

Dividend Tax Clienteles: Evidence from Tax Law Changes

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## **Dividend Tax Clienteles: Evidence from Tax Law Changes**

### Abstract

We investigate institutional investors' preference for dividend paying stocks following changes in the dividend tax penalty during the sample period from 1987 until 2004. Following prior literature we separate institutions into tax-advantaged and taxable cohorts and find that when the dividend tax penalty is positive, high-dividend firms constitute a significantly larger (smaller) percentage of tax-advantaged (taxable) institutions' portfolios. Multivariate regressions involving institutional ownership levels and changes confirm our initial findings. We estimate (for the median dividend paying firm) when the dividend tax penalty decreases by 23.3%, we expect tax-advantaged (taxable) institutional ownership will decrease by 0.25% (increase by 0.36%) of a firm's shares outstanding. We find our results are robust to both simultaneous equations estimations and for a subsample of firms that do not change their dividend policy. Overall, our paper provides strong support for the existence of institutional tax-based dividend clienteles.

## **Dividend Tax Clienteles: Evidence from Tax Law Changes**

### **Introduction**

The dramatic increase in the institutional ownership of equities in recent years raises important questions concerning the determinants of institutional investment. Institutions now own more than \$8 trillion in U.S. equities, and numerous studies document strong correlations between institutional ownership and both firm-specific and macro-economic variables (Gompers and Metrick 2001; Cohen 2003). One important determinant of institutional ownership may be investor level taxes. Our study contributes to this literature by investigating institutional investors' preference for dividend paying stocks following changes in the dividend tax penalty during the sample period from 1987 to 2004.<sup>1</sup>

The theory of dividend tax clienteles predicts that firms paying little or no dividends will attract investors in higher tax brackets, while firms that pay high dividends will attract investors in lower tax brackets (Miller and Modigliani 1961). The existence of dividend tax clienteles is important, since the tax status of the firm's shareholders influences the extent to which the tax penalty is capitalized into equity prices (Li 2007). Prior academic studies find mixed support for the existence of dividend tax clienteles. In particular, Dhaliwal et al. (1999) treat institutional investors as a homogeneous tax-exempt group and find a significant increase in the institutional ownership of firms after a dividend initiation. Although their study provides support for the existence of dividend tax clienteles, studies by Del Guercio (1996) and Grinstein and Michaely (2005) suggest that other market frictions (e.g. prudent man regulations) may influence some institutions to invest in dividend vs. non-dividend paying stocks. Both studies fail to find a

relationship between the magnitude of dividend yields and institutional investment that would support the existence of dividend tax clienteles.

Our study contributes to the current debate by recognizing and incorporating two important factors in the investigation of dividend tax clienteles: 1) the heterogeneity of institutional investors, and 2) the variation in the time series of tax incentives. Both have been discussed in prior literature, but not in this context. Chetty and Saez (2005) recognize the heterogeneity of institutional investor tax cohorts, and state that, “raw institutional ownership is clearly not a valid proxy for nontaxable status” (also see Moser 2007 and Jin 2006). Specifically, institutions such as charitable endowments, pension funds and universities are tax-exempt; whereas mutual funds and investment advisors (brokers) pass through any tax liabilities to their underlying shareholders.<sup>2</sup>

If institutional managers take into account the tax liabilities of their underlying shareholders, then tax law changes provide a natural experiment to address the existence of dividend tax clienteles. Dhaliwal et al. (2005) use the time series variation in the dividend tax penalty to investigate the implied cost of equity capital. Similarly, we use changes in tax regimes to investigate dividend tax clienteles. During periods when dividends are taxed at a higher rate (relative to capital gains taxes), tax-advantaged institutions should prefer high dividend paying stocks, whereas institutions whose underlying shareholders are taxable should prefer investing in equities with few or no dividend distributions. When changes in the tax laws reduce the tax rate on dividends (relative to capital gains), and thus the relative advantage of dividends for tax-advantaged institutions, we expect the dividend preferences of these two tax cohorts to converge.

Univariate tests confirm that tax-advantaged (taxable) institutions place 2.96% more (-1.79% less) of their portfolio in high dividend paying stocks in years when the dividend tax penalty is positive. The robustness of these results is validated in multivariate tests, which control for other firm-specific characteristics that prior literature finds are correlated with institutional investment. We investigate both institutional ownership levels and changes and find that tax-advantaged (taxable) institutions decrease (increase) their holdings in dividend paying stocks following decreases in the dividend tax penalty. The economic significance of these findings is meaningful. We estimate that, for the median dividend paying stock (dividend-to-book=1.579%), a change in the dividend tax penalty from 23.3% to 0% results in taxable institutions selling 0.36% of the firm's shares outstanding (\$16.63 million) and tax-advantaged institutions buying 0.25% of the firm's shares outstanding (\$11.55 million).

While our results are consistent with the existence of dividend tax clienteles, it is also possible that institutions may influence a firm's management to adjust dividend payout policy (Moser 2007). Thus, dividend policy and tax-advantaged (taxable) institutional ownership may be endogenously determined. We address this endogeneity concern in two ways. First, we implement a simultaneous equations framework and find that our results are robust to this specification. Tax-advantaged (taxable) institutional investor "vote with their feet" and invest relatively more (less) in high dividend paying firms when the dividend tax penalty is high. We find no evidence to support the hypothesis that institutional investors influence a firm's payout policy. Second, we analyze a subsample of firms that hold their dividend payout constant (i.e. dividend payout is exogenous). All results hold when analyzing the constant dividend sample.

The remainder of the paper proceeds as follows: the next section explores the related literature. Section III discusses our hypotheses, and Section IV provides a description of our sample and data. Section V presents both univariate and multivariate empirical results, and section VI concludes.

### **Background and Literature Review**

Prior academic literature contends that the tax asymmetry applied to dividend income affects investments, security valuation and capital structure (Miller and Modigliani 1961; Modigliani and Miller 1963; Miller 1977). Specifically, after allowing for market frictions in the form of differential taxes on dividends and capital gains, Miller and Modigliani (1961) conclude that the tax status of the investor influences the investor's preference for dividend paying firms. The theory of tax clienteles predicts that, *ceteris paribus*, zero or low dividend paying firms attract investors in higher tax brackets, whereas high dividend paying firms attract investors who are in lower tax brackets.

Dividend tax clienteles are important since they may affect firm value. When investors are subject to heterogeneous tax rates, in equilibrium, the tax penalty on dividends should be capitalized into equity prices. Li (2007) finds that the extent to which the tax penalty is capitalized depends on the tax status of the firm's shareholders. In addition, significant changes in investors' preferences for dividends will lead to clientele groups readjusting their portfolios. This restructuring will affect asset prices when demand curves are not perfectly elastic.

Academic literature has been unable to reach a definitive conclusion concerning the existence of dividend tax clienteles. Early studies, such as those by Elton and Gruber (1970) find support for the existence of dividend tax clienteles by examining ex-dividend date price data. However, subsequent research argues that such clienteles may exist for non-tax reasons such as risk-based investment styles or for other information reasons (Keim 1985; Miller and Scholes 1982). Miller and Scholes (1982) find that after controlling for both risk and information effects, the previously documented tax effect goes away.<sup>3</sup>

Another method used to investigate the existence of dividend tax clienteles investigates shareholder ownership changes around changes in dividend policy. Most of these studies treat institutional investors as a homogeneous tax-exempt group. Theory suggests that after a firm initiates or increases a dividend, tax-exempt investors will purchase shares of the firm's stock, while tax-disadvantaged investors will sell shares of the firm's stock. Evidence supporting the existence of dividend tax clienteles using this methodology is also mixed.

Michael et al. (1995) fail to find evidence of significant institutional ownership changes in the three years following a dividend omission.<sup>4</sup> Alternatively, Dhaliwal et al. (1999) examine changes in the institutional ownership of 203 firms initiating a dividend from 1982 to 1995. The study finds a mean (median) increase in the percent of shares outstanding held by institutions of 3.51% (1.56%) during the six months following a dividend initiation. Del Guercio (1996) suggests that such changes may be the by-product of regulation. Prudent man regulations may influence some institutions to invest in

dividend (vs. non-dividend) paying stocks, but she finds that dividend yields do not explain investment choices.

Grinstein and Michaely (2005) undertake a comprehensive study of institutional holdings and payout policy during the period from 1980 to 1996. The study tests whether payout policy affects institutional investment, and conversely, whether institutional investors influence a firm's future payout policy. Their evidence indicates that institutions avoid firms that do not pay dividends, and prefer firms that repurchase shares. However, such preferences are unrelated to the magnitude of dividend-to-book ratio, providing little support for the existence of dividend tax clienteles.<sup>5</sup>

The above mentioned studies fail to reach a consensus on the existence of dividend tax clienteles, however, none of the aforementioned studies fully account for two important factors: 1) the heterogeneity of institutional investors, and 2) variation in the time series of tax incentives. Our paper contributes to the current body of literature by recognizing the importance of these two factors in the investigation of dividend tax clienteles. Concerning the first factor (heterogeneity of institutional investors): Although many studies treat institutional investors as a homogeneous tax-exempt group (e.g. Perez-Gonzalez 2003; Blouin et al. 2004), other studies recognize the heterogeneity of institutional investor tax cohorts (Chetty and Saez 2005; Moser 2007; Strickland 2002; Jin 2006; and Usrey et al. 2007). Jin (2006) shows that the institution's tax status (or that of its underlying shareholders) affects its trading decisions, and Bergstresser and Poterba (2002) provide evidence that after-tax returns affect mutual fund manager compensation. In addition, Moser (2007) finds that, holding all else constant, as tax-disfavored

institutional ownership increases, firms are more likely to repurchase shares as opposed to distribute dividends.

The second important factor is the failure of previous studies to fully account for variation in the time series of tax incentives. Existing literature recognizes the importance of tax law changes in the investigation of dividend tax clienteles and corporate dividend policy. Dhaliwal et al. (1999) find a greater increase in institutional ownership of dividend initiating firms before the Tax Reform Act (TRA) of 1986 when compared to the subsequent period.<sup>6</sup> An independent and concurrent study by Usrey et al. (2007) finds that mutual funds increased their ownership of dividend paying stocks while the remainder of institutional shareholders reduced their ownership of dividend paying stocks following the 2003 Tax Act.<sup>7</sup> Although these studies recognize the importance of tax law changes, our paper is the first to investigate the dividend preferences of heterogeneous institutional investors across a broad time period involving seven changes in the dividend tax penalty.

Our paper contributes to the current debate regarding dividend tax clienteles by investigating changes in institutional ownership of dividend paying stocks across different dividend tax penalty regimes. We hypothesize that changes in the dividend tax penalty will alter the equilibrium investment level in dividend paying firms for both tax-advantaged and taxable institutions.

### **Hypothesis Development**

When the dividend tax penalty is positive, tax-exempt investors will realize higher after-tax returns from dividend paying stocks when compared to taxable investors. This relative return advantage is increasing in the level of dividends paid and the magnitude of

the dividend tax penalty. Thus, we expect a relatively higher level of holdings by tax-advantaged institutions in high dividend paying stocks when the dividend tax penalty is high or after the dividend tax penalty increases. Alternatively, we expect taxable institutions will exhibit preferences for low (or no) dividend paying stocks during high dividend tax penalty regimes. When the dividend tax penalty declines to zero, we expect the preferences of tax-advantaged and taxable investors will converge. This leads to our first hypothesis:

H<sub>1</sub> – Tax-advantaged (taxable) institutions’ preference for dividends is positively (negatively) related to the magnitude of the dividend tax penalty.

Hypothesis H<sub>1</sub> focuses on the level of institutional shareholder’s investments in high dividend paying firms. Analysis of levels may result in spurious correlations, since many variables are cross-sectionally correlated (see O’Brien and Bhushan 1990). A more demanding test of the causal relationship between tax-advantaged (taxable) institutional ownership and dividend policy is the investigation of yearly changes in institutional ownership following changes in the dividend tax penalty. During each tax regime, equilibrium is established among investors, *ceteris paribus*. When the dividend tax penalty changes, we expect institutions to update their expectations regarding the after-tax returns of their holdings. A decrease in the dividend tax penalty increases the expected after-tax return for taxable institutions in dividend paying stocks. Although tax-exempt shareholders are not subject to a dividend tax penalty (since their effective tax rate is 0% for both dividends and capital gains), such a change reduces the relative

advantage of tax-exempt institutions in dividend paying stocks. This leads to our second hypothesis:

H<sub>2</sub> – Changes in tax-advantaged (taxable) institutions' preference for dividends is positively (negatively) related to changes in the dividend tax penalty.

Both hypotheses concern institutional preferences for dividend paying firms as a function of the dividend tax penalty. Although differences between taxes on dividends and taxes on capital gains may help to explain institutional preferences, the tax effect may be small for various reasons (Miller and Modigliani 1961). Signaling theories and Prudent Man Laws are two other factors that may help explain institutional preferences for dividends (Miller and Rock 1985; Del Guercio 1996).<sup>8</sup>

Confounding factors may contribute to inconclusive results on the existence of institutional dividend tax clienteles found in prior research. However, such confounding factors are highly unlikely to be correlated with changes in the dividend tax penalty. As a result, our study adds to the current literature by recognizing the heterogeneity of institutional investor tax cohorts and the existence of different tax regimes across a broad sample period. If dividend tax clienteles exist, then changes to the tax regime provide a natural experiment to test for the existence of such clienteles.

### **Sample and Data**

Our study investigates the dividend preferences of tax-advantaged and taxable institutions across different tax regimes. During the 1987 to 2004 sample period we find a significant amount of variation in the dividend tax penalty.<sup>9</sup> Table 1 presents both levels

and changes to the dividend tax penalty during the sample period. Following Poterba and Summers (1985), we define the dividend tax penalty as  $(t_d - t_{cg}) / (1 - t_{cg})$ , where  $t_d$  equals the highest marginal tax rate applied to dividends, and  $t_{cg}$  refers to the highest marginal capital gains tax rate. The dividend tax penalty ranges from a high of 24.5% during the 1997 to 2000 period to 0.0% during the 1988 to 1990 and 2003 to 2004 periods. We find that the dividend tax penalty changes in seven of the seventeen years in our sample period.

(Insert Table 1 here)

We first collect institutional ownership data on all firms for the 1987 to 2004 sample period from 13F filings obtained through Thompson Financial. Institutions with holdings greater than \$100 million must file a form 13F with the SEC. The filings are submitted quarterly and require institutions to disclose holdings in U.S. firms if their stock position is greater than \$200,000 or 10,000 shares. Thompson classifies each institution into one of five categories: Bank holding companies, Mutual funds, Investment advisors, Insurance companies, and Other Institutional shareholders.<sup>10</sup> Consistent with prior research by Chetty and Saez (2005), Strickland (2002), and Moser (2007) we separate institutions into tax cohorts. The first category (tax-advantaged institutions), defined as Banks and Other Institutional Shareholders, consists of shares held by banks, pension funds, charitable endowments, universities, and other corporations. Shareholders in this group are either tax-exempt shareholders or are tax-favored with respect to dividends due to the dividends received deduction.<sup>11</sup>

The second group (taxable institutions) is composed of mutual funds, investment advisors (brokers), and insurance companies. Although we are not able to specifically identify the underlying shareholders in this group, a significant portion of these

shareholders are subject to shareholder level taxes. Bergstresser and Poterba (2002) estimate that the median underlying mutual fund investor is subject to a 31% marginal tax rate during their 1993 to 1999 sample period. We acknowledge that institutions classified as taxable institutional shareholders are subject to measurement error, in that not all shareholders in this category are subject to the full dividend tax penalty. However, to the extent that underlying shareholders in this group are actually tax-exempt, this biases our study against finding results that are consistent with our hypotheses.<sup>12</sup>

We then collect all available firm information during the sample period from the Center for Research in Security Prices (CRSP) and Compustat files. Table 2 summarizes the sample selection procedures. Consistent with prior studies we exclude financial and utility firms (Grinstein and Michaely 2005). Our initial sample consists of 69,338 firm-year observations during the 1987 to 2004 sample period. We eliminate firm-year observations where Compustat does not have sufficient information to calculate leverage, sales, book value of equity, and earnings. We also require all observations to have sufficient CRSP data to calculate measures of Beta, prior-year abnormal returns, and prior-year average trading volume. These two filters result in a final sample of 51,092 firm-year observations. For robustness, we also perform multivariate analysis on a sample which excludes non-dividend paying firms. Eliminating all non-dividend paying firm-year observations from our sample results in 17,508 firm-year observations.

(Insert Table 2 here)

## RESULTS

### Univariate Statistics

In order to produce meaningful inferences in a univariate setting, we first divide all firms into four dividend categories: 1) No Div – includes firms that do not pay any dividends, 2) Low Div – includes firms whose dividend-to-book ratio is less than the median (1.597%) for all dividend paying firms, 3) Medium Div – includes firms whose dividend-to-book ratio is between 1.597% (50<sup>th</sup> percentile) and 2.817% (75<sup>th</sup> percentile), and 4) High Div – includes firms whose dividend-to-book ratio is higher than 2.817% (75<sup>th</sup> percentile).<sup>13</sup> We face several challenges when investigating this question in a univariate setting. Since institutional ownership of equities and the aggregate market value of each of our four dividend categories exhibit a significant trend across our sample period, inference obtained from ownership levels may merely reflect the time trend (Gompers and Metrick 2001). Therefore, we construct measures of “market-adjusted” portfolio weights for each dividend category (see Grinblatt et al. 1995; Sias 2004).

Figure 1 shows that the aggregate market value of non-dividend (high-dividend) paying firms is increasing (decreasing) as a percentage of total market equity during our sample period (see Fama and French 2001). Institutions following a market-neutral portfolio allocation would allocate 8.7% (40.3%) of their assets to non-dividend (high-dividend) paying stocks in 1987, and this allocation would increase (decrease) to 25.9% (28.6%) by 2004. In every year of our sample period, tax-advantaged (taxable) institutions underweight (overweight) non-dividend paying firms and overweight (underweight) high-dividend paying firms when compared to the market-neutral benchmark portfolio.

(Insert Figure 1 here)

Patterns of persistent overweighting (underweighting) of high and no dividend paying stocks are consistent with externalities such as regulation. However, if changes in the dividend tax penalty influence institutional preferences for dividends, we should observe a change in the magnitude of these over-weightings (under-weightings) that is correlated with changes in the dividend tax penalty. To control for the time-varying properties of the market-neutral portfolio, we construct measures of abnormal portfolio weight as follows:

$$AbnWeight_{i,t} = \frac{Hold_{i,t}}{THold_t} - \frac{Mkt_{i,t}}{TMkt_t}$$

Where  $i$  refers to the dividend category and  $t$  is the time period (year) of the observation. We construct the measure *AbnWeight* for taxable and tax-advantaged institutions separately. *Hold* is the market value of equity held by tax-advantaged (taxable) institutions in dividend category  $i$  firms, and *THold* is the market value of all equity holdings by tax-advantaged (taxable) institutions. We then adjust the portfolio allocation by the market neutral allocation of each dividend class. The adjustment factor is  $(Mkt/TMkt)$ , where *Mkt* is the total market value of dividend category  $i$  firms, and *TMkt* is the market value of equity for all firms.

The purpose of the *AbnWeight* measure is to investigate deviations of tax-advantaged (taxable) institutions from the market-neutral portfolio. If the optimal portfolio for the risk-neutral investor is the market portfolio, then deviations from this benchmark provide insights concerning institutional investor preferences. Clearly, the measure includes deviations that result from both active and passive decisions by portfolio managers, however, the adjustment factor  $(Mkt/TMkt)$  significantly attenuates

any changes in portfolio composition that are the result of security returns rather than active changes.<sup>14</sup>

We divide sample years into those with a positive dividend tax penalty (*Penalty Years*) and those with zero dividend tax penalty (*No Penalty Years*). We then take the mean *AbnWeight* value for each tax regime group and use the time series standard deviation for all statistical tests. Empirical results are presented in Table 3. Consistent with our hypotheses, we find that tax-advantaged institutions overweight high dividend paying stocks by 5.93% in *Penalty Years* compared to only 2.97% in *No Penalty Years*. The -2.96% difference is statistically significant at the 1% level. Given the relative consistency of “market-adjusted” portfolio weights, we believe this difference is economically meaningful.

(Insert Table 3 here)

We find no significant difference in *AbnWeight* in low and medium dividend paying firms for tax-advantaged institutions across different tax regimes. However, tax-advantaged institutions underweight non-dividend paying stocks by -6.15% in *Penalty Years*, compared to an underweighting of only -3.52% in *No Penalty Years*. The difference of 2.63% is both statistically (at the 1% level) and economically significant.

In years with a dividend tax penalty, Taxable institutions underweight high dividend paying firms by -4.69%. In contrast, in years without a dividend tax penalty, taxable institutions underweight high dividend paying firms by only -2.90%. The difference between the underweighting in dividend tax penalty and no dividend tax penalty years is 1.79% (t-statistic=2.78), and further supports our hypotheses. However, these taxable institutions do not appear to change their overweighting of non-dividend

paying firms when the dividend tax penalty changes. Instead, it appears that as the dividend tax penalty declines, taxable institutions decrease their relative holdings of low dividend paying firms. In *Penalty Years (No Penalty Years)* taxable institutions overweight (underweight) low dividend firms by 0.89% (-1.46%). This difference of -2.35% is statistically significant at the 5% level.

Univariate results support hypotheses 1 and 2. During periods of a positive dividend tax penalty, tax-advantaged (taxable) institutions exhibit a stronger preference for high (no/low) dividend paying firms when compared to holdings in periods with no dividend tax penalty. However, as mentioned previously, univariate tests are not able to determine whether these deviations from the market-neutral portfolio are the result of active or passive decisions by institutional investors. In addition, these univariate tests do not control for other variables that are correlated with institutional ownership levels. In the next section we address these shortcomings and examine our hypotheses in a multivariate framework.

### **Multivariate Statistics – Ownership Levels and Changes**

We implement a formal empirical test of Hypothesis 1 using institutional ownership levels. The regression specification is as follows, and includes independent variables that prior literature suggests are correlated with institutional holdings:

$$OWN_{i,t} = \alpha_0 + \alpha_1 DivBook_{i,t-1} * Spread_t + \alpha_2 DivBook_{i,t-1} + \alpha_3 Spread_t + \alpha_4 AvgVol_{i,t-1} + \alpha_5 Beta_{i,t-1} + \alpha_6 LnMVE_{i,t-1} + \alpha_7 MktBook_{i,t-1} + \alpha_8 EPRatio_{i,t-1} + \alpha_9 Leverage_{i,t-1} + \varepsilon_t \quad (1)$$

The dependent variable *OWN* is the number of shares owned by tax-advantaged (taxable) institutional shareholders divided by the number of shares outstanding, where *i* refers to the firm and *t* is the time period (year) of the observation.<sup>15</sup>

The independent variables of interest measure the firm's dividend-to-book ratio (*DivBook*) and the dividend tax penalty (*Spread*). Consistent with Grinstein and Michaely (2005) we use the dividend-to-book ratio instead of dividend yield in order to minimize multicollinearity problems.<sup>16</sup> In a static tax regime with a positive dividend tax penalty, we expect the coefficient on *DivBook* to be negative (positive) for taxable (tax-advantaged) institutions.<sup>17</sup> Due to the variation in the dividend tax penalty over our sample period, we include the interaction term *DivBook\*Spread*. As *Spread* increases, ceteris paribus, we expect tax-advantaged (taxable) institutions to increase (decrease) their ownership levels of high dividend paying stocks. Thus, our expectation is that the interaction term will have a positive (negative) coefficient for tax-advantaged (taxable) institutions.

Our regression includes firm-specific variables that prior literature suggests are correlated with institutional ownership levels. *Beta* is the market model Beta calculated using daily stock returns from the [-250, -50] day period, and controls for a firm's systematic risk. Prior studies find a positive relationship between institutional ownership and Beta (Bushee and Noe 2000; Grinstein and Michaely 2005).<sup>18</sup> Prior literature also suggests that institutional investors prefer more liquid firms. To control for firm liquidity (*AvgVol*) we compute the firm's average monthly trading volume divided by shares outstanding during the prior calendar year.

The remaining independent variables are collected from the Compustat database. Since prior literature finds that institutional ownership is positively related to firm size, we include the log of the firm's market value of equity (*LnMVE*) (Gompers and Metrick 2001). *LnMVE* is calculated by taking the natural log of prior year shares outstanding

multiplied by stock price at the end of the prior year. Similar to Bushee and Noe (2000), Gompers and Metrick (2001), and Bushee (2001) we include several variables that capture growth and income ratios that institutions may base their trading decisions on. These include the firm's prior year market-to-book ratio (*MktBook*) and prior year earnings-to-price ratio (*EPRatio*). Finally, based the work from Bushee and Noe (2000) we include the independent variable *Leverage* to control for the firm's prior year debt-to-book ratio.

We run the multivariate levels regression for both the full sample (51,092 firm-year observations) and the dividend paying firms only sample (17,508 firm-year observations). Table 4 provides descriptive statistics for dependent and independent variables for both samples used in our multivariate regressions. In aggregate, taxable institutions own a larger fraction of outstanding shares than tax-advantaged institutions. The mean (median) ownership of taxable and tax-advantaged institutions for the full sample is 26.11% (23.05%) and 9.59% (6.79%) respectively. Consistent with prior literature, we find that almost 70% of all firm-year observations have a dividend-to-book value of zero.<sup>19</sup> Summary statistics suggest institutions own a relatively larger fraction of dividend paying firms than non-dividend paying firms.

(Insert Table 4 here)

We present regression results for tax-advantaged and taxable institutional ownership for both the full sample and dividend paying firms only sample in Table 5. In untabulated results, we also check the correlation between independent variables and find that multicollinearity is not a problem in our samples. The results of the multivariate regressions presented in Table 5 support Hypothesis 1. The coefficient estimate on the

interaction term  $DivBook * Spread$  for the full (dividend only) sample is 1.415 (0.711) and indicates that tax-advantaged institutions own 0.55% (0.28%) more of the shares outstanding for the median dividend paying firm (dividend-to-book=1.597%) in the highest dividend tax penalty years when compared to zero dividend tax penalty years. Using the mean market value of equity in each sample, our estimates suggest that tax-advantaged institutions hold \$11.37 million (\$12.94 million) more of the median dividend paying firm in the full (dividend only) sample in the highest dividend tax penalty years when compared to the lowest dividend tax penalty years. For taxable institutions the coefficient for the interaction term is negative and significant for both samples. The coefficient indicates that for the full (dividend only) sample we expect taxable institutional ownership levels of the median dividend paying firm to be 1.90% (2.31%) lower during the highest dividend tax penalty years when compared to zero tax penalty years. Again we use the mean market value of equity for each sample and find that taxable institutions hold \$39.3 million (\$106.75 million) less of the outstanding equity in the median dividend paying firm in the full (dividend only) sample in the highest tax penalty years when compared to the lowest tax penalty years.<sup>20</sup>

The economic magnitude of our results is comparable to many other studies investigating institutional ownership. Dhaliwal et al. (1999) estimate that for the average firm in their sample institutional ownership increases by \$10.6 million in the six months following a dividend initiation. Another study by Parrino et al. (2003) finds that institutions increase their holdings by 0.64% of shares outstanding in the quarter before voluntary CEO turnovers, and decreases their ownership by 3.34% of shares outstanding in the quarter before forced CEO turnovers.

(insert Table 5 here)

Our research design implicitly assumes that taxable institutions are subject to the maximum dividend tax penalty. To the extent that some of the shareholders in this category are tax-exempt (or are subject to a penalty less than the maximum), the measurement error biases our study against finding results consistent with our hypotheses. In addition, this measurement error may have implications for the economic interpretation of coefficient estimates. If the marginal investor in the taxable institution cohort is subject to a dividend tax penalty that is less than the maximum penalty, this will inflate the magnitude of the economic significance of our results in institutional ownership levels regressions. However, this measurement error is unlikely to bias the economic interpretation of coefficient estimates in our analysis of changes in institutional ownership.<sup>21</sup>

Coefficient estimates for firm-specific control variables are mostly consistent with prior literature. We find that both tax-advantaged and taxable institutional ownership is positively related to firm size (*lnMVE*) and firm liquidity (*AvgVol*) in both the full and dividend only sample. In addition, coefficients on *MktBook* and *Leverage* are negative and significant for both institutional tax cohorts. Prior studies find mixed results when investigating the relationship between market-to-book and institutional ownership (Grinstein and Michaely 2005; Gompers and Metrick 2001).

We find some differences between the determinants of tax-advantaged and taxable institutional ownership. The coefficient on Beta is positive (negative) and significant for tax-advantaged (taxable) institutions in the full sample, but is positive and significant for both types of institutions in the dividends only sample. In addition, we find

a positive relationship between a firm's earnings-to-price ratio (*EPRatio*) and taxable institutional ownership.

Prior research suggests that annual levels of institutional ownership and dividend-to-book ratios are autocorrelated (Grinstein and Michaely 2005). In order to test whether autocorrelation is a problem in our models we produce Durbin-Watson test statistics for each regression specification presented in Table 5. Durbin-Watson statistics range from 1.918 to 1.941 and suggest that autocorrelation is not a problem in our analysis. Overall, our results are consistent with prior findings, and support the hypothesis that tax-advantaged (taxable) institutions' preference for dividends is positively (negatively) related to the magnitude of the dividend tax penalty. A more demanding test of the causal relationship between tax-advantaged (taxable) institutional ownership and dividend policy is the investigation of yearly changes in institutional ownership following changes in the dividend tax penalty. In addition, our analysis of changes in institutional ownership eliminates the concern that our findings are the results of autocorrelation in the dependent variable.

We implement the following regression specification with regard to institutional ownership changes:

$$\Delta OWN_{i,t} = \alpha_0 + \alpha_1 DivBook_{i,t-1} * \Delta Spread_t + \alpha_2 DivBook_{i,t-1} + \alpha_3 \Delta Spread_t + \alpha_4 \Delta DivBook_{i,t} + \alpha_5 AbnRet_{i,t} + \alpha_6 \Delta AvgVol_{i,t} + \alpha_7 \Delta Beta_{i,t} + \alpha_8 \Delta MktBook_{i,t} + \alpha_9 \Delta EPRatio_{i,t} + \alpha_{10} \Delta Leverage_{i,t} + \varepsilon_t \quad (2)$$

The dependent variable  $\Delta OWN$  represents the change in institutional ownership in firm  $i$  from year  $t-1$  to  $t$ . Similar to the analysis of institutional ownership levels, our primary variable of interest is the coefficient on the interaction term  $DivBook * \Delta Spread$ . We expect that an increase in the dividend tax penalty ( $\Delta Spread$ ) will increase (decrease) tax-advantaged (taxable) institutions' preferences for dividends. Thus, the coefficient on

the interaction term  $DivBook * \Delta Spread$  should be positive for tax-advantaged institutions and negative for taxable institutions. Consistent with our levels analysis, we include additional control variables that may influence changes in institutional ownership. All change variables represent changes from year t-1 to t. Independent variables  $\Delta Beta$  and  $\Delta AvgVol$  control for changes in risk and liquidity. Similar to our levels analysis, we also include  $\Delta MktBook$ ,  $\Delta EPRatio$ , and  $\Delta Leverage$ .

We include two variables in regression specification (2) that are not in our levels regression. The first is  $AbnRet$ , which is the market-model adjusted abnormal return in year t-1.<sup>22</sup> Prior literature finds strong evidence that institutions buy past winners and sell past losers (Cai and Zheng 2003; Burch and Swaminathan 2003; Nofsinger and Sias 1999). We expect the coefficient on  $AbnRet$  to be positive and significant. We also include  $\Delta DivBook$  to control for any contemporaneous changes in dividend policy made by firms.

We present results for tax-advantaged and taxable institutional ownership changes for both the full and dividend only samples in Table 6. Consistent with results from our ownership levels regression, we find strong support for Hypothesis 2 in our analysis of institutional ownership changes. When investigating tax-advantaged (taxable) institutional ownership changes, we find the coefficient on the interaction term  $DivBook * \Delta Spread$  is significantly positive (negative) for both the full and dividend only samples. For tax-advantaged institutions the coefficient estimate for the full (dividend only) sample is 0.651 (0.954) and for taxable institutions the coefficient estimates are -0.771 (-0.674). The coefficients indicate that for the median dividend paying firm (dividend-to-book=1.597%) when the dividend tax penalty decreases by 23.3%, we expect that in the

full (dividend only) sample tax-advantaged institutional ownership will decrease by 0.204% (0.36%) of shares outstanding, and taxable institutional ownership to increase by 0.29% (0.25%) of shares outstanding. Using the mean market value of equity for the full (dividend only) samples, this translates into a decrease in ownership of \$4.96 million (\$16.63 million) for tax-advantaged institutions and an increase in equity ownership of \$6.0 million (\$11.55 million) for taxable intuitions for the median dividend paying firm.<sup>23</sup>

(insert Table 6 here)

Other determinants of institutional ownership changes are similar to those relationships found in prior literature. Firms with higher abnormal returns, increases in liquidity ( $\Delta AvgVol$ ), and increases in risk ( $\Delta Beta$ ) are associated with positive changes in ownership for both tax-advantaged and taxable institutional shareholders. The coefficients on  $\Delta EPRatio$  and  $\Delta MktBook$  are positive and significant for taxable institutional ownership changes only. Consistent with Bushee and Noe (2000), the coefficient on  $\Delta Leverage$  is insignificant for both tax-advantaged and taxable institutions in the full sample, but is negative and significant in the dividends only sample. Results from both the ownership levels and changes regression support the existence of dividend tax clienteles. If a firm's dividend policy is exogenous then OLS will produce unbiased and consistent estimates. However, it is possible that a firm's dividend policy and ownership structure influence each other. We address this endogeneity concern using a simultaneous equations model in the next section.

### **Multivariate Statistics – Simultaneous Equations**

Our results suggest that tax-advantaged (taxable) investors invest relatively more (less) in high dividend paying firms as the dividend tax penalty increases. Alternatively, tax-advantaged (taxable) institutions may influence a firm's management to adjust dividend payout policy in accordance with their preferences (Perez-Gonzalez 2003, Moser 2007). Thus, dividend policy and tax-advantaged (taxable) institutional ownership may be endogenously determined. Moser (2007) finds that as the dividend tax penalty increases and the percentage of a firm's stock owned by taxable (tax-exempt) institutional shareholders increases, firms are more likely to distribute funds to shareholders through share repurchases (dividends).

The hypotheses that dividend policy affects institutional ownership and, conversely, institutional ownership affects dividend policy are not mutually exclusive. Ex-ante, we believe that the dominant effect is likely to be that dividend policy affects tax-advantaged (taxable) institutional ownership. Institutions face low transaction costs when re-allocating their portfolio holdings to reflect updated preferences for dividend paying firms. On the other hand, firms are significantly constrained in their ability to change their dividend policy. For example, DeAngelo and DeAngelo (1990) find that only severely distressed firms terminate or lower their dividend payment. Nevertheless, we address these endogeneity concerns in a simultaneous equations framework.

We implement a two stage simultaneous estimation procedure using the following equations:

$$DivBook_{i,t} = \gamma_0 + \gamma_1 Own_{i,t} * Spread_t + \gamma_2 Own_{i,t} + \gamma_3 Spread_t + \gamma_4 CurrAssets_{i,t-1} + \gamma_5 Pr of Assets_{i,t-1} + \gamma_6 MktCapAssets_{i,t-1} + \gamma_7 CashAssets_{i,t-1} + \varepsilon_{1,t} \quad (3a)$$

$$OWN_{i,t} = \alpha_0 + \alpha_1 DivBook_{i,t} * Spread_t + \alpha_2 DivBook_{i,t} + \alpha_3 Spread_t + \alpha_4 AvgVol_{i,t-1} + \alpha_5 Beta_{i,t-1} + \alpha_6 LnMVE_{i,t-1} + \alpha_7 MktBook_{i,t-1} + \alpha_8 EPRatio_{i,t-1} + \alpha_9 Leverage_{i,t-1} + \varepsilon_{2,t} \quad (3b)$$

The specification for *DivBook* in equation (3a) uses explanatory variables suggested by prior research (Litner 1956; Brav et al. 2005; Chetty and Saez 2005). The variables include total current assets (*CurrAssets*), profit divided by assets (*ProfAssets*), Market value of equity divided by assets (*MktAssets*), and Cash holdings divided by assets (*CashAssets*).

The regression specification for *OWN* in equation (3b) is nearly identical to equation (1), where *OWN* measures the number of shares owned by tax-advantaged (taxable) institutional shareholders divided by the number of shares outstanding. The only difference is that we now use contemporaneous *DivBook* measures (time period= $t$ ) rather than lagged values (time period= $t-1$ ) since both *DivBook* and *OWN* are now endogenously estimated in the system of equations.

In the first stage of the procedure, we regress *DivBook* on all exogenous variables from (3a) and (3b) using a Tobit regression (since the dependent variable is censored at zero). In the second stage, we estimate (3b) using the fitted values of *DivBook* ( $\hat{DivBook}$ ) from the first stage (Green, 2000).<sup>24</sup> We then repeat this two stage procedure by regressing *OWN* on all exogenous variables from (3a) and (3b) in the first stage, and in the second stage estimate (3a) using the fitted values of *OWN* ( $\hat{OWN}$ ) from the first stage. By construction, our fitted values are uncorrelated with error terms  $\varepsilon_1$  and  $\varepsilon_2$ , and therefore OLS produces consistent estimates of  $\alpha_1$  and  $\gamma_1$  in the second stage.

Consistent with simultaneous equations presented by Grinstein and Michaely (2005) we limit our sample to dividend paying firms only.<sup>25</sup> We lose 646 firm-year observations from the dividend only sample due to missing Compustat values for new independent variables required in equation (3a). We present results for the second stage

regressions in Table 7 (we do not tabulate first stage regression estimates). Panel A presents second stage regression results where  $OWN$  is the dependent variable and  $DivBook \hat{*} Spread$  is the independent variable of interest. Consistent with OLS results the coefficient on the interaction term  $DivBook \hat{*} Spread$  is 1.061 (-6.629) for tax-advantaged (taxable) institutions. Both are statistically significant at the 1% level, and the magnitude of coefficients is similar to OLS results. Other independent variables remain relatively consistent with our earlier OLS results. We continue to find positive and significant coefficients on  $Beta$  and  $LnMVE$ , and negative and significant coefficients on  $Leverage$  for both taxable and tax-advantaged institutions.

(Insert Table 7 here)

We present the second stage regression (3a) in Panel B of Table 7. The dependent variable is  $DivBook$  and the independent variable of interest is  $OWN \hat{*} Spread$ . If tax-advantaged (taxable) institutional investors influence a firm's managers to increase (decrease) dividend payout when the dividend tax penalty is high, we expect a positive and significant coefficient for tax-advantaged institutional ownership and a negative and significant coefficient for taxable institutional ownership. We find that the coefficient on the interaction term is insignificant for both taxable and tax-advantaged institutions. Our results suggest that causality appears to only run one way. Tax-advantaged (taxable) institutional investors "vote with their feet" and invest relatively more (less) in high dividend paying firms when the dividend tax penalty is high. We do not find any evidence to support the hypothesis that institutional investors influence a firm's payout policy decisions. Results are consistent with our prior expectations that firm managers are constrained in their ability to alter their "regular" dividend policy.<sup>26</sup>

The results from our simultaneous equations outlined in Table 7, provide evidence suggesting that endogeneity problems are not driving our results. In an additional robustness test we extend our two stage simultaneous equations model to investigate changes in institutional ownership. We use the following system of equations:

$$DivBook_{i,t} = \gamma_0 + \gamma_1 \Delta Own_{i,t} * Spread_t + \gamma_2 \Delta Own_{i,t} + \gamma_3 Spread_t + \gamma_4 CurrAssets_{i,t-1} + \gamma_5 Pr of Assets_{i,t-1} + \gamma_6 MktCapAssets_{i,t-1} + \gamma_7 CashAssets_{i,t-1} + \varepsilon_{1,t} \quad (4a)$$

$$\Delta OWN_{i,t} = \alpha_0 + \alpha_1 DivBook_{i,t-1} * \Delta Spread_t + \alpha_2 DivBook_{i,t-1} + \alpha_3 \Delta Spread_t + \alpha_4 \Delta DivBook_{i,t} + \alpha_5 AbnRet_{i,t} + \alpha_6 \Delta AvgVol_{i,t} + \alpha_7 \Delta Beta_{i,t} + \alpha_8 \Delta MktBook_{i,t} + \alpha_9 \Delta EPRatio_{i,t} + \alpha_{10} \Delta Leverage_{i,t} + \varepsilon_t \quad (4b)$$

The regression specification for *DivBook* in equation (4a) includes the same exogenous variables that are specified in equation (3a). The endogenous variables of interest in our system of equations are now *DivBook* and  $\Delta OWN$ , and we modify the equation accordingly. The regression specification for  $\Delta OWN$  in equation (4b) is nearly identical to equation (2), where we are measuring the yearly change in tax-advantaged (taxable) institutional ownership. Similar to our simultaneous equations estimation of ownership levels, the only change is that we now use contemporaneous *DivBook* measures rather than lagged values.

We perform the two stage estimation procedure for the dividend only sample by regressing *DivBook* on all exogenous variables from (4a) and (4b) using a Tobit regression specification in the first stage. We then estimate equation (4b) in the second stage of our procedure using fitted values of *DivBook* ( $\widehat{DivBook}$ ) from the first stage. Results for our second stage estimation of equation (4b) are presented in Table 8. For tax-advantaged institutions we find that coefficient for the interaction term ( $\widehat{DivBook} * \Delta Spread$ ) is positive and significant, which is consistent with OLS results.

For taxable institutions we now find the coefficient estimate for the interaction term is - 0.086 and insignificant. Results confirm that tax-advantaged institutions invest relatively more in high dividend paying firms as the dividend tax penalty increases; however, results for taxable institutions are inconclusive.

(Insert Table 8 here)

We note that even for tax-advantaged institutions, the magnitude of the coefficient estimate on the interaction term (0.170) is smaller than the OLS coefficient estimate (0.954). Reduction in the magnitude of coefficient estimates on the interaction term ( $DivBook\hat{k} * \Delta Spread$ ) is likely due to measurement error introduced in the first stage estimation of  $DivBook\hat{k}$ . Although the two stage simultaneous estimation addresses the endogeneity concerns in our study, results have low power to detect significant associations when first stage estimations are particularly noisy. In fact, we find that the adjusted  $R^2$  value in our first stage estimation of  $DivBook\hat{k}$  is 3.05%, suggesting that  $DivBook\hat{k}$  is a noisy estimate of  $DivBook$ . In order to address the shortcomings of the simultaneous model we use an alternate approach in the next section.

### **Multivariate Statistics – Constant Dividend sample**

In our sample of dividend paying firms, we observe a large number of firms who do not change their dividend policy from one year to the next. This “sticky” property of firms’ dividend policy has been documented extensively in academic literature (Lintner 1956). In the absence of any dividend policy change, we take a firm’s dividend policy as exogenous. We proceed as follows in identifying this subsample.

We begin with the sample of dividend only firm-year observations (17,510 firm-year observations). For each observation we check to see if the firm paid out the same dollar amount in dividends in both the current and prior year. We use the dollar value of dividends rather than the dividend-to-book ratio since book value of assets may change over time without a corresponding change in dividend policy. We identify 8,353 firm-year observations where dividend policy does not change from the previous year (we refer to this sample as the constant dividend sample).

We then run OLS regression equation (2) on the constant dividend sample. We report only changes in institutional ownership from equation (2) for expositional convenience. Investigation of institutional ownership changes is a more demanding test of the causal relationship between institutional ownership and dividend policy. The dependent variable in the regression is  $\Delta OWN$ , which measures active yearly changes in tax-advantaged (taxable) institutional investor ownership. The independent variable of interest is the interaction term  $DivBook * \Delta Spread$ . We present results in Table 9. Consistent with prior findings, the coefficient on the interaction term is positive (negative) and significant for the tax-advantaged (taxable) institutional ownership. For tax-advantaged (taxable) changes in institutional ownership the coefficient on the interaction term is 0.776 (-0.899), and the magnitude of coefficients is similar to OLS results presented in Table 6.

(Insert Table 9 here)

## CONCLUSION

Over the last twenty years institutional ownership of domestic equities has increased dramatically. As a result, the existence of dividend tax clienteles among

institutions is particularly important, since these clienteles may affect firm value. Our study contributes to the current debate over the existence of dividend tax clienteles by recognizing and incorporating the heterogeneity of institutional investors and the variation in the time series of tax incentives. We find that when the dividend tax penalty is positive, high dividend firms constitute a significantly larger (smaller) percentage of tax-advantaged (taxable) institutions' portfolios.

Multivariate regressions involving institutional ownership levels and changes confirm our initial findings. When the dividend tax penalty increases, we find that tax-advantaged shareholders purchase dividend paying stocks and taxable institutional shareholders generally sell dividend paying stocks. In contrast, after decreases in the dividend tax penalty we find the opposite result. We estimate (for the median dividend paying firm) when the dividend tax penalty decreases by 23.3%, we expect tax-advantaged institutional ownership will decrease by \$11.55 million (0.23% of the firm's shares outstanding), and taxable institutional ownership will increase by \$16.63 million (0.36% of shares outstanding). We find our results are robust to both simultaneous equations estimations and for a subsample of firms that do not change their dividend. Overall, our paper provides strong support for the existence of institutional dividend tax clienteles.

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Table 1

## Summary of the Dividend Tax Penalty

Table 1 presents summary information for the dividend tax penalty during the 1987 to 2004 sample period. The dividend tax rate represents the highest marginal tax rate applied to dividend income. The capital gains tax rate is the highest marginal rate applied to long-term capital gains.

Year	Dividend Tax Rate ( $t_d$ )	Capital Gain Tax Rate ( $t_{cg}$ )	Dividend Tax Penalty ( $t_d - t_{cg} / (1 - t_{cg})$ )	$\Delta$ Dividend Tax Penalty
1987	38.50%	28.00%	0.146	
1988	28.00%	28.00%	0.000	(0.146)
1989	28.00%	28.00%	0.000	0.000
1990	28.00%	28.00%	0.000	0.000
1991	31.00%	28.00%	0.042	0.042
1992	31.00%	28.00%	0.042	0.000
1993	39.60%	28.00%	0.161	0.119
1994	39.60%	28.00%	0.161	0.000
1995	39.60%	28.00%	0.161	0.000
1996	39.60%	28.00%	0.161	0.000
1997	39.60%	20.00%	0.245	0.084
1998	39.60%	20.00%	0.245	0.000
1999	39.60%	20.00%	0.245	0.000
2000	39.60%	20.00%	0.245	0.000
2001	39.10%	20.00%	0.239	(0.006)
2002	38.60%	20.00%	0.233	(0.006)
2003	15.00%	15.00%	0.000	(0.233)
2004	15.00%	15.00%	0.000	0.000

Table 2  
Sample Selection Statistics

Table 2 presents sample selection information for the sample of firm-year observations during the 1987 to 2004 sample period. Our initial sample consists of all firm year observations (excluding financial and utility firms) where Compustat reports a positive asset value for the firm and where institutional ownership data is available from Thompson Financial. We require all observations have adequate Compustat data to calculate leverage, sales, book value of equity, and earnings. We also require sufficient CRSP information to calculate Beta, abnormal return, and average trading volume.

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Initial Firm Year Observations with Institutional Ownership data (Eliminating Financial Firms and Regulated Utilities)	69,338
Missing Compustat Information	- 7,221
Missing CRSP Information	- 11,025
Remaining Firm-Year Observations	51,092 (a)
Less Non-Dividend Paying Firms	33,582
Dividend Paying Firm-Year Observations	17,510 (b)

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(a) – Full Sample of firm-year observations used in Tables 5 and 6

(b) – Sample of Dividend only firm-year observations used in Tables 5, 6, 7, 8, and 9

Table 3  
Univariate Statistics

Table 3 presents univariate statistics for measures of *AbnWeight* for both tax-advantaged and taxable institutions. We divide all firms into four categories: 1)No Div – firms that do not pay any dividends, 2)Low Div – firms whose dividend-to-book ratio is less than the median for all dividend paying stocks, 3)Medium Div – firms whose dividend-to book ratio is between the 50<sup>th</sup> and 75<sup>th</sup> percentile, and 4)High Div –firms whose dividend-to-book ratio is above the 75<sup>th</sup> percentile. For each year in the sample period we then construct measures of abnormal portfolio weightings for tax-advantaged and taxable institutions in each of the four firm dividend categories. We pool those years where the dividend tax penalty is positive (*Penalty Years*) and those years when it is zero (*No Penalty Years*). We report the mean abnormal weightings for each tax regime group. T-statistics are presented in parentheses.

Tax Regime	Tax-Advantaged Institutions				
	No Div	Low Div	Medium Div	High Div	
<i>Penalty Years</i>	-6.15%	0.12%	0.10%	5.93%	
<i>No Penalty Years</i>	-3.52%	0.43%	0.11%	2.97%	
<i>Difference</i>	2.63% (4.10)	*** 0.31% (0.48)	0.02% (0.04)	-2.96% (-5.23)	***
Tax Regime	Taxable Institutions				
	No Div	Low Div	Medium Div	High Div	
<i>Penalty Years</i>	3.01%	0.89%	0.79%	-4.69%	
<i>No Penalty Years</i>	3.30%	-1.46%	1.06%	-2.90%	
<i>Difference</i>	0.29% (0.69)	-2.35% (-2.26)	** 0.27% (0.30)	1.79% (2.78)	***

\* denotes significance at the 10% level  
 \*\* denotes significance at the 5% level  
 \*\*\* denotes significance at the 1% level

Table 4 – Full and Dividend Only Sample Descriptive Statistics

Table 4 presents summary statistics for both the full sample of firm-year observations and the dividend only sample of firm-year observations. We present the median, mean, and standard deviation of all dependent and independent variables used in our multivariate regression analysis.

	Full Sample				Dividend Only Sample			
	N	Median	Mean	Std Dev	N	Median	Mean	Std Dev
<b>Dependent Variables</b>								
<i>Tax Adv. IO (in %)</i>	51,092	6.788	9.591	9.202	17,517	13.373	14.182	10.139
<i>Taxable IO (in %)</i>	51,092	23.054	26.106	19.855	17,517	30.101	30.995	17.723
$\Delta$ <i>Tax Adv. IO (in%)</i>	51,092	0.079	0.455	4.488	17,517	0.165	0.281	4.880
$\Delta$ <i>Taxable IO (in%)</i>	51,092	0.299	0.356	8.779	17,517	0.779	0.499	8.321
<b>Independent Variables</b>								
Tax Variables								
<i>DivBook * Spread</i>	51,092	0.000	0.099	0.280	17,517	0.139	0.277	0.407
<i>DivBook * <math>\Delta</math>Spread</i>	51,092	0.000	-0.014	0.160	17,517	0.000	-0.037	0.262
<i>DivBook</i>	51,092	0.000	0.780	1.700	17,517	1.596	2.745	8.568
<i>Spread</i>	51,092	0.161	0.140	0.100	17,517	0.161	0.128	0.099
$\Delta$ <i>Spread</i>	51,092	0.000	-0.019	0.087	17,517	0.000	-0.020	0.089
$\Delta$ <i>DivBook</i>	51,092	0.000	-0.002	1.005	17,517	0.000	0.033	1.361
CRSP Variables								
<i>AvgVol</i>	51,092	0.637	1.012	1.113	17,517	0.495	0.681	0.698
$\Delta$ <i>AvgVol</i>	51,092	-0.003	0.023	1.814	17,517	0.004	0.006	1.213
<i>AbnRet</i>	51,092	0.052	0.087	0.566	17,517	0.060	0.072	0.348
<i>Beta</i>	51,092	0.650	0.728	0.598	17,517	0.598	0.645	0.454
$\Delta$ <i>Beta</i>	51,092	0.009	0.008	0.656	17,517	0.011	0.008	0.398
Compustat Variables								
<i>LnMVE</i>	51,092	4.925	7.635	9.935	17,517	6.286	8.438	9.623
<i>MarketBook</i>	51,092	1.369	1.938	1.664	17,517	1.354	1.688	1.102
$\Delta$ <i>MarketBook</i>	51,092	-0.001	-0.007	8.208	17,514	0.004	-0.005	0.610
<i>EPRatio</i>	51,092	0.038	-0.058	0.363	17,517	0.059	0.051	0.113
$\Delta$ <i>EPRatio</i>	51,092	-0.002	-0.039	0.427	17,517	-0.002	-0.013	0.158
<i>Leverage</i>	51,092	0.192	0.223	0.202	17,517	0.215	0.222	0.163
$\Delta$ <i>Leverage</i>	51,092	0.000	0.014	0.950	17,510	-0.001	0.004	0.078

Table 5

## Multivariate Regression - Levels of Institutional Ownership

Table 5 presents a pooled multivariate regression where tax-advantaged (taxable) institutional ownership divided by shares outstanding is the dependent variable. Independent variables include the firm's dividend-to-book ratio (*DivBook*), the dividend tax penalty (*Spread*), the interaction term *DivBook\*Spread*, Average Monthly Volume divided by shares outstanding (*AvgVol*), the firm's Beta (*Beta*), the log of Market Value of Equity (*LnMVE*), the Market-to-book ratio (*MktBook*), the Earnings-to-Price ratio (*EPRatio*), and *Leverage*. T-statistics are presented in parentheses.

	Full Sample		Dividend Only Sample	
	Tax-Advantaged Institutions	Taxable Institutions	Tax-Advantaged Institutions	Taxable Institutions
<i>Intercept</i>	-0.825*** (-8.07)	-1.602*** (-7.18)	-0.141 (-0.60)	6.341*** (15.03)
<b>Tax Variables</b>				
<i>DivBook * Spread</i>	1.415*** (11.29)	-4.863*** (-17.76)	0.711*** (3.58)	-5.914*** (-16.65)
<i>DivBook</i>	-0.013** (-2.00)	-0.067*** (-4.92)	-0.030*** (-3.91)	-0.040*** (-2.95)
<i>Spread</i>	-16.880*** (-52.01)	8.449*** (11.92)	-15.721*** (-20.58)	34.955*** (25.59)
<b>CRSP Variables</b>				
<i>AvgVol</i>	0.226*** (6.58)	3.250*** (43.30)	0.217** (2.16)	6.791*** (37.76)
<i>Beta</i>	0.150** (2.32)	-0.617*** (-4.37)	1.960*** (11.82)	1.634*** (5.51)
<b>Compustat Variables</b>				
<i>LnMVE</i>	2.769*** (155.86)	5.553*** (143.11)	2.678*** (70.95)	2.929*** (43.39)
<i>MarketBook</i>	-0.697*** (-34.21)	-1.619*** (-36.38)	-0.860*** (-12.67)	-0.981*** (-8.08)
<i>EPRatio</i>	-0.151* (-1.65)	2.598*** (13.03)	0.340 (0.61)	0.417 (0.42)
<i>Leverage</i>	-1.050*** (-6.51)	-1.504*** (-4.27)	-2.067*** (-4.99)	-1.933*** (-2.61)
Observations	51,092	51,092	17,510	17,510
Durbin-Watson D	1.926	1.941	1.924	1.918
Adjusted R <sup>2</sup>	41.41%	39.98%	31.27%	28.05%

\* denotes significance at the 10% level, \*\* denotes significance at the 5% level, \*\*\* denotes significance at the 1% level

Table 6

## Multivariate Regression – Changes in Institutional Ownership

Table 6 presents a pooled multivariate regression where the change in tax-advantaged (taxable) institutional ownership divided by shares outstanding is the dependent variable. Independent variables include the firm's dividend-to-book ratio (*DivBook*), the change in the dividend tax penalty ( $\Delta Spread$ ), the interaction term *DivBook* \*  $\Delta Spread$ , change in dividend-to-book ratio ( $\Delta DivBook$ ), prior year abnormal return (*AbnRet*), change in monthly volume ( $\Delta AvgVol$ ), change in firm Beta ( $\Delta Beta$ ), change in Market-to-book ( $\Delta MktBook$ ), change in Earnings-to-price ratio ( $\Delta EPRatio$ ), and change in leverage ( $\Delta Leverage$ ). T-statistics are presented in parentheses.

	Full Sample		Dividend Only Sample	
	Tax-Advantaged Institutions	Taxable Institutions	Tax-Advantaged Institutions	Taxable Institutions
<i>Intercept</i>	0.316 <sup>***</sup> (15.22)	0.194 <sup>***</sup> (4.83)	0.151 <sup>***</sup> (3.76)	0.450 <sup>***</sup> (6.63)
<b>Tax Variables</b>				
<i>DivBook</i> * $\Delta Spread$	0.651 <sup>***</sup> (4.80)	-0.771 <sup>***</sup> (-2.94)	0.954 <sup>***</sup> (4.81)	-0.674 <sup>**</sup> (-2.02)
<i>DivBook</i>	-0.013 <sup>***</sup> (-3.39)	-0.012 (-1.59)	-0.008 <sup>*</sup> (-1.69)	-0.020 <sup>***</sup> (-2.60)
$\Delta Spread$	-3.175 <sup>***</sup> (-12.69)	1.860 <sup>***</sup> (3.85)	-5.007 <sup>***</sup> (-8.62)	1.473 (1.50)
<b>CRSP Variables</b>				
$\Delta TVOL$	0.132 <sup>***</sup> (12.14)	0.476 <sup>***</sup> (22.60)	0.232 <sup>***</sup> (7.65)	1.073 <sup>***</sup> (21.02)
$\Delta BETA$	0.075 <sup>**</sup> (2.47)	0.771 <sup>***</sup> (13.19)	-0.049 (-0.53)	-0.004 (-0.02)
<i>AbnRet</i>	1.089 <sup>***</sup> (31.19)	2.559 <sup>***</sup> (37.94)	1.267 <sup>***</sup> (11.94)	1.744 <sup>***</sup> (9.74)
<b>Compustat Variables</b>				
$\Delta MktBook$	-0.002 (-0.74)	0.008 <sup>*</sup> (1.73)	-0.007 (-0.11)	0.988 <sup>***</sup> (9.67)
$\Delta EPRatio$	0.038 (0.82)	1.042 <sup>***</sup> (11.72)	-0.087 (-0.37)	1.281 <sup>***</sup> (3.24)
$\Delta Leverage$	-0.006 (-0.29)	-0.048 (-1.16)	-1.238 <sup>**</sup> (-2.57)	-1.615 <sup>**</sup> (-1.98)
$\Delta DivBook$	-0.075 <sup>***</sup> (-3.76)	0.032 (0.84)	-0.010 <sup>***</sup> (-3.53)	0.030 (0.63)
Observations	51,092	51,092	17,510	17,510
Adjusted R <sup>2</sup>	2.65%	4.92%	1.71%	3.74%

\* denotes significance at the 10% level

\*\* denotes significance at the 5% level

\*\*\* denotes significance at the 1% level

Table 7

## Simultaneous Equations – Levels of Institutional Ownership

Table 7 presents results of a two-stage simultaneous equations model. Panel A presents the results of a second-stage estimation where tax-advantaged (taxable) institutional ownership is the dependent variable and explanatory variables include the predicted value of Dividend-to-book ratio ( $DivBook\hat{k}$ ), and the dividend tax penalty (Spread). Other independent variables include Average Monthly Volume divided by shares outstanding ( $AvgVol$ ), the firm's Beta ( $Beta$ ), the log of Market Value of Equity ( $LnMVE$ ), the Market-to-book ratio ( $MktBook$ ), the Earnings-to-Price ratio ( $EPRatio$ ), and  $Leverage$ . Panel B presents results of a second stage estimation where dividend-to-book is the dependent variable and explanatory variables include the predicted value of tax-advantaged (taxable) institutional ownership ( $OWN\hat{N}$ ), the dividend tax penalty ( $Spread$ ), total current assets ( $CurrAssets$ ), profit divided by assets ( $ProfAssets$ ), Market value of equity divided by assets ( $MktAssets$ ) and cash holdings divided by assets ( $CashAssets$ ). T-statistics are presented in parentheses.

	Tax-Advantaged Institutions	Taxable Institutions
<i>Intercept</i>	3.268 <sup>***</sup> (9.58)	7.306 <sup>***</sup> (16.95)
<i>DivBook<math>\hat{k}</math> * Spread</i>	1.061 <sup>***</sup> (2.61)	-6.629 <sup>***</sup> (-11.60)
<i>DivBook<math>\hat{k}</math></i>	-1.018 <sup>***</sup> (-13.87)	-0.094 <sup>***</sup> (-6.35)
<i>Spread</i>	-20.767 <sup>***</sup> (-15.81)	37.671 <sup>***</sup> (21.18)
<i>AvgVol</i>	-0.073 (-0.71)	6.766 <sup>***</sup> (36.82)
<i>Beta</i>	1.186 <sup>***</sup> (6.82)	1.600 <sup>***</sup> (5.28)
<i>LnMVE</i>	2.674 <sup>***</sup> (69.57)	2.895 <sup>***</sup> (42.08)
<i>MarketBook</i>	-0.123 (-1.53)	-0.831 <sup>***</sup> (-6.25)
<i>EPRatio</i>	-1.393 <sup>**</sup> (-2.07)	-2.176 <sup>*</sup> (-1.81)
<i>Leverage</i>	-5.054 <sup>***</sup> (-10.60)	-4.709 <sup>***</sup> (-5.80)
Observations	16,864	16,864
Adjusted R <sup>2</sup>	31.67%	27.50%
Durbin-Watson D	1.909	1.92

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Panel B: Dependent Variable is DivBook

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	Tax-Advantaged Institutions	Taxable Institutions
<i>Intercept</i>	2.958 <sup>***</sup> (9.08)	3.426 <sup>***</sup> (9.62)
<i>OWN<sup>hat</sup> * Spread</i>	0.131 (1.26)	0.026 (0.40)
<i>OWN<sup>hat</sup></i>	-0.049 <sup>***</sup> (-2.90)	-0.043 <sup>***</sup> (-4.08)
<i>Spread</i>	-4.780 <sup>***</sup> (-2.93)	-2.280 (-1.08)
<i>CurrAsset</i>	-2.132 <sup>***</sup> (-6.54)	-2.231 <sup>***</sup> (-6.84)
<i>ProfitAsset</i>	7.379 <sup>***</sup> (6.45)	6.847 <sup>***</sup> (5.97)
<i>MarketCapAsset</i>	0.339 <sup>***</sup> (5.35)	0.368 <sup>***</sup> (5.87)
<i>CashAsset</i>	9.143 <sup>***</sup> (16.36)	9.117 <sup>***</sup> (16.69)
Observations	16,864	16,864
Adjusted R <sup>2</sup>	3.68%	3.81%

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\* denotes significance at the 10% level  
 \*\* denotes significance at the 5% level  
 \*\*\* denotes significance at the 1% level

Table 8

## Simultaneous Equations – Changes in Institutional Ownership

Table 8 presents results of the second stage of a two-stage simultaneous equations model. Tax-advantaged (taxable) institutional ownership changes are the dependent variables and explanatory variables include the predicted value of Dividend-to-book ratio ( $DivBook\hat{k}$ ), change in the dividend tax penalty ( $\Delta Spread$ ), change in dividend-to-book ratio ( $\Delta DivBook$ ), prior year abnormal return ( $AbnRet$ ), change in monthly volume ( $\Delta AvgVol$ ), change in firm Beta ( $\Delta Beta$ ), change in Market-to-book ( $\Delta MktBook$ ), change in Earnings-to-price ratio ( $\Delta EPRatio$ ), and change in leverage ( $\Delta Leverage$ ). T-statistics are presented in parentheses.

Dependent variable is Change in Tax-Advantaged (Taxable) institutional ownership		
	Tax-Advantaged Institutions	Taxable Institutions
Intercept	0.876*** (11.67)	0.804*** (6.35)
$DivBook\hat{k} * \Delta Spread$	0.170** (2.55)	-0.086 (-0.77)
$DivBook\hat{k}$	-0.036** (-2.62)	-0.046** (-2.00)
$\Delta Spread$	-5.000*** (-11.79)	-2.062*** (-2.88)
$\Delta TVOL$	0.229*** (7.51)	1.096*** (21.23)
$\Delta BETA$	-0.063 (-0.66)	0.014 (0.08)
$AbnRet$	1.195*** (10.98)	1.668*** (9.07)
$\Delta MktBook$	-0.070 (-1.14)	0.954*** (9.19)
$\Delta EPRatio$	-0.188 (-0.73)	1.642*** (3.79)
$\Delta Leverage$	-1.390*** (-2.77)	-0.954 (-1.13)
$\Delta DivBook$	0.640 (0.78)	0.950 (0.69)
Observations	16841	16841
Adjusted R <sup>2</sup>	2.01%	3.92%

\* denotes significance at the 10% level  
 \*\* denotes significance at the 5% level  
 \*\*\* denotes significance at the 1% level

Table 9

## Multivariate Regression – Constant Dividend Sample

Table 9 presents a pooled multivariate regression where the change in tax-advantaged (taxable) institutional ownership divided by shares outstanding is the dependent variable. Independent variables include the firm's dividend-to-book ratio (*DivBook*), the change in the dividend tax penalty ( $\Delta Spread$ ), the interaction term  $DivBook * \Delta Spread$ , change in dividend-to-book ratio ( $\Delta DivBook$ ), prior year abnormal return (*AbnRet*), change in monthly volume ( $\Delta AvgVol$ ), change in firm Beta ( $\Delta Beta$ ), change in Market-to-book ( $\Delta MktBook$ ), change in Earnings-to-price ratio ( $\Delta EPRatio$ ), and change in leverage ( $\Delta Leverage$ ). The sample includes only those firms that do not change their dividend policy from the prior year. T-statistics are presented in parentheses.

	Tax-Advantaged Institutions	Taxable Institutions
<i>Intercept</i>	0.198*** (2.95)	0.733*** (6.60)
<b>Tax Variables</b>		
<i>DivBook * <math>\Delta Spread</math></i>	0.776*** (2.91)	-0.899** (-2.04)
<i>DivBook</i>	-0.027* (-1.64)	-0.031 (-1.16)
<i><math>\Delta Spread</math></i>	-5.880*** (-7.23)	4.111*** (3.06)
<b>CRSP Variables</b>		
<i><math>\Delta TVOL</math></i>	1.055*** (11.42)	3.545*** (23.20)
<i><math>\Delta BETA</math></i>	-0.097 (-0.71)	-0.305 (-1.35)
<i>AbnRet</i>	1.136*** (7.01)	1.377*** (5.14)
<b>Compustat Variables</b>		
<i><math>\Delta MktBook</math></i>	-0.169 (-1.60)	0.373** (2.14)
<i><math>\Delta EPRatio</math></i>	0.208 (0.55)	0.784 (1.25)
<i><math>\Delta Leverage</math></i>	-0.515 (-0.71)	-3.958*** (-3.28)
<i><math>\Delta DivBook</math></i>	-0.041 (-0.92)	-0.010 (-0.13)
Observations	8,353	8,353
Adjusted R <sup>2</sup>	2.94%	7.18%

\* denotes significance at the 10% level

\*\* denotes significance at the 5% level

\*\*\* denotes significance at the 1% level

# Figure 1

Figure 1 presents portfolio weightings for four dividend categories for the market-neutral portfolio, tax-advantaged institutions, and taxable institutions.

Figure 1A: No Div Stocks

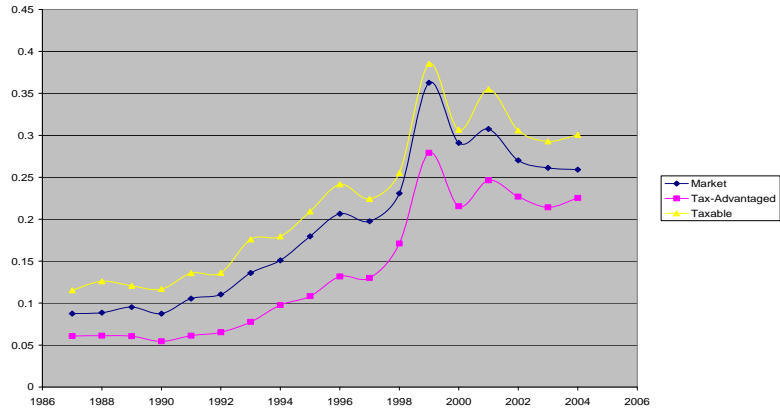


Figure 1B: Low Div Stocks

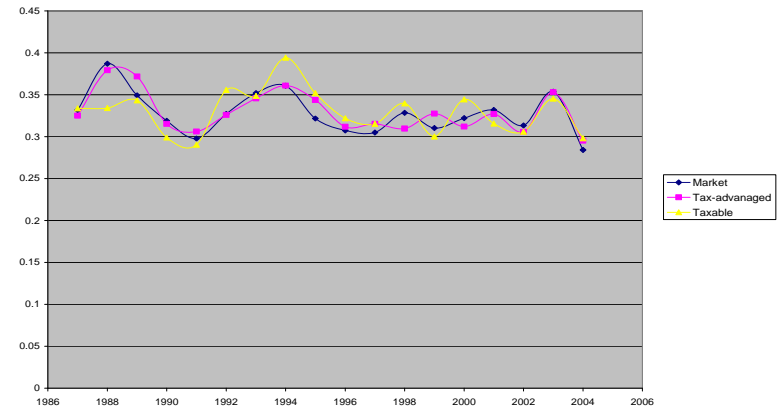


Figure 1C: Medium Div Stocks

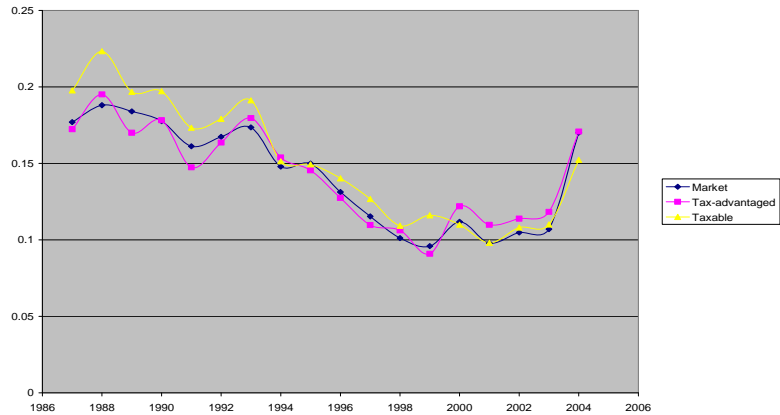
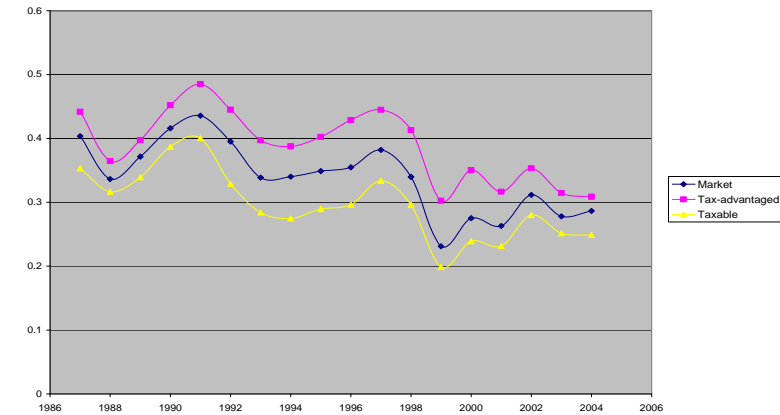


Figure 1D: High Div Stocks



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<sup>1</sup> The dividend tax penalty is defined as  $(t_d - t_{cg}) / (1 - t_{cg})$  where  $t_d$  equals the tax rate applied to dividends, and  $t_{cg}$  refers to the highest marginal capital gains tax rate (Porterba and Summers 1985).

<sup>2</sup> According to the Investment Company Institute, almost half of mutual fund assets are held by taxable entities

<sup>3</sup> Miller and Scholes (1982) use the after-tax version of the CAPM to control for systematic risk, and include only dividends declared in advance to control for information effects.

<sup>4</sup> Dhaliwal et al. (1999) find that this result is sensitive to the time period over which institutional ownership changes are measured. When measuring the one year change in institutional ownership following dividend omissions, they find a significant change of -2.3%.

<sup>5</sup> Other studies that fail to find support for the existence of dividend tax clienteles include Jain (2005) and Hotchkiss and Lawrence (2003). Hotchkiss and Lawrence (2003) find that institution specific factors contribute to the existence of dividend clienteles; however, they suggest that the tax status of the institution does not drive this clientele behavior. Alternatively, Graham and Kumar (2006) find support for the dividend clientele hypothesis among individual investors, and Geisler (2000) finds evidence of dividend tax clienteles among insurance companies.

<sup>6</sup> The TRA of 1986 increased the effective tax rate on capital gains and decreased the effective tax rate on dividends.

<sup>7</sup> The 2003 Tax Act lowered the highest statutory tax rate on dividends from 38.6% to 15%.

<sup>8</sup> Prudent Man Laws come from the ERISA Act of 1974. While these rules do not specifically define prudent stocks, most pension plans adopted written statements of investment policy which may specify certain dividend characteristics for prudent stocks.

<sup>9</sup> We begin our sample in 1987 due to the phasing in of tax changes in 1986 that occur as a result of the Tax Act of 1986.

<sup>10</sup> In 1998 Thompson Financial announced a coding problem with their classification of institutional shareholders into one of five different categories. In the second quarter of 1998, Thompson Financial reclassified approximately 1,000 institutions from Mutual Funds and Brokers to the Other Institutional

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Shareholder category. For purposes of consistency we manually reclassify institutional shareholders to their pre-1998 category.

<sup>11</sup> Corporations that receive dividends from other taxable, domestic corporations are entitled to the dividends received deduction. If the recipient corporation owns less than 20% of the stock of the paying corporation, then the recipient corporation gets to deduct 70% of the dividend received. If the recipient corporation owns at least 20% but less than 80% of the stock of the paying corporation, then the recipient corporation gets to deduct 80% of the dividend received. If the recipient corporation owns 80% or more of the stock of the paying corporation, then the recipient corporation gets to deduct 100% of the dividend received.

<sup>12</sup> The measurement error in institutional investor classification may also influence the economic interpretation of regression coefficient estimates. We provide a thorough discussion of these issues in Section V.

<sup>13</sup> We repeat our analysis using alternative cutoff levels for high and low dividend paying firms. Results are statistically and economically similar.

<sup>14</sup> Passive deviations include those that result from a portfolio manager's inaction. Consider a situation in which tax-exempt institutions hold the market-neutral portfolio in period  $t$ . In period  $t+1$ , a significant number of firms enter the market that do not pay any dividends. Holding all else constant, if tax-advantaged portfolio managers do not buy or sell any securities, they would now hold a greater portion of dividend paying stocks than the market-neutral portfolio. In order to alleviate concerns that our results are driven by passive rather than active decisions, we consider only active changes (portfolio managers actively increasing or decreasing their security positions) in all multivariate tests.

<sup>15</sup> Each of these measures is recorded as of June 30 in year  $t$ .

<sup>16</sup> Dividend yield and changes in dividend yield are highly correlated with a firm's past performance. Since prior studies (see Nofsinger and Sias, 1999) find that institutions buy past winners and sell past losers, we include past performance as an independent control variable when investigating changes in institutional ownership. The correlation between dividend-to-book and dividend yield is 0.78 in the full sample and 0.71 in the sample of dividend paying firms only. The correlation between dividend-to-book and dividend yield is statistically significant at the 0.001 level in both samples.

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<sup>17</sup> In untabulated results excluding the *DivBook\*Spread* interaction term, we find the coefficient on *DivBook* is negative and significant for taxable institutions and positive and insignificant for tax-advantaged institutions.

<sup>18</sup> In robustness tests we use alternate measures of stock risk. Stock return volatility (*StdDev*) is the standard deviation of daily stock returns during the t-1 calendar year. We also include separate measures for non-systematic risk. *IRISK*, is the standard deviation of market model residuals over the t-1 calendar period. (see Bushee and Noe 2000). All results are robust to different risk specifications.

<sup>19</sup> All CRSP and Compustat variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles in order to reduce the influence of outliers in statistical tests.

<sup>20</sup> In untabulated results, we find that the interaction term is negative and significant for the total institutional ownership sample. These results are similar to those found by Chetty and Saez (2005) in that the size of the taxable sample and magnitude of the effect dominate the effect from tax-advantaged institutions.

<sup>21</sup> Regressions investigating changes in institutional ownership use change in the dividend tax penalty (rather than level) as the independent variable of interest. If the relative magnitude of the marginal investor's dividend tax penalty (compared to the maximum dividend tax penalty) does not change over time, inference obtained from the changes in institutional ownership regressions will be unbiased. We thank an anonymous referee for drawing our attention to this issue.

<sup>22</sup> Firm returns (*AbnRet*) are highly correlated with changes in market value (*LnMVE*). Therefore, we do not include  $\Delta LnMVE$  in regression specification (2). In robustness tests, we substitute  $\Delta LnMVE$  for *AbnRet* and obtain results that are both qualitatively and quantitatively similar.

<sup>23</sup> In untabulated results, we find that the coefficient on the interaction term for the changes in total institutional ownership sample is insignificant. This result underscores the importance of separating institutions into appropriate tax cohorts.

<sup>24</sup> Our simultaneous equations methodology is similar to Graham and Rogers (2002) and Kaznik (1999).

<sup>25</sup> Simultaneous estimation involving the full sample of firms may be problematic and lead to incorrect inference since fitted values of *DivBook* ( $\hat{DivBook}$ ) are often positive for firms that have never paid a

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dividend. These firms represent almost 70% of our sample firm-year observations. In untabulated robustness tests we run two stage simultaneous equations on the full sample and find results that are qualitatively and quantitatively similar to dividend only sample results.

<sup>26</sup> We note that our results are not inconsistent with Moser (2007). Moser recognizes that firms are constrained in altering the regular dividend policy, and therefore considers both special dividends and share repurchases as alternate payout methods.