making has a long history. In Miller and Modigliani’s (1961) argument on the irrelevance of a firm’s dividend policy in relation to its share price, they admit that differences in personal income taxes on dividends and capital gains could lead to concentrations of investors or “clienteles” which could impact share price. Research that followed investigated whether personal income taxes influenced firm price as well as other firm decisions. For example, Graham (1999) examines the impact of personal tax rates on a firm’s decision to use debt or equity financing.

Even though Miller and Modigliani (1961) acknowledge that tax clienteles could impact share price, they argue that institutional investors (with their assumed indifference to taxes) will mitigate the effect of personal taxes on share price. In the past decade, research has used the level of institutional ownership to control for the probability that the tax status of a firm’s marginal investor is not a taxable individual. Much of this research treats institutional investors as a homogenous tax-exempt group. This research may assume that institutional investors are tax-exempt because some institutional investors have shareholders that do not pay tax on their investments (e.g. pension funds and charitable endowments); however, some of the underlying shareholders of institutions do pay tax on their investment (e.g. mutual funds). Research that is more recent has investigated whether personal income taxes influence institutions in a differential manner. In this review, I summarize tax research involving institutional investors according to the questions the research attempts to address. I organize the paper in the following manner. Section two summarizes research on the formation of tax clienteles. Sections three through seven summarize research that investigates the effects of personal income taxes on firm payout policy, corporate acquisitions, share price, trading volume, and financing decisions.

Section eight summarizes research on the tax heterogeneity of institutional investors. The last section concludes the paper.

2. The Formation of Tax Clienteles

Miller and Modigliani (1961) hold that, in a perfect capital market with no transfer taxes, a firm’s earnings power and investment policy determine its value and not its dividend policy. Miller and Modigliani find that “…given a firm’s investment policy, the dividend payout policy it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders” (p. 414). This finding suggests that investors will not consider dividend policy when making investment decisions and will not form clienteles based on a preference for dividends. However, if Miller and Modigliani (1961) were to include taxes in their model, they suggest that a “clientele effect” is possible. This “clientele effect” occurs due to the tax-disadvantage of dividend income.24 This tax clientele effect is a concentration of investors, with the same tax status, that prefer one company’s dividend policy to another company’s policy due to the investors’ tax status.

Following Miller and Modigliani (1961), research attempted to find a correlation between differential tax rates on equity income and the tax status of investors. For example, Richardson et al. (1986) investigate whether dividend initiations result in a marked increase in trading volume. While Richardson et al. (1986) show an increase in volume, they attribute this increase to the signaling of future earnings by the dividend and not a tax clientele effect. Seida (2001) provides evidence of tax clienteles by finding a strong positive association between dividend increase magnitude and increased trading activity. Seida (2001) also finds evidence that tax clienteles already exist for firms because firms with higher levels of dividends have lower increases in trading activity following dividend increases. These studies analyze trading volume shifts to

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24 The tax-disadvantage occurs when dividends are taxed a higher personal tax rate than capital gains.
determine whether a tax clientele exists for certain types of income. Other research investigated a particular segment of investors, institutions, to determine the existence of tax clienteles.

While Miller and Modigliani (1961) admit that tax clienteles could influence share price, they argue that institutional investors (pensions, charitable and educational institutions, etc.) “…for whom there is no tax differential…” (p. 432) will mitigate the effect on share price. Investigating this premise, a segment of research investigates shifts in institutional ownership for the existence of tax clienteles. Early research assumes institutional investors are a homogenous tax-exempt group that prefers equity income that has a higher personal income tax rate. During many of the studies sample periods, dividends had a higher tax rate than capital gains. This research assumes that institutional investors will form a tax clientele for dividend paying firms.

Allen et al. (2000) argue firms pay dividends in order to attract institutional investors. They theorize that firms benefit from investor perception that institutions invest in high quality firms and contend that institutions prefer dividends due to their tax advantage. Allen et al. (2000) imply that firms with higher dividends will have larger institutional ownership and predict that tax differences between institutions and individuals will determine dividend payments. Their theories support tax clienteles and suggest that tax clienteles could influence firm payout policy.

Empirical studies on tax clienteles and institutional investors have been mixed. Examining market reactions to dividend omissions and initiations from 1964 to 1988, Michaely et al. (1995) find weak evidence of clientele shifts following dividend omissions. They also investigate whether the percentage of a firm’s institutional ownership changes following a dividend omission. Michaely et al. (1995) find a slight increase in institutional ownership following a dividend omission. They interpret this finding as negative evidence for the existence of tax clienteles. Grinstein and Michaely (2005) and Jain (2005) examine institutional preference
for dividend-paying firms and find that institutions prefer firms that pay fewer dividends. Because institutions do not prefer high dividend-paying firms, the authors suggest that these results do not indicate the formation of tax clienteles by institutions.

Dhaliwal et al. (1999) investigate the formation of tax clienteles following the initiation of a cash dividend from 1982 to 1995. Using aggregate institutional ownership as a proxy for a firm’s tax-exempt investors, they predict that dividend initiating firms will experience an increase in their percentage of institutional ownership. Dhaliwal et al. (1999) provide evidence that institutional owners increase their holdings of firms that initiate a dividend. They argue that this increase is better explained by tax clientele theory than other arguments. Ayers et al. (2002) found that high dividend yield firms had a higher percentage of aggregate institutional ownership as compared to firms that did not pay dividends.

Many studies treat institutions as a single tax-exempt group. Geisler (2000) examines a specific category of institutional investor (life insurance companies) for the existence of tax clienteles. He investigates whether variance in the dividends received deduction influences a life insurance company’s preference for dividends. Geisler (2000) finds that firms who benefit the most from the dividends received deduction have greater dividend yields, indicating investment behavior consistent with tax clienteles. Hotchkiss and Lawrence (2007) provide evidence that the tax status of individual shareholders influence the preference for dividends.

Usrey et al. (2008) provide evidence that mutual funds, whose primary shareholders are taxable individuals, increased their stock holdings of dividend paying firms following the 2003 Act. They also find that institutional investors other than mutual funds decreased their holdings of dividend paying firms during the same period. Moser and Puckett (2008) investigate the relationship between changing tax regimes and institutional preference for dividends. They find
that, when the dividend tax penalty is high, tax disadvantaged institutions (mutual funds and investment advisors) hold lower amounts of dividend paying stocks than tax advantaged institutions (charitable endowments, pension funds, universities). Overall, prior research provides evidence that institutions form tax clienteles. However, recent research indicates that institutional investors are not homogenous with respect to their tax preferences and may actually belong to different clienteles.

3. The Effect of Personal Taxes on Firm Payout Policy

A large portion of research has been devoted to examining whether firm dividend policy influences share price.\(^{25}\) Miller and Modigliani (1961) provide that the difference in personal tax rates on dividend and capital gain income could influence firm payout policy. Research that followed investigated whether personal income taxes affected firm dividend policy.\(^{26}\) Miller and Scholes (1978, 1982) argue that taxes do not influence firm dividend policy, while Litzenberger and Ramaswamy (1979) find evidence consistent with taxes influencing dividend policy. The motivation for this research is whether the tax status of a firm’s investors will influence its dividend policy. The question is whether a firm that has a majority of investors who pay higher taxes on dividends than capital gains will pay less dividends and vice versa. This question has yet to be resolved. One method for determining whether a firm’s investor is taxable or tax-exempt is to investigate the firm’s institutional ownership. Some of this research treats institutional investors as a tax-exempt group; however, a segment of research segregates institutional investors according to the tax status of the institutions investors. The possible tax heterogeneity of institutions adds a further question: Does the type of institutional investor influence how personal income taxes affect firm dividend policy?

\(^{25}\) Allen and Michaely (2002) provide a comprehensive summary on firm payout policy.

\(^{26}\) See Litzenberger and Ramaswamy (1979), Miller and Scholes (1982), Michaely and Vila (1995, 1996), etc.
Perez-Gonzalez (2002) investigates whether the tax preferences of a firm’s large shareholders influence its dividend policy. He finds that personal taxes influence a firm’s dividend policy when its large shareholders are individuals. Firms whose large shareholders were institutions pay 35 percent more dividends than firms whose large shareholders are individuals. Blouin et al. (2004) investigate changes in dividend policy following the reduction in the personal tax rate on dividends from the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the 2003 Act). They find that firms increased their regular and special dividends following the 2003 Act. Using one minus the percentage of aggregate institutional ownership, Blouin et al. (2004) are unable to find evidence that a firm’s level of individual ownership is correlated to an increase in dividends. Grinstein and Michaely (2005) investigate the effect of institutional holdings on payout policy and do not find evidence that institutions influence dividend policy.

Desai and Jin (2007) investigate how the heterogeneous tax characteristics of institutional investors influence firm payout policy. They find that the tax preference of a firm’s institutional investor influences its dividend policy. Firms whose institutional investors have a lower tax cost on dividends tailor their dividend policy to their institutional investors. Similar to Blouin et al. (2004), Chetty and Saez (2005) investigate the effect of the 2003 Act on dividend policy. They find that the dividend policy for firms with high levels of nontaxable institutional ownership (insurance companies, pension funds, and endowments) was not affected by the 2003 Act. Taxable institutions influenced firms to increase their dividends following the 2003 Act. Measuring tax regimes from 1986 to 2004, Moser (2007) provides evidence similar to Chetty and Saez (2005). He finds that, when the tax disadvantage of dividends is high and taxable institutional ownership is high, firms are more likely to repurchase shares than pay dividends, while nontaxable institutions offset the influence of the tax disadvantage of dividends on
repurchases. These results indicate that the tax heterogeneity of institutional investors influences firm dividend policy in a differential manner.

4. The Effect of Taxes on Corporate Acquisitions

Extant research attempts to determine whether corporate and investor taxes influence the prices and form of a corporate acquisition or merger. This literature examines whether tax benefits from corporate tax law or tax costs from individual tax law will influence whether the transaction structure is tax-free or taxable. For example, Hayn (1989) investigates whether the tax attributes of target firms influence the tax structure of the acquisition. Analyzing the stock-price response to IRS rulings on the tax structure of the acquisition, she finds that shareholder returns for tax-free acquisitions are influenced by tax-credits and NOL carryfowards, while capital gains tax and a step-up in tax basis influence shareholder returns in taxable acquisitions. This stream of research analyzes whether tax-characteristics of shareholders are important to the structure of the transaction. Several studies use the level of a firm’s institutional ownership to control for the firm’s shareholders that are not influenced by capital gains taxes. These institutional investors would mitigate the tax cost of capital gains in a taxable transaction.

Erickson (1998) investigates the tax attributes of the acquiring firm, target firm, and the target firm’s shareholders for 340 acquisitions from 1985 to 1988. He finds that the acquiring firm’s tax attributes influence transaction structure, but the attributes of the target firm do not influence the transaction. Erickson (1998) uses institutional investors to control for shareholders who are less affected by capital gains taxes and does not find evidence that tax characteristics of a firm’s shareholders influence the acquisition.

Ayers et al. (2003) examine whether capital gains taxes increase the cost of taxable acquisitions for acquisitions occurring from 1975 to 2000. Using three proxies for shareholder
capital gains, they find that capital gains taxes increase acquisition premiums. Ayers et al. (2003) use the level of institutional ownership of the target corporation to proxy for the tax status of the price-setting shareholder and find that as the target’s institutional ownership increases the acquisition premium decreases. Ayers et al. (2004) investigate whether personal tax rates on capital gains influence the tax status of a corporate acquisition. They find that tax-free acquisitions are positively associated with the capital gains tax rate. Ayers et al. (2004) also find that institutional ownership (their proxy for a firm’s tax-exempt investor) mitigates the effect of capital gains taxes. These results provide evidence that institutional investors are not influenced by personal tax rates on capital gains. Research has not examined whether the different tax statuses of a firm’s institutional investors influence corporate acquisitions.

5. The Effect of Personal Taxes on Share Price and Trading Volume

A large portion of tax research investigates whether personal capital gains and dividends taxes affect equity prices. The question for this area of research is whether the investor who determines security prices (the marginal investor) pays taxes. Many of these studies investigate whether the dividend tax penalty, (higher tax rates on dividends compared to capital gains prior to the 2003 Act) influences the price of dividend paying firms. There are two contending theories that are the basis for this stream of research. One theory (Tax-Capitalization theory) holds that future personal taxes on dividends are capitalized into share price. Therefore, shareholders have reduced the share price to include dividend taxes, and a firm’s dividend policy will not affect its stock price. The other theory (Tax-Penalty theory) holds that the difference in tax rates on dividends and capital gains injects dividend policy into price formulation. Both theories predict personal tax rates on dividends will decrease price, but Tax-Penalty theory predicts that a firm’s

dividend policy will affect the magnitude of the price change. No consensus exists with respect to if and how much personal taxes influence share price.

Another stream of research investigates the influence of capital gains taxes on share price. Similar to research on dividend taxation, capital gains research uses two contending theories for examining how capital gains influence share price. These theories disagree on whether investor level taxes influence the demand for equity or the supply of equity. Capitalization theory (Brennan, 1970) indicates that prices will be driven up through buy-side pressure following tax rate reductions that increase the after-tax rate of return for taxable investors. A competing theory influences the supply of equity through the lock-in effect. The lock-in effect (Klein, 1999, 2000; Vaird, 2000) indicates that investors are hesitant to sell shares due to the potential capital gains tax recognition. In order to be persuaded a sell, these investors require a higher premium to recognize capital gains that could have been deferred. The lock-in effect predicts that investors will be willing to take a reduced premium following a tax rate reduction, thereby increasing the supply of stock for sale. Prior research has found results consistent with tax capitalization and the lock-in effect.

As with other research investigating the effects of personal taxes, this research utilizes institutional investors as a proxy for the tax exempt investor. These studies predict that personal taxes will affect share price either positively or negatively depending on the magnitude of the difference in tax rates on dividends and capital gains. For example, an increase in the dividend tax rate is predicted to have a negative effect on the share price of dividend paying firms. This stream of research predicts that as a firm’s level of institutional ownership increases, the influence of personal taxes on the firm’s share price will decrease. Recent research examines
whether tax heterogeneity among institutional investors influences firm price in a differential manner.

Han and Khaksari (1996) use an after tax CAPM to examine the relationship between dividend yields and returns. They investigate whether the dividend tax penalty leads to a tax premium on high dividend yield stocks. Han and Khaksari (1996) find that dividends have a significant information effect on dividends, but no tax effect is detected. They propose that the lack of results could be due to institutional investors that are not sensitive to taxes. Erickson and Maydew (1998) investigate whether securities that have favorable tax rates have a lower pre-tax return than securities that are taxed unfavorably. They examine the effect of a proposed reduction to the corporate dividends received deduction on share prices. They show that preferred stock price experienced a negative stock price reaction, while high dividend yield common stocks were not affected. Erickson and Maydew (1998) interpret this finding as evidence that corporations are the marginal investor for preferred stock, while the marginal investor for common stock is not influenced by the dividends received deduction.

Ayers et al. (2002) examine share price changes following an increase in the personal tax rates on dividends after the passage of the Revenue Reconciliation Act of 1993 (the 1993 Act). Using a five-day sample period, they test the tax-capitalization and tax-penalty theories by regressing daily cumulative abnormal returns around the 1993 Act on dividend yield and the level of institutional ownership. Consistent with tax-penalty theory, Ayers et al. (2002) find that higher dividend yield firms experienced a more negative stock price reaction compared to firms that did not pay dividends. Additionally, they found that aggregate institutional ownership offsets the effects of the 1993 Act. They interpret this finding as an indication that institutional investors are not influenced by investor level taxes.
In a study similar to Ayers et al. (2002), Dhaliwal et al. (2003) use a long-window study to examine whether pre-tax returns incorporate a premium to the dividend tax penalty. They find that the return premium is positively associated with a firm’s dividend yield. Additionally, this premium decreases as the firm’s level of aggregate institutional ownership increases. As with Ayers et al. (2002), the results are consistent with tax-penalty theory and provide evidence that institutional investors are not influenced by personal taxes. While Ayers et al. (2002) and Dhaliwal et al (2003) examine ex-ante returns, Dhaliwal et al. (2005) use ex-post returns to investigate the influence of the dividend tax penalty on a firm’s cost of equity. Using three versions of the Feltham-Ohlson (1995) residual income model, they examine the relation between a firm’s implied cost of equity and the penalized portion of a firm’s dividend yield.\(^{28}\) They find that the cost of equity increases as a firm’s dividend yield increases, and this effect is mitigated by aggregate institutional ownership. Using the same methodology, Dhaliwal et al. (2007) examine the effect of the 2003 Act on the cost of equity. They find that the cost of equity decreased following the 2003 Act, and aggregate institutional ownership mitigated the effects of the 2003 Act.

Auerbach and Hassett (2005) investigate the effects of dividend policy on firm value around the enactment of the 2003 Act. Using multiple event dates to measure changes due to significant news about a dividend tax rate cut, they find that higher dividend yield firms had higher abnormal returns than lower yield firms. They also find that firms who were likely to issue new shares benefited from the 2003 Act. They argue that the results support tax-capitalization theory. Auerbach and Hassett (2005) also show that aggregate institutional ownership has a negative effect on abnormal returns, but when tax-exempt institutions are

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\(^{28}\) The three models are from Gebhardt et al. (2001), Claus and Thomas (2001), and Gode and Mohanram (2003).
excluded, the results are positive and significant. This provides evidence that some institutions are influenced by personal taxes.

Dhaliwal et al. (2005) investigate the effects of personal taxes on the earnings response coefficient (ERC) around the 1993 Act. They examine whether personal taxes on dividends influence the relationship between earnings and stock returns. Supporting tax-penalty theory, the results provide evidence that an increase in the personal tax rate on dividends leads to a decrease in the ERC for high dividend yield firms. This effect is dependent on the marginal investor being a taxable individual. In other words, as the institutional ownership increases the influence of personal taxes is decreased. Li (2007) investigates the impact of the dividend tax penalty on the benefits a firm receives from issuing dividends. Relying on prior research that indicates dividends increase share value due to added information and a reduction of agency costs, Li (2007) examines whether the cost of the personal taxes on dividends offsets the benefits. Measuring the effects of three tax regime changes on cumulative abnormal returns, he finds that the dividend tax penalty is negatively related to the market’s response to a dividend surprise. Additionally, he finds that aggregate institutional ownership mitigates the effects of the dividend tax penalty.

The previously discussed research provides strong evidence that personal taxes on dividends affects firm share price. It also provides strong evidence that firms with high levels of institutional ownership are less affected. Guenther and Sansing (2007) argue that the level of institutional ownership does not alter the effects of the dividend tax penalty on expected stock returns. They develop a model and show that the dividend tax penalty influences returns, and tax-exempt investors decrease the dividend tax penalty. However, they argue that tax-exempt investors decrease the tax penalty for all investors if it is assumed that all investors own a portion
of the firm. This result indicates that more research is necessary on how institutional investors influence price reactions to personal taxes on dividends.

Jin (2006) investigates whether institutions with taxable clients are influenced by personal taxes on capital gains. He investigates whether potential capital gains influence institutional trading patterns. Li (2007) finds that institutions with tax-sensitive clients are less likely to sell if potential capital gains are high, while potential capital gains do not influence institutions with tax-exempt clients. Li (2007) also finds that stocks with larger capital gains that are held predominantly by tax sensitive investors experience less of a negative decline following a negative earnings surprise. This result does not hold for stocks held by primarily tax-exempt investors. These results provide evidence that institutional investors are not a homogenous tax-exempt group.

Blouin et al. (2000) examine cumulative abnormal returns to determine the effect of capital gains on stock price. Using three-day returns from quarterly earnings announcements, they measure whether investors must be compensated for selling a stock at a short-term gain rather than holding out for long-term treatment. They find that cumulative abnormal returns are increasing with the possibility of short-term capital gains. This finding is consistent with investors insisting on being compensated in order to recognize a short-term gain. They also find that cumulative abnormal returns are more influenced when mostly individuals own the firm.

Blouin et al. (2002) investigates the impact of a reduction in the capital gain holding requirements on the stock price of IPO firms. Examining a tax law that reduced the long-term capital gains holding period from 18 to 12 months, they test whether trading and share prices were influenced for IPO shares that had been owned for more than 12 but less than 18 months. They find that there was an increase in trading and a decrease in stock price for affected firms.
The results would seem to indicate that individual shareholders affected by the 1998 change primarily owned the sample IPO firms. Unfortunately, the tax status of the firm’s shareholders (i.e. institutional versus individual) is not directly examined.

Dai et al. (2006) and Ayers et al. (2006) examine the capitalization and lock-in effects around a decrease in the capital gains rate from the 1997 Act. Examining returns and trading volume during the weeks around the effective date, Dai et al. (2006) find evidence consistent with both the lock-in effect and the capitalization effect. Specifically, they find that individuals and mutual funds bought shares anticipating a benefit from a tax rate reduction in the week before enactment, and individuals and mutual funds sold shares in the week after enactment due to the benefit from the reduction. Additionally, they find that firms with high stock appreciation and a high concentration of tax-sensitive owners experienced a stronger lock-in effect and had greater trading volumes. Ayers et al. (2002) investigate buy and sell orders segmented by individual and institutional investors. They find evidence that individual investors increase buy orders for equity prior to the effective date and increased sell orders following the effective date. They also find that institutional investors are less influenced by the change in capital gains tax rates.

Dhaliwal and Li (2006) investigate how the tax status of a firm’s investors and the dividend tax penalty influence the firm’s excess trading volume. They investigate trading between tax-advantaged and tax-disadvantaged investors to determine whether the dividend tax penalty and a firm’s dividend yield influence the trading of the firm’s shares. They measure the tax status of a firm’s investors using the firm’s level of aggregate institutional ownership. They find that volume increases with dividend yield and the level of institutional ownership to a certain point. However, as institutional ownership increases, trading volume eventually
decreases. This provides evidence that the level of tax-exempt and tax-sensitive investor influences the trading of firm shares. Lightner et al. (2008) investigate trading volume and changes in shareholder composition around the 2003 Act. They find that individual investors increased their holdings of dividend paying firms following a decrease in the personal tax rates on dividends. They also find a corresponding shift in institutional ownership.

6. The Effect of Personal Taxes on Financing Decisions

Traditional financial theory holds that a firm should weigh costs and benefits of debt when making a financing decision. The benefit received from debt financing is the interest deducted from taxable earnings, while a major cost is financial distress. Financial theory assumes a firm will choose its optimal capital structure by balancing the bankruptcy costs against the tax benefits of debt. The tax benefits of debt are the product of the corporate tax rate \( t_c \), the interest rate \( r_d \), and the amount of debt \( D \). Modigliani and Miller (1963) assert that tax benefits and debt are equally risky; therefore, the tax benefit of debt is capitalized using \( r_d \) as the discount rate. Allowing that the tax benefits of debt and the debt itself are perpetual, the tax benefit of debt can be simplified to \( t_c D \).

Miller (1977) argues that the individual tax rate on income should be incorporated in the tax benefit calculation. He estimates a firm’s gain per dollar of leverage, \( G_l \), as follows:

\[
G_l = \left[ 1 - \frac{(1-t_c)(1-t_{ps})}{1-t_{pb}} \right].
\]  

(1)

where \( t_{ps} \) is the personal tax rate on income from common stocks, and \( t_{pb} \) is the personal tax rate on income from bonds. In addition to the corporate tax, Miller (1997) asserts that personal taxes should influence a firm’s capital structure. While the interest deduction provides a tax advantage from debt financing, the income tax on interest income at the personal level is a disadvantage to debt financing. Green and Hollifield (2003) model the relationship between the tax advantages of
equity financing and firm capital structures. They show that the tax disadvantages of debt do not completely offset the advantages of debt but are large enough to create variation in firm level capital structure. Dhaliwal et al. (2007) expand equation (1) to include the personal tax rates on dividends and capital gains as follows:

\[ G_t = 1 - \left[ \frac{(1-t_c)(1-t_d + (1-t_d)t_{cg})}{1-t_{pb}} \right] \],

(2)

where \( d \) is the firm’s dividends, \( t_d \) is the personal tax rate on dividends, and \( t_{cg} \) is the personal tax rate on capital gains.

Graham (1999) investigates the tax disadvantages of debt from personal taxes and its effect on firm capital structure. He finds that the tax disadvantages of debt are negatively related to a firm’s debt ratio, providing evidence that personal taxes influence firm financing decisions. Graham finds that corporate and personal taxes lead to optimum capital structures, indicating that the tax disadvantages of personal taxes do not completely offset the advantages from interest deductions. While Graham (1999) finds that differences in corporate and personal tax rates influence firm debt ratios, he does not find significant evidence that time-series variation in personal taxes influences a firm’s capital structure. Graham’s (1999) explanation of this finding is that his sample period is from 1980 to 1994, when there is little variation in tax rates on interest and dividend income.

Dhaliwal et al. (2007) investigate the effect of personal taxes on a firm’s decision to issue equity or debt. They study changes in personal tax rates on dividends and capital gains following the 1997 and 2003 Tax Acts. This sample period alleviates the problems of Graham (1999) because personal tax rates on interest and dividends vary during the sample period. Dhaliwal et al. (2007) find that when tax rates on equity income (capital gains and dividends) were decreased by the 1997 and 2003 Tax Acts, firms were more likely to issue equity relative to
debt. This finding provides additional support that personal tax rates on debt income are a disadvantage to debt substantial enough to influence corporate financing decisions.

Prior research on the effect of institutional investors on firm capital structure indicates that institutional investors may be a substitute for the disciplinary and signaling roles of debt. Jensen (1986) suggests that firms can use debt to reduce agency problems by reducing the resources available for consumption by management. Grier and Zychowicz (1994) and Moh’d et al. (1998) show a negative correlation between a firm’s debt levels and its percentage of shares owned by institutional investors. The authors suggest institutional investor monitoring and disciplinary pressure imposed on managers may supplant the disciplinary role of debt and mitigate the effectiveness of debt as a signal. Dhaliwal et al. (2007) find that when personal tax rates on interest income are greater than rates on dividend income, firms are more likely to issue equity rather than debt. However, they find that this effect is decreased by aggregate institutional ownership, their proxy for the tax exempt marginal investor.

Usrey (2009) investigates whether differences between the tax liabilities of the underlying shareholders of institutional investors affect firms’ capital structures and decisions to issue debt versus equity following changes in tax rates enacted by the 1997 and 2003 Acts. He investigates whether the level of tax-disadvantaged institutional ownership versus tax-advantaged influences the decision to issue equity or debt. The results of the study indicate that institutional investors are not a homogenous tax-exempt group. The results show that the financing decisions of firms with high levels of tax-disadvantaged institutional investors are influenced by changes in individual tax rates and the personal tax penalty of debt, while firms with high levels of tax-advantaged institutional investors are not affected by changes in individual tax rates or the personal tax penalty of debt.
7. The Tax Heterogeneity of Institutional Investors

Prior research (Michaely et al., 1995; Dhaliwal et al., 1999; Grinstein & Michaely, 2005; Jin, 2006; Moser & Puckett, 2007; Usrey et al., 2007) on the relationship between capital markets, institutional investors, and personal taxes has primarily focused on institutional investors’ equity investment decisions. This research investigates Miller and Modigliani’s (1961) conclusion that when there are differential personal tax rates on dividend and capital gain income, investors will form clienteles based on their effective marginal tax rates. Specifically, they predict that high tax rate investors will form clienteles for low dividend paying firms, while low tax rate investors will form clienteles for high dividend paying firms. Empirical research (Michaely et al., 1995; Dhaliwal et al., 1999; Grinstein & Michaely, 2005; Jin, 2006; Moser & Puckett, 2007; Usrey et al., 2007) investigates whether institutional investor investment decisions are influenced by the differential personal tax rates on dividend and capital gain income.\(^{29}\)

Michaely et al. (1995) examines market reactions following dividend omissions and initiations. They do not find statistically significant evidence that institutional ownership changes following dividend omissions. In contrast, Dhaliwal et al. (1999) examine institutional ownership changes for dividend initiating firms. They find a statistically significant increase in institutional ownership following a dividend initiation. Ayers et al. (2002) find that high dividend yield firms have a higher percentage of aggregate institutional ownership compared to firms that do not pay dividends.

Grinstein and Michaely (2005) examine institutional ownership and firm payout policy from 1980 to 1996 to determine whether firm payout policy influences institutional holdings and whether institutions influence firm payout policy. Consistent with Ayers et al. (2002), they find

\(^{29}\) Prior to the 2003 Act, individual tax rates on capital gains were less than individual tax rates on dividend income. The 2003 Act equalized these rates.
institutions prefer firms that pay dividends and firms that repurchase shares. However, they do not find that higher concentrations of institutional ownership influence a firm’s future dividends, repurchases, or total payout. The aforementioned studies indicate that no consensus exists as to whether personal taxes influence institutional investor investment preferences.

It is possible that the lack of agreement is attributable to the aforementioned studies treating institutional investors as a homogenous group (used as a proxy for the tax-exempt marginal investor). In other words, these studies treat institutional investors as if they are influenced by personal taxes in the same manner. However, the underlying shareholders of institutional investors are not affected by taxes in the same manner. A pension fund’s shareholders defer taxes on their investment earnings. Charitable endowments do not pay taxes on their investments, whereas, a large percentage of mutual fund investors pay taxes on their earnings in the current period. Chetty and Saez (2005) state that “raw institutional ownership is clearly not a valid proxy for nontaxable status.”

It should be noted that factors other than tax differences between institutional investors could account for differential investment behaviors. Some mutual funds have stated investment policies that limit their flexibility when deciding on investing in a firm. For example, a mutual fund may have a stated policy that it will invest in utilities. There may also be legal considerations for an institution to consider. Del Guercio (1996) examines differences in the investment behavior of different types of institutions arising from the legal burden placed on them as fiduciaries. A fiduciary’s motive for meeting legal burdens is referred to as “prudence.” Del Guerico (1996) reports that banks, who are exposed to the most legal liability, invest more heavily in stocks that are considered prudent investments by courts, whereas mutual funds, which are not as exposed to legal liabilities, are less influenced by “prudence.”

30 Bergstresser and Poterba (2002) estimate the median investor in a mutual fund is subject to a 31% marginal rate.
Dai et al. (2006) find that individuals and mutual funds bought shares anticipating a benefit from a tax rate reduction in the week before enactment of the 1997 Act, and individuals and mutual funds sold shares in the week after enactment due to the benefit from the reduction. Additionally, they find that firms with high stock appreciation and a high concentration of tax-sensitive owners experienced a stronger lock-in effect and had greater trading volumes. Desai and Jin (2007) find that the tax preference of a firm’s institutional investor influences its dividend policy, and firms whose institutional investors have a lower tax cost on dividends tailor their dividend policy to their institutional investors. Chetty and Saez (2005) investigate the effect of the 2003 Act on dividend policy. They find that the dividend policy for firms with high levels of nontaxable institutional ownership was not affected by the 2003 Act. Taxable institutions influenced firms to increase their dividends following the 2003 Act. Measuring tax regimes from 1986 to 2004, Moser (2007) provides evidence similar to Chetty and Saez (2005). He finds that when the tax disadvantage of dividends is high and taxable institutional ownership is high, firms are more likely to repurchase shares than pay dividends, while nontaxable institutions offset the influence of the tax disadvantage of dividends on repurchases. These results indicate that the tax heterogeneity of institutional investors influences firm dividend policy in a differential manner.

Jin (2006) provides evidence that the tax status of an institution’s underlying shareholder impacts its trading decisions. Usrey et al. (2007) provide evidence that mutual funds, whose primary shareholders are taxable individuals, increased their stock holdings of dividend paying firms following the 2003 Act. They also find that institutional investors other than mutual funds decreased their holdings of dividend paying firms during the same period. Moser and Puckett (2007) investigate the relationship between changing tax regimes and institutional preference for dividends. They find that when the dividend tax penalty is high, tax disadvantaged institutions
hold lower amounts of dividend paying stocks than tax advantaged institutions. These studies indicate that institutional investors are not homogenous with respect to their tax preferences.

8. Conclusion

This paper synthesizes extant literature that attempts to control for institutional investors’ impact on capital markets’ tax studies. While research on the effects of income taxes on capital markets is fairly developed, the role of institutional investors in this research has not yet been fully developed. There is still much to discover about how institutional investors influence the market and whether they influence the markets in the same manner. Additionally, there still remains a question as to who exactly is the underlying investor in an institution. For example, how many investors in a mutual fund do so through a tax-deferred 401(K) versus as a taxable individual. This question could also be raised about brokerage accounts. While there remains some limitations to answer these questions (specifically available data), these and other questions need to be examined to truly understand the role institutions play with respect to income taxes.
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OVERALL CONCLUSION

This dissertation investigates the role of institutional investors in capital market tax studies. Specifically, this study examines how institutional investors influence firms’ cost of capital and financing decisions following changes in personal tax rates on debt and equity income. The dissertation is organized into three essays that examine these topics. The first two essays examine tax rate changes in 1997 and 2003 that reduced the personal tax rates on interest, capital gains and dividends. Essay three summarizes relevant literature involving institutional investors and capital market tax studies.

The results of these studies indicate that institutional investors are not homogenous with respect to their influence on firms. The results show that the financing decisions of firms with high levels of tax-disadvantaged institutional investors are influenced in a differential manner than firms with high levels of tax-advantaged ownership following changes in personal tax rates. These results also provide evidence that institutional investors are not homogenous with respect to their influence on firm cost of equity following changes in personal tax rates. The studies in this dissertation provide important evidence that is useful for tax studies that follow. Specifically, future research should control for tax differences between institutional investors.