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Dividends, Share Repurchases, and Tax Clienteles: Evidence from the 2003 Reductions in Shareholder Taxes

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ABSTRACT

This paper jointly evaluates firm-level changes in investor composition and shareholder distributions following a 2003 reduction in the dividend and capital gains tax rates for individuals. We find that directors and officers, but not other individual investors, rebalanced their portfolios to maximize after-tax returns in light of the new tax rules. We also find that firms adjusted their distribution policy (specifically, dividends versus share repurchases) in a manner consistent with the altered tax incentives for individual investors. To our knowledge, this is the first paper to employ simultaneous equations to estimate both investor and managerial responses to the 2003 rate reductions. We find that estimating a system of equations leads to different inferences.

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I. INTRODUCTION

This paper jointly evaluates firm-level changes in investor composition and shareholder distributions following a 2003 reduction in dividend and capital gains tax rates. We predict that individual investors, the only ones affected by the reduction in shareholder taxes, rebalanced their portfolios to maximize after-tax returns in light of the new tax rules. We also predict that firms adjusted their distribution policy (specifically, dividends versus share repurchases) to maximize share value, i.e., distributing profits in a manner that was most attractive to their investors after considering shareholder taxes. With regard to investor responses, we find evidence that insiders (i.e., directors and officers) increased holdings in their own companies if their dividend-repurchase mix reflected the new tax incentives. However, we find no evidence that other individual investors rebalanced their portfolios. With regard to managerial responses, we find that firms with disproportionately large individual holdings modified their payouts in a manner consistent with the altered tax incentives. However, changes in dividend and repurchase policy were not immediate; firms deferred widespread, substantial changes until the second quarter following enactment.

To our knowledge, this is the first paper to jointly estimate investor and firm responses to changes in shareholder taxes. The fact that both investors and firms can change their behavior following a change in shareholder taxes presents an identification problem. To illustrate, suppose we test for an association between dividend yields and individual stock ownership and find that the correlation becomes more positive following a reduction in individual dividend tax rates. Such a finding is consistent with both (1) individuals switching to high-dividend-paying firms following the tax cut (i.e., a tax clientele response) and (2) firms that are held mostly by individuals increasing their dividends following the tax reduction (a firm payout response). To

distinguish between investors' rebalancing their portfolios and firms' altering their distributions, this study estimates simultaneous equations. Prior studies have focused on either investors or managers, but not both.

To maximize the power of our tests, we compare a firm's ownership and dividend-repurchase mix before and after the largest change in U.S. dividend taxation. The Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) reduced, for individuals only, the maximum, statutory dividend tax rate from 38.6% to 15%. It also lowered the maximum, statutory individual capital gains tax rate, which applies to share repurchases, from 20% to 15%. In many ways, JGTRRA is an ideal legislative setting for testing an association between shareholder taxes and payout policy. The scope of JGTRRA was narrow. Its genesis was individual dividend tax reduction. Its primary amendment was individual capital gains tax relief.¹ The final bill did little more than reduce dividend and capital gains tax rates. Nonetheless, the economic effects were huge.² Because of its narrow focus and big impact, the JGTRRA provides a much stronger setting than other shareholder tax rate changes, which were either much smaller (e.g., Tax Relief Act of 1997) or involved widespread overhaul of the tax system that affected far more than just shareholder taxes (Tax Reform Act of 1986).

The JGTRRA dividend and capital gains tax cuts should have altered the optimal mix of dividends and repurchases for at least some individual investors. As a result, we expect that some individuals rebalanced their portfolio so that a higher proportion of their equity returns came in the form of dividends. Consistent with such portfolio rebalancing, Desai and Dharmapala (2010) report that total U.S. equity investments shifted from foreign countries

¹ For the legislative history, see Auerbach and Hassett (2006).

² The size of the tax savings has been very large. In September 2007, the U.S. Congress' Joint Committee on Taxation reported that the 2003 dividend and capital gains tax rates will cost the Treasury \$632 billion between 2007 and 2011, the largest tax expenditure in the tax code.

whose companies did not qualify for the lower dividend tax rates to foreign countries whose companies did qualify for the lower dividend tax rates. However, to our knowledge, no one has documented whether individual investors rebalanced their much larger holdings of domestic holdings in a manner consistent with the changed tax incentives following passage of the JGTRRA. This study addresses this void by studying the domestic portfolio rebalancing of three different individual investor groups.

To attract individual investors who were looking for more dividends following passage of the legislation, we expect that at least some firms increased the dividend portion of their distributions. Consistent with such a managerial response, Chetty and Saez (2005) document that dividend initiations jumped in 2003. Brown et al. (2007) add that reductions in share repurchases funded these 2003 dividend initiations and such substitution was limited to companies where directors and officers held disproportionately large shares. They find no similar managerial responses among the set of firms that account for almost all dividend issuances, i.e., the firms paying dividends before JGTRRA, or among firms without high insider ownership.³ Comparing executive compensation in 2003 and 2002, Aboody and Kasznik (2008) also reach mixed conclusions about the changes in the dividend–repurchase mix.

We conduct a more comprehensive study of the managerial responses to JGTRRA by looking at dividend-paying firms (which far exceed initiators in number and payout), studying both insiders and other individual investors, and extending the analysis to include changes in distribution policies through 2005 (two years beyond these extant JGTRRA studies).

³ Brown et al. (2007) are careful to state that their inferences about substitution are limited to 2003 dividend initiators. That said, because their sample includes both initiators and non-initiating firms, it was unclear to us whether the findings reported in Table VI of their paper shed any light on the firm responses of non-initiators. Private conversations with the authors confirmed that their conclusions were limited to 2003 dividend initiators. In addition, to enable us to investigate the non-initiators in their study more closely, the authors kindly provided us with their data for which we were most appreciative. We replicated their results, and, consistent with the inferences in their paper and our conversations with them, we found that their results only hold for firms that initiated in 2003.

Lengthening the investigation period enables us to calibrate how long it took investors and managers to respond to JGTRRA. We also estimate a system of equations and find that results are statistically and economically more significant under simultaneous equations than they are under ordinary least squares.

To test for investor and firm responses, we compare the percentage of shares held before and after JGTRRA for three groups of individual investors: insiders (i.e., directors and officers of the firm), other non-executive individuals investing on their own account, and mutual fund investors.⁴ We aggregate each firm's dividends and repurchases during the eight quarters immediately preceding the quarter of enactment and compute the ratio of dividends to total payout (dividends plus repurchases).⁵ We compare that ratio to the one formed with aggregated dividends and repurchases for the eight quarters immediately after the quarter of enactment. We then test for an association between the change in shareholders and change in the dividend-repurchase mix. This difference-in-differences approach mitigates the likelihood of spurious conclusions arising from omitted correlated variables. Estimating a system of equations enables us to determine whether the association is driven by tax clientele effects, payout changes, or both.

We find evidence consistent with both investor and firm responses to JGTRRA. However, insiders are the only investors who appear to have altered their holdings in response to JGTRRA. We find stronger evidence that firms modified their payout policy in response to changes in shareholder taxes. In particular, we find that the movement toward distributing a larger proportion of profits as dividends was greatest among those companies held

⁴ Many mutual fund investors are not individuals and the earnings for many mutual funds held by individuals are not subject to JGTRRA, e.g., 401(k) investments. Unfortunately, we cannot observe the extent to which JGTRRA affects specific mutual funds' investor base. This limitation biases against our finding a response by mutual fund investors.

⁵ We aggregate to reduce some of the noise arising because repurchases, unlike regular quarterly dividends, are uneven and irregular.

disproportionately by individual investors, particularly directors and officers, but also those firms where other individual and mutual funds had large holdings. We find that firms began to substantially alter their distribution policies in the second quarter following passage, consistent with firms needing time to adjust their dividend and repurchase policies.

The next section develops testable hypotheses. Section III details the research design. Section IV presents the empirical findings. Closing remarks follow.

II. HYPOTHESIS DEVELOPMENT

Framework

This paper does not attempt to tackle the longstanding puzzle of why firms pay dividends when they could distribute profits through share repurchases, which remain tax-advantaged, though less so, even after JGTRRA.⁶ Rather, in a nutshell, we: (a) accept the fact that investors desired and some firms paid dividends before JGTRRA (obviously for non-tax reasons), (b) assume that the mix of dividends and repurchases was optimal before passage of the legislation, (c) expect that the large tax rate reductions for dividends (compared with the relatively modest reductions for capital gains) led some individuals to rebalance their portfolios in favor of dividend income, and (d) predict that some firms, in response to the changing tax incentives for individual investors, increased the portion of their distributions in the form of dividends after JGTRRA. The remainder of this section elaborates on these relations to develop formal hypotheses about the impact of JGTRRA on shareholder distributions.

⁶ For a sampling of the “dividend puzzle” literature, see Miller and Modigliani (1961), Feldstein and Green (1983), Bagwell and Shoven (1989), Berhheim (1991), DeAngelo, DeAngelo, and Skinner (2000), Jagannathan, Stephens, and Weisbach (2000), Fama and French (2001), Grullon and Michaely (2002), Dhaliwal and Li (2006), Gordon and Dietz, 2006 and Chetty and Saez, 2007, among many others. On a different note, even though both repurchases and dividends now face a maximum tax rate of 15%, repurchases remain tax-advantaged for at least two reasons. First, sellers can offset the tax basis of the shares that they sell against the proceeds from the sale in computing their capital gains. Second, they can offset those capital gains with capital losses that otherwise might not be deductible. This contrasts with dividends, where the entire amount is taxed upon receipt.

To develop the intuition for our hypotheses, we start with a simple framework.⁷ Absent taxes, suppose that all investors hold optimally diversified portfolios of the risk-free asset and the market portfolio. In that setting, shareholder ownership of stocks should not vary across investors with similar risk preferences. Now suppose some investors (call them individuals) become taxed on their dividend income. These individual investors will no longer hold the original, pre-tax, optimally diversified portfolio. Rather, they will underweight their portfolio in tax-disfavored dividend-paying stocks and overweight their portfolio in tax-favored, no-dividend stocks. This shift will boost the price of no-dividend stocks and drive down the price of dividend-paying stocks. These price movements will entice non-individual investors (call them tax-exempts) to hold more dividend stocks and less no-dividend stocks. As a result, each investor ultimately would hold the portfolio that features his optimal tradeoff between risk and after-tax return; the share price of each stock would equate supply and demand; and a heterogeneous mix of shareholders would emerge endogenously. One example of an empirical study of such tax clientele responses is Dhaliwal, et al. (1999), who document increases in institutional holdings when firms initiate dividends, which are tax-disadvantaged to individual investors.⁸

Similarly, if individuals were taxed more heavily on dividends than on share repurchases, then they would overweight their portfolios with stocks that distributed disproportionate amounts of profits through repurchases, as compared with dividends.⁹ Meanwhile, non-individual investors would overweight their portfolios with stocks that distributed disproportionate amounts

⁷ We appreciate the contributions of an anonymous referee in sketching out the framework that we rely on in this paper.

⁸ Moser and Puckett (2009) include the JGTRRA in their study of whether there is a positive association between the portion of dividend-paying securities in tax-advantaged institutions' portfolios and the dividend penalty. Although they find evidence of a positive association, their analysis is confounded by the inclusion of financial institutions as tax-advantaged institutions (Blouin 2009).

⁹ We are assuming that tax-sensitive investors do not interpret any potential dividend and repurchase signals differently from other market participants.

of profits through dividends, as compared with share repurchases. In this setting, managers would choose both the level and mix (dividends versus share repurchases) of shareholder distributions that maximizes the firm's stock price. Their distribution policy would affect both the equilibrium price and the equilibrium mix of investors and changes in their payout policy will induce a change in the mix of investors that own the firm.

Now suppose the dividend tax rate was cut. Individual investors would rebalance their portfolios, adding more dividend-paying stocks than was optimal under the prior high-dividend tax regime. This will drive up the price of dividend-paying stocks, altering the optimal portfolio mix for tax-exempt investors who would now shift from dividend-paying stocks to no-dividend stocks at the margin. At the same time that investors would be adjusting their portfolios in light of the changes in dividend tax policy, managers would be revising their level and mix of shareholder distributions in light of the new tax policy to continue to maximize their stock price. As a result, both the investor mix (individuals versus tax-exempts) and the firm's distribution policy (dividends versus share repurchases) would change after a reduction in the dividend tax rate.

To determine the relative importance of the investor response and the firm's response would require joint evaluation of both investors' and managers' incentives. Studies that examine only individual investors' new tax-motivated demand for dividends might erroneously attribute all of the increase in dividends to a clientele effect. In the extreme, this is true even if investors did not rebalance their portfolio but rather, firms simply increased their dividend payouts. Likewise, studies (such as several prior examinations of JGTRRA) that focused solely on firm's new tax-driven supply of dividends might erroneously attribute increased dividend income by individuals to a payout response when the result was actually due to individual investors

rebalancing their portfolios. In the tests below, we find evidence of both a clientele and a managerial response to shareholder tax rate reductions.

Investor Responses

We begin our hypothesis development by focusing on potential investor responses to JGTRRA. We assume that because the decline in the dividend tax rate (from 38.6% to 15%) exceeded the decrease in the capital gains tax rate (from 20% to 15%) that the net effect of JGTRRA was to make firms that distributed profits mostly through dividends more attractive for individual investors than those that distribute profits mostly through share repurchases. Assuming investors were holding the optimal portfolio (considering risk and taxes) before JGTRRA's enactment, we predict that, after enactment, individual investors altered their portfolios to receive a higher percentage of their returns in the form of dividends.

H1: Individual investors responded to JGTRRA by increasing their holdings in stocks that distribute larger proportions of their profits through dividends.

That said, it is important to recognize that investors cannot freely rebalance their portfolios. Besides commissions and other transaction costs that investors face on all trades, taxable investors pay capital gains taxes on any excess of the proceeds from the sale of the stock over the basis of the stock. Thus, some investors may have accepted an inferior portfolio, rather than incur the tax and non-tax costs of rebalancing their portfolio. This is one reason why we might not observe investors engaging in widespread rebalancing following JGTRRA.

Firm Responses

Meanwhile, we anticipate that firms will respond to individual investors' enhanced interest in dividends by increasing the portion of profits that they distribute in the form of dividends. Those firms wishing to retain or increase their holdings by individual investors are likely to distribute more of their profits as dividends, following enactment, than other firms. Unfortunately, we cannot observe the pool of future shareholders that firms hope to attract by adjusting their payout policy. Therefore, we look to their shareholder mix at passage and assume that firms with larger individual owners at enactment would be more likely to alter their distribution policy to distribute more of their profits as dividends than those firms with little, if any, individual ownership. To the extent a firm's current investor mix is not a good predictor of managers' desired investor mix in the future, our tests are biased against finding a firm response to JGTRRA.

H2: Managers responded to JGTRRA by distributing a larger portion of their profits as dividends. The extent to which managers increased their dividend percentage increased with the individual ownership of their firm.

That said, there are several reasons why managers might not have adjusted their dividend-repurchase mix in response to JGTRRA. First, the JGTRRA tax rate reductions were scheduled to expire in five years at the end of 2008 (later deferred to the end of 2010) and 2004 Democratic Presidential candidate, John Kerry, pledged to restore the higher dividend tax rates for the two highest tax brackets, if elected. Since dividends tend to be sticky and the markets historically punish firms for decreasing dividends, many firms may have chosen to leave their distribution policy unchanged, delay any change until after the 2004 elections, or turn to one-time special dividends (which we ignore in this study). Second, dividends are purported to play

an important role by alleviating asymmetric information through conveying private information to the market. Tax-motivated dividend changes might undermine this signal. Three, large increases in dividends could adversely affect the firm's compensation structure, particularly to the extent that the firm relies on stock options, which are not dividend-protected. Consistent with this deterrent to modifying distributions, Aboody and Kasnick (2008) find that firms that increased their dividends after JGTRRA modified their stock option and restricted stock compensation plans. In short, there were multiple reasons for firms to be hesitant about modifying their distribution policy following JGTRRA, even if individuals were seeking higher dividends than before the legislation.

III. RESEARCH DESIGN

System of Regression Equations

As discussed above, we jointly evaluate the changes in investor composition and distribution policy following enactment of JGTRRA. We predict that individual investors rebalanced their portfolios so that a larger proportion of their shareholder income was in the form of dividends as opposed to share repurchases. We also expect that managers altered their distributions so that a larger proportion of their distributions were dividends and that this adjustment was increasing in the extent to which individuals owned the firm.

To jointly evaluate the impact of investor and manager responses to JGTRRA, we estimate a system of four equations (variables are defined below):

$$\text{Equation (1): } \textit{INSIDER} = \alpha_0 + \alpha_1 * \textit{POST} + \alpha_2 * \textit{DIV\%} + \alpha_3 * \textit{DIV\%} * \textit{POST} + \alpha_4 * \textit{S\&P\textit{RATING}} + \alpha_5 * \textit{AGE} + \alpha_6 * \textit{SP500} + \alpha_7 * \textit{LIQUIDITY} + \alpha_8 * \textit{BETA} + \alpha_9 * \textit{IRISK} + \alpha_{10} * \textit{MKT\textit{ADJRET}} + \alpha_{11} * \textit{SALESGR} + \alpha_{12} * \textit{R\&DINT}$$

Equation (2): $NONEXEC = \delta_0 + \delta_1*POST + \delta_2*DIV\% + \delta_3*DIV\%*POST + \delta_4*S\&P\&RATING + \delta_5*AGE + \delta_6*SP500 + \delta_7*LIQUIDITY + \delta_8*BETA + \delta_9*IRISK + \delta_{10}*MKTADJRET + \delta_{11}*SALESGR + \delta_{12}*R\&DINT$

Equation (3): $MF = \gamma_0 + \gamma_1*POST + \gamma_2*DIV\% + \gamma_3*DIV\%*POST + \gamma_4*S\&P\&RATING + \gamma_5*AGE + \gamma_6*SP500 + \gamma_7*LIQUIDITY + \gamma_8*BETA + \gamma_9*IRISK + \gamma_{10}*MKTADJRET + \gamma_{11}*SALESGR + \gamma_{12}*R\&DINT$

Equation (4): $DIV\% = \beta_0 + \beta_1*POST + \beta_2*INSIDER + \beta_3*INSIDER*POST + \beta_4*NONEXEC + \beta_5*NONEXEC*POST + \beta_6*MF + \beta_7*MF*POST + \beta_8*RE + \beta_9*PERM + \beta_{10}*TRANS + \beta_{11}*FCF + \beta_{12}*DYIELD + \beta_{13}*LEVERAGE + \beta_{14}*SIZE + \text{Industry Dummies}$

To capture investor responses, the first three equations regress the percentage of the firm held by three individual investor groups on the percentage of the firm's payouts that are dividends (*DIV%*). There is one equation for each investor group: insiders (*INSIDER* in equation 1), other individuals (*NONEXEC* in equation 2), and mutual funds (*MF* in equation 3). The coefficients on the key variables of interest are α_3 , δ_3 , and γ_3 , respectively. The fourth and final equation in the system flips the direction of the association and regresses the percentage of the firm's payouts that are dividends on each of the three-investor groups. The fourth equation has three key variables of interest, one for each investor group in the period post-enactment: insiders (β_3), other individuals (β_5), and mutual funds (β_7).

Dividends-to-Payout Ratio Variable

The percentage of the firm's payouts that are dividends (*DIV%*) is an explanatory variable in the first three equations and the dependent variable in the final equation. *DIV%* is a ratio where the numerator is the sum of dividends over an eight-quarter period. The denominator is the sum of dividends and share repurchases over the same eight quarters. There are two eight-quarter periods for each firm. The first eight quarters are the eight quarters immediately before

the fiscal quarter in which JGTRRA was enacted.¹⁰ The second eight quarters are the eight quarters immediately following the fiscal quarter in which the JGTRRA was enacted.¹¹ Consequently, each firm has two *DIV%* measures—one before enactment and one after enactment.

We aggregate distributions over a two-year period because, unlike regular, quarterly dividends, share repurchases are irregular. Therefore, focusing on the dividend-repurchase mix in a single quarter could introduce excessive noise. That said, in sensitivity tests later in the paper, we relax this aggregation requirement and report results on a quarterly basis. Inferences are largely unaltered.

We can measure repurchases in two ways. One option is total share repurchases. Another option is net repurchases, i.e., total share repurchases less stock issuances.¹² We use net repurchases because we are interested in the cash that the firm could have distributed as dividends. Fama and French (2001) note that dividends cannot substitute for repurchases in many situations. Firms need shares for executive compensation, stock option exercises, stock acquisitions, and funding employee stock ownership plans, among other things. Thus, consistent with Fama and French (2001), we measure net repurchases as the change in treasury stock.¹³ If there is a net decrease in treasury stock, then we truncate our measure of repurchases at zero.

¹⁰ We exclude the enactment quarter (May 2003) because it is unclear which tax regime managers were contemplating when they issued dividends and repurchased shares during that quarter. We treat the first quarter of 2003 as a pre-enactment quarter, even though the legislation was retroactive to the beginning of the year. The reason is that passage of the legislation was uncertain until Vice-President Cheney's tiebreaking vote in the U.S. Senate in May. Sensitivity tests, detailed below, provide assurance that this classification is appropriate. In addition, inferences hold if we exclude any 2003 quarters from the pre-enactment period.

¹¹ Blouin and Krull (2009) show that share repurchases rose in 2005 as firms enjoyed a tax holiday for repatriating earnings from foreign subsidiaries. When we replicate our analysis excluding the 2005 quarters, inferences hold.

¹² For further detail, see the discussion in footnotes 5 and 6 of Boudoukh, Michaely, Richardson and Roberts (2007) and footnote 9 of Skinner (2007).

¹³ Using treasury stock to measure repurchases is not without limitations. As Fama and French (2001) point out, using annual changes in treasury stock will fail to match a repurchase in one year and its reissuance in another year. This problem is mitigated in our research design because we combine two years of activity into one observation. However, even aggregation over two years cannot fully eliminate the potential mismeasurement.

For those firms that do not use the treasury stock method, we measure net repurchases as total repurchases from the statement of cash flows less decreases in preferred stock.

For post-enactment observations in the first three regressions, we interact *DIV%* with *POST*, a categorical variable that equals one for observations after the May 23, 2003 enactment (i.e., quarters after the second quarter of 2003). In these three tax clientele tests, positive coefficients on *DIV%*POST* (the coefficients are α_3 , δ_3 , and γ_3 in the system of equations) will be interpreted as evidence that, after passage of the JGTRRA, individuals rebalanced their portfolios by shifting toward stocks where dividends constituted a larger portion of total payouts. We also include *POST* as a separate variable in each regression equation to capture any other temporal change.

Investor Group Variables

We employ three variables to capture the portion of the firm owned by individual investors. The first individual ownership measure, *INSIDER*, is the percentage of shares held by directors and officers as reported in Thomson Financial's Insider Filing Data.¹⁴ Note that these shareholders play dual roles—as the managers setting distribution policy and as individual shareholders, often with large stockholdings and suffering from inadequate diversification.¹⁵

The second measure of individual ownership is *NONEXEC*, which is intended to measure all individual holdings, other than those by insiders or through mutual funds. Ideally, we would

¹⁴ The reporting of holdings of insiders is mandated by Section 16 of the Securities Exchange Act of 1934, which applies to every person who is the beneficial owner of more than 10% of any class of equity security registered under Section 12 of the Exchange Act and each director and officer (collectively, "reporting persons" or "insiders") of the issuer of the security. On a different note, conclusions do not change if we limit *INSIDER* to direct holdings, excluding shares held by family members, trusts and corporations controlled by the insider, and similar related parties.

¹⁵ Brown, et al. (2007) report that insiders were particularly influential among dividend initiators in 2003. They present evidence consistent with dividends crowding out repurchases in firms with large insider holdings. However, they find no such substitution or insider influence among companies that were paying dividends before JGTRRA, which is the group of firms that is the focus of this paper's analysis.

measure the number of shares for which dividends and capital gains are expected to flow through to individual tax returns, i.e., those shares held by individuals or flow-through entities (e.g., mutual funds, partnerships, trusts, S corporations, or limited liability corporations) whose income is reported on U.S. individual tax returns. This ideal measure would exclude all other holdings, i.e., those shares for which the dividends and capital gains do not flow through to individual tax returns, such as tax-exempt organizations, corporations, foreigners, and tax-deferred accounts (e.g., qualified retirement plans, including pensions, 401(k), and IRAs). Unfortunately, the ideal measure does not exist. Thus, as Ayers et al. (2002), Ayers et al. (2003), Blouin et al. (2003), Dhaliwal et al. (2003), and many others do, we use 13-F filings to estimate the percentage of the firm held by individual shareholders. *NONEXEC* is one less (a) the percentage of shares that institutional investors own, as reported in 13-F filings and collected by Thomson Financial's Institutional Holdings database, (b) the percentage of shares held by non-officer/director beneficial owners as reported in Thomson Financial's Insider Filing data, and (c) *INSIDER*.

The third measure of individual ownership, *MF*, is the percentage of the firm owned by mutual funds, as reported in 13-F filings and collected by Thomson Financial's Institutional Holdings database. As mentioned above, this is an imperfect measure of individual ownership because mutual funds include both investments that are subject to personal taxes and investments that are not subject to personal taxes. Sometimes the dividends and capital gains realized by mutual funds are taxed at the individual level. At other times, distributions to mutual funds are exempt because the shares are held in deferred tax accounts, such as 401(k) or IRAs. We include *MF* in the study as an attempt to capture all shareholder income that is taxed on personal tax returns. However, we recognize that the unobservable measurement error in *MF* (arising from the inclusion of non-individual owners) may undermine its usefulness in the study.

Each of the three individual ownership measures serves as the dependent variable in one of the first three regressions. All three are explanatory variables in the fourth regression, which tests for firm responses. Positive coefficients on these variables will be consistent with firms' altering their payouts in response to changes in individual tax incentives. Specifically, a positive coefficient on *INSIDER*POST* (β_3) in the fourth regression will be interpreted as evidence that, after passage of the JGTRRA, the percentage of payouts distributed as dividends was increasing in insider ownership. It seems likely, that when directors and officers hold large shares of a firm, payouts are likely to be particularly responsive to individual tax incentives. A positive coefficient on *NONEXEC*POST* (β_5) in the fourth regression will be interpreted as evidence that, after passage, *DIV%* was increasing in the percentage of the firm held by non-executive shareholders. A positive coefficient on *MF*POST* (β_7) in the fourth regression will be interpreted as evidence that, after passage, *DIV%* was increasing in the percentage of the firm held by mutual funds. The measurement error in *MF* (arising from the fact that non-individuals invest in mutual funds) should bias the coefficient on *MF*POST* toward zero.

Control variables

Theory is not sufficiently rich to provide much guidance concerning the control variables in a system of equations where the dependent variables are investor composition and the mix of dividends and repurchases. To our knowledge, no paper models the non-tax variables that should vary with the dependent variables in this study. Thus, we control for a host of factors that have been found to be associated with the investor mix and the distribution mix.

For the three regression equations testing for clientele effects, we rely on Bushee (2001), who shows that the level of institutional ownership is associated with firm value, and Del

Guercio (1996), who documents that institutional holders tend to hold investments that are more prudent. Hence, we include a number of control variables in the investor holdings regressions to capture firm value and the relative quality of the investment. Specifically, we include *SALESGR* as a proxy for firm growth. It is defined as the average sales growth over the three previous years. We include two proxies for firm risk: beta (*BETA*), which is included to control for systematic risk and the standard deviation of the prior year's daily market model residuals (*IRISK*) to control for idiosyncratic risk. Market-adjusted returns over the prior year (*MKTADJRET*) is intended to control for firm performance, which has been found to be positively associated with institutional holdings. The S&P common stock rating (*S&PRATING*) and the number of years that the firm is covered by CRSP (*AGE*) are included to capture the relative quality of the underlying investment. The prior year's log of average monthly volume divided by shares outstanding (*LIQUIDITY*) is included as a control for liquidity because institutional holders prefer more liquid securities. We also include whether or not a firm is listed on the S&P 500 (*SP500*) as a control because many index funds are required to hold these firms. Finally, we include R&D intensity (*R&DINT*), measured as research and development expenses divided by sales because Hessel and Norman (1992) report that some institutions are fixated on the R&D activity of the firm.

Concerning the fourth regression, where the dependent variable is *DIV%*, we take the approach of including various measures that are known to affect either dividends or repurchases, though sensitivity tests show that results are largely robust to the set of control variables. First, we include lagged retained earnings scaled by lagged total assets (*RE*) in the model. A firm must have earnings and profits (as defined in the tax law) for its distributions to be taxed as dividends. Unfortunately, earnings and profits are unobservable, found only in confidential corporate tax

returns. Thus, we use retained earnings as a proxy for earnings and profits. If firms with low or no retained earnings have fewer distributions that qualify as dividends, then *DIV%* should increase in *RE*. Consistent with this expectation and liquidity constraints, DeAngelo et al. (2005) report that firms with low or no retained earnings pay fewer dividends. Next, we include earnings in the model. Jagannathan et al. (2000) and Guay and Harford (2000) report that dividends are paid from permanent earnings whereas repurchases are paid from transitory earnings. Dittmar and Dittmar (2004) contend that both are paid from permanent earnings, but agree that repurchases come from transitory earnings. Thus, we dichotomize earnings into a permanent part (*PERM*) and a transitory part (*TRANS*). We measure *PERM* with operating income and *TRANS* as the difference between net income and operating income.¹⁶ We scale both components by lagged assets. Based on the conflicts in the prior work, we make no prediction about the sign of *PERM*. However, we expect *DIV%* should decrease in *TRANS*. We also include a measure of the firm's payout capacity, free cash flow scaled by lagged assets (*FCF*). Dividends may be a mechanism to reduce agency problems in firms with free cash flow (Jensen and Meckling, 1976). Thus, we anticipate that *DIV%* is increasing in *FCF*. We include the lagged ratio of dividends to the market value of equity (*DYIELD*), expecting *DIV%* to be increasing in the *DYIELD*. We add lagged long-term debt, scaled by lagged assets, (*LEVERAGE*) to control for cross-firm variation in capital structure. Finally, we include the natural logarithm of total assets (*SIZE*) to control for any size effects. We have no expectations about the sign of the *LEVERAGE* and *SIZE* coefficients.

¹⁶ Differences between permanent and transitory earnings include special items, other income and discontinued operations.

IV. EMPIRICAL TESTS

Sample Selection

We begin our tests for investor and manager responses following JGTRRA by drawing an initial sample from the 14,122 firms in the Compustat database between the second quarter of 2001 and the quarter preceding the one that includes May 2003. We then exclude (a) firms whose shares were not common or publicly traded, (b) firms that changed their fiscal year-end during our sample period, (c) financial institutions and insurance companies since regulatory constraints may inhibit management from altering the firm's payout policy, (d) firms with missing Compustat information, and (e) firms not in existence at any time from July 1, 2001, to June 30, 2005.

From the remaining 1,923 firms, we draw two balanced panels. Each firm must have one observation for the eight quarters preceding JGTRRA and one observation for the eight quarters following JGTRRA. Because $DIV\%$ is undefined if there is neither a dividend nor a repurchase, each firm must have at least one dividend or one repurchase, both before and after JGTRRA. The first sample (Dividend Payers Sample) is the 421 firms in the study that paid dividends sometime during the eight quarters immediately preceding JGTRRA and had either a dividend or repurchase (or both) during the eight quarters immediately following JGTRRA. The second sample (Dividend Payers and Repurchasers) is the 294 firms that both paid dividends and repurchased shares sometime during the eight quarters immediately preceding JGTRRA and had either a dividend or a repurchase (or both) during the eight quarters immediately following JGTRRA.

Our definition of $DIV\%$ forces us to exclude firms that distribute no profits to shareholders. We further chose to limit our tests to firms that paid dividends at least once during

the eight quarters preceding JGTRRA. The reason for these limitations is two-fold. First, firms that were paying dividends before passage paid 97% of the dividends issued in the four quarters following enactment. However, much of the JGTRRA research (e.g., Chetty and Saez, 2005 and Brown, et al., 2007) has focused on the relatively narrow impact of JGTRRA on dividend initiation in 2003 alone.¹⁷ Thus, this paper chooses to focus on the under-studied, but more economically significant, portion of the economy, the dividend-paying firms. Second, dividend initiation, and to a lesser extent, a firm's first share repurchase, convey more and different information to the markets than simply altering the amount of an ongoing stream of dividends or repurchases. Thus, firms that have a history of shareholder distributions likely can modify the dividend-repurchase mix at a lower cost than firms that have never paid dividends or repurchased shares. In fact, it is possible that some managers that had never paid dividends before JGTRRA considered initiating payouts in response to the changed tax incentives associated with JGTRRA but decided that the costs of initiation exceeded the benefits of attracting individual investors who were now seeking more dividend income. By limiting our analysis to dividend-paying firms, we ensure that the potential costs of dividend initiation do not affect our estimates of managerial responsiveness to the changed individual tax incentives under JGTRRA. This both increases the power of our tests and removes an additional factor that we would need to control for, if we included non-dividend-paying firms. One downside to limiting the sample to firms that were already paying dividends is that, if these firms were at their dividend capacity when JGTRRA was enacted, then they may have been unable to increase their dividend payouts, even if they had wished to respond to the changed tax incentives for individual investors.

¹⁷ This is not to imply that initiations arising from the JGTRRA were unimportant. Initiators began issuing dividends that they might not have paid and likely will continue to issue dividends in the future because dividend payments are sticky and the market takes a dim view of dividend cuts.

Another distinguishing factor about our analysis of JGTRRA is that we examine investor and firm responses through 2005. Desai and Dharmapala (2010) study portfolio rebalancing in 2003 only. Brown et al. (2007) and Aboody and Kasznick (2008) study changes in the dividend-repurchase mix for only two quarters after passage of the legislation. As Shevlin (2008) notes, examining such a short period requires quick response by firms and raises concerns about whether these studies miss important responses in 2004 and 2005. It seems unlikely that during the seven months following enactment investors completely unwound their positions and firms had fully adjusted their notoriously sticky dividends and repurchase policy in response to the tax rate reductions. By investigating a longer window, we permit a more deliberate response and can calibrate how long it took for the largest dividend tax rate reduction in history to fully permeate the economy.

Although we exclude non-dividend-paying firms from the primary tests in this paper, in the process of selecting the sample firms, we detect some initial evidence consistent with firms shifting from repurchases to dividends. Among the 1,923 firms from which we draw our samples, we find that 145 companies initiated dividends after JGTRRA, while only 30 firms omitted dividends (a net increase of 115 dividend issuers). Meanwhile, 222 firms began repurchasing after enactment while 370 companies stopped repurchasing (a net reduction of 148 repurchasers). We also find that 26 firms both initiated dividends and ceased repurchasing after passage of the JGTRRA, while only three firms omitted dividends and began repurchasing. Furthermore, among 702 firms that repurchased both before and after JGTRRA, 90 initiated dividends while only ten firms omitted dividends, a net increase in dividend issuers of 80 firms. On the other hand, among the 408 firms that paid dividends both before and after JGTRRA, 46 began repurchasing after passage, but 58 stopped buying back shares, a net decrease in

repurchasers of 12 firms. All of these comparisons are consistent with firms' shifting from repurchases to dividends following enactment of the JGTRRA.

Descriptive statistics

Table 1 provides means and medians for the regression variables, both before and after enactment of JGTRRA, for both samples and reports whether the pre- and post-enactment means and medians are significantly different.¹⁸ The samples provide some evidence that dividends increased following JGTRRA (median total dividends and mean dividends per assets increased in both samples). However, there is less evidence that *DIV%* (i.e., dividends as a percentage of total shareholder distributions) increased after passage (only the difference in medians for the Dividend Payers and Repurchasers sample is significant). Recall, however, that we do not hypothesize about the overall impact of JGTRRA on dividends, repurchases or *DIV%*. Rather, we are predicting a more positive association between *DIV%* and individual stock ownership, following passage of JGTRRA.

Both samples show decreases in non-executive individual holdings (*NONEXEC*) and increases in mutual funds holdings (*MF*).¹⁹ Among control variables, free cash flow (*FCF*), volume (*LIQUIDITY*), idiosyncratic risk (*IRISK*), and returns (*MKTADJRET*) fell after enactment for both samples. Stock ratings (*S&PRATING*), beta (*BETA*), and sales growth (*SALESGR*) increased after passage for both samples.

¹⁸ Means are tested using a *t*-test of the means. The *p*-values for the medians are the larger *p*-value using the Wilcoxon and Kruskal-Willis tests.

¹⁹ According to the Investment Company Institute (see www.ICI.org), from 2001 to 2005 mutual fund ownership of all publicly traded equity securities increased from 21% to 25%. In addition, over our sample period, individuals increased the proportion of their financial assets held by mutual funds from 40% in 2001 to 47% in 2005.

Preliminary Regression Results

Table 4 presents the primary findings in the study, summary statistics from GMM estimates of the system of four equations. To provide some perspective for those results, Tables 2 and 3 show separate OLS regression results for each of the four equations. Table 2 shows selected coefficient estimates from the first three equations where investor ownership percentages are the dependent variables and $DIV\%*POST$ is the variable of interest. Table 3 presents results for the fourth equation where $DIV\%$ is the dependent variable and the ownership percentages of the three-investor groups are explanatory variables.

Starting with Table 2, we expect a positive coefficient on $DIV\%*POST$, which will be interpreted as evidence that, following enactment, individual ownership increased for those firms that distributed larger portions of their profits as dividends. Using OLS, we find a positive coefficient on $DIV\%*POST$ (α_3) when $INSIDER$ is the dependent variable. However, the coefficient is not significantly greater than zero at the 5% level (using a one-tailed test, the coefficient is significant at the 10% level for the Dividend Payers sample). Contrary to expectations, three of the four coefficients on $DIV\%*POST$ are negative when the dependent variable is $NONEXEC$ (δ_3) or MF (γ_3), although none is significantly different from zero. In short, the OLS results in Table 2 provide no evidence that investors rebalanced their portfolios following enactment, shifting toward stocks that distributed a larger portion of their payout as dividends.

Among the control variables, two are significant in every regression. $LIQUIDITY$ is negative when $INSIDER$ or $NONEXEC$ is the dependent variable and positive when MF is the dependent variable. The signs flip for $IRISK$, i.e., its coefficient is always positive when $INSIDER$ or $NONEXEC$ is the dependent variable and always negative when MF is the

dependent variable. These results are consistent with differences in the non-tax factors that matter to insiders and non-executive individuals investing on their own account as compared to those that matter to mutual fund investors (see Bushee 2001).

Table 3 presents OLS summary statistics from regressing the ratio of dividends to total payouts (*DIV%*) on the measures of individual ownership and control variables. We predict that the coefficients on *INSIDER*POST* (β_3), *NONEXEC*POST* (β_5), and *MF*POST* (β_7) will be positive, consistent with firms altering their distribution policy to retain and attract individual investors, given the tax changes in JGTRRA.

We find the *INSIDER*POST* coefficients are positive and significantly greater than zero at the 5% level. We interpret these findings as evidence that firms with large holdings by directors and officers distributed a larger portion of their profits as dividends, after enactment, than they did before enactment. This is consistent with the individuals who set the dividend/repurchase policy (i.e., the directors and officers), modifying the distribution policy after enactment in a manner that is consistent with their own (and other individual) shareholders' interests. The *NONEXEC*POST* and *MF*POST* coefficients also are positive, but not significantly greater than zero at conventional levels.²⁰ These initial results are consistent with managers responding to the altered tax incentives of directors and officers, but not other individual investors.

Among control variables, the coefficients on *RE* (retained earnings) are always significantly greater than zero. The coefficients on *PERM* (operating income), *FCF* (free cash flow), and *SIZE* (total assets) are always significantly less than zero.

²⁰ The *NONEXEC*POST* coefficient is significant at the 10% level using a one-tailed test in the in the Dividend Payers and Repurchasers sample.

Primary Regression Results

We now estimate all four-regression equations simultaneously. We find that coefficients estimates are larger and more significant using simultaneous estimation procedures, consistent with joint evaluation of investor and firm responses leading to superior estimates than were detected using separate estimations. We infer from the stronger results that investor and managers responded concurrently to the tax changes in JGTRRA.

Table 4 shows the results from estimating all four equations simultaneously using GMM. For brevity, we report only the coefficients for the key variables. Looking first at insider responses, we find that, when *INSIDER* is the dependent variable, the coefficient on *DIV%*POST* (α_3) is significantly greater than zero for the Dividend Payers sample at the 5% level. (It is significant at the 10% level using the Dividend Payers and Repurchasers sample.) This finding is consistent with directors and officers boosting their holdings in their own firms, after enactment, if their firms were distributing relatively large portions of their profits as dividends (i.e., it is consistent with a tax clientele effect).²¹ The *DIV%*POST* coefficient of 0.11 implies that an increase of one standard deviation in *DIV%*POST* or 0.28, would boost insider holdings by three percentage points. This is a substantial increase in holdings by directors and officers because they held only 10% of the firm, on average, before JGTRRA. In contrast, as in Table 2, we continue to find no evidence that non-executive individuals (δ_3) or mutual fund investors (γ_3) rebalanced their holdings by shifting toward firms distributing a higher portion of their profits as dividends, as compared with repurchases. Thus, we conclude that directors and

²¹ Since the percentage of stock held by insiders was declining during the investigation period (see Table 1), insiders in high-dividend-paying firms may not have been buying far more shares in their own companies. Instead, perhaps these insiders simply sold few shares in their own companies during this period while insiders in lower dividend-paying firms were unloading large holdings.

officers were the only investor group changing their holdings in response to firm distribution policy.

Looking at manager responses, we find strong evidence that firms held disproportionately by insiders, non-executive individuals, and mutual funds began to distribute a higher percentage of profits through dividends following enactment. When the dependent variable is *DIV%*, the coefficients on *INSIDER*POST* (β_3), *NONEXEC*POST* (β_5) and *MF*POST* (β_7) are all positive and significant at conventional levels for both samples. These results are consistent with managers modifying their payout policy in response to their individual owners' increased preference for dividends compared with repurchases, following passage of JGTRRA. In other words, as dividends became less tax-disadvantaged, firms appear to have provided more dividends as a percentage of their total payout. Brown, et al (2007) reports similar findings but only for insiders with large holdings in firms that initiated dividend in 2003.²² Our findings show that firm responses extended to a broader set of firms (non-initiating dividend payers) and individual investors.

Analyzing the economic significance of each coefficient using a one-standard deviation increase, we find that the *INSIDER*POST* coefficient of 0.32 (0.42) with the Dividend Payers (Dividend Payers & Repurchasers) sample implies a four (six) percentage point increase in *DIV%*, i.e., the percentage of payout, distributed as dividends. With a pre-JGTRRA mean *DIV%* of 78% (68%), this suggests that for every standard deviation increase in insider holdings, the ratio of dividend issuance to total distributions rose 5% (9%). Likewise, the *NONEXEC*POST* coefficient suggests a four percentage point increase in *DIV%* for both samples. Finally, the *MF*POST* coefficient of 0.28 (0.33) implies a four (five) percentage point increase in *DIV%* for

²² Brown, et al (2007) treats all 2003 dividend initiations as responses to JGTRRA, even though the legislation was highly controversial and passed by a single vote in the U.S. Senate in May.

the Dividend Payers (Dividend Payers & Repurchasers) sample. In short, all six coefficients across the two samples imply an economically significant change in distribution policy in response to altered investor preferences following JGTRRA.

We find that the GMM estimates are substantially stronger than the OLS ones. This is consistent with our expectation that investor and manager responses are simultaneously determined. Evaluating only investors or only managers potentially explains some of the weak and conflicting results from prior JGTRRA studies (see reviews by Dharmapala, 2009, and Shackelford, 2009). In this analysis, if we were to stop with the OLS results, we would erroneously conclude that no investors rebalanced their portfolios and that the firm responses were limited to those companies with heavy insider ownership. We also would substantially understate the economic significance of legislation as estimated by using the regression coefficients.

Comparisons with Non-Event Periods

This section repeats the analyses detailed above using non-event periods. If the 2003 findings are related to JGTRRA, then we expect the coefficients from the non-event years to be different from the 2003 coefficients. We repeat the tests as if the actual May, 2003 rate reductions had occurred in May, 1994, and include the eight pseudo “pre-enactment” quarters prior to the quarter that includes May, 1994 and the eight pseudo “post-enactment” quarters that follow the quarter that includes May, 1994. We then repeat this seven more times, using May of each year as the pseudo event.²³

²³ We stop with 2001 because any test of 2002 would result in the inclusion of some of the period following enactment of the JGTRRA, invalidating its use as a non-event, comparison period.

Table 5 reports the GMM summary statistics for the key coefficients for each year for the Dividend Payers sample.²⁴ For example, estimating Equation (1) for 1994, where *INSIDER* is the dependent variable, the *DIV%*POST* coefficient is -0.04. With Equation (2), when *NONEXEC* is the dependent variable, the *DIV%*POST* coefficient is 0.23. With Equation (3), when *MF* is the dependent variable, the *DIV%*POST* coefficient is 0.01. With Equation (4), for the single firm response equation where the dependent variable is *DIV%*, the *INSIDER*POST* coefficient is 0.15; the *NONEXEC*POST* coefficient is 0.03; and the *MF*POST* coefficient is 0.02. Unlike the 2003 results where four of the six coefficients are significantly greater than zero, none of these six coefficients is significantly different from zero. However, at the same time, none of the 1994 coefficients is significantly different from its 2003 counterpart, suggesting that there may be nothing unique about 2003. Results for the remaining years are tabulated, and summary statistics for the coefficients from the non-event years are presented at the bottom of Table 5.

The findings confirm the inferences drawn from the primary tests in Table 4. The 2003 coefficient on *DIV%*POST*, when *INSIDER* is the dependent variable, exceeds its counterpart in every year, except 2001. Using a *t*-test (sign test), we can reject at the 0.02 (0.07) level that the 2003 coefficient would be randomly selected from a distribution formed by the eight coefficients from 1994 through 2001. Finding that the 2003 association was different provides further confirmation that insider holdings, following JGTRRA, were increasing in the dividend percentage of total payout. As further confirmation of the Table 4 results, we continue to find no indication of tax clientele movements by other individuals or mutual funds.

Turning to the manager responses to JGTRRA, we find that the 2003 *INSIDER*POST* coefficient always exceeds its counterparts in every year from 1994 to 2001 and significantly so

²⁴ Inferences are qualitatively unaltered if the Dividend Payers and Repurchasers sample is used.

from 1997 to 2000. The 2003 *NONEXEC*POST* coefficient is greater than its counterparts in every year, except 1996, and statistically significantly larger in two of the eight years. The 2003 *MF*POST* coefficient always exceeds its non-event counterparts, though not significantly. However, for all three 2003 coefficients, we can reject at the 1% level, using a *t*-test, that the 2003 coefficient would be randomly drawn from a distribution of the estimated coefficients from the non-event years. We can similarly reject at the 1% (7%) level, using the sign test, for the *INSIDER*POST* and *MF*POST* (*NONEXEC*POST*) coefficients. Together, these results support our earlier conclusions that managers of firms with disproportionately large individual investor holdings modified their distribution policy more than other firms did. These sensitivity tests provide comfort about our earlier inferences, providing evidence that the associations in 2003 between distribution policy and individual ownership measures differ from the relations between those variables in the prior decade.

There is a caveat for this robustness check. The capital gains tax rate fell from 28% to 20% in 1997 without any change in the dividend tax rate. Using the same logic developed in this study, we would have predicted a shift from dividends to repurchases following that rate reduction, albeit of a lesser extent because the rate change was more modest. If that change in the distribution mix did occur, then this sensitivity test using non-event periods would bias in favor of our finding that the 2003 coefficients were more positive than those in previous years. The reason is that the tax incentives facing individual investors after the rate reductions in 1997 would have called for the mix of distributions to shift toward repurchases and away from dividends. In other words, 1997 was not really a non-event year.

Therefore, if firms responded accordingly, we would expect the coefficients on the individual tax measures for 1997 and perhaps 1998 to be negative. Consistent with firms

modifying their payout policy if individuals held disproportionately large interests, we notice that the coefficients on *INSIDER*POST*, *NONEXEC*POST*, and *MF*POST* coefficients (when *DIV%* is the dependent variable) turn negative for the first time in 1997. Thus, firm responses to changing tax incentives following the 1997 Act may have been biased in favor of our rejecting the null hypothesis that the distribution mix did not change after 2003. However, when we exclude the 1997 coefficients in our comparison of the 2003 coefficients to those in the other non-event periods, we still find that the 2003 coefficient estimate remains significantly different from those in the other years. Furthermore, if managers did indeed respond to the 1997 tax cuts by increasing the repurchase portion of their distributions, then these results provide further evidence that managers consider the personal taxes of their shareholders in issuing dividends and repurchasing shares.

How Quickly Did Investors and Managers Respond to JGTRRA?

All of the tests so far in this paper aggregate dividends and repurchases over the eight quarters before enactment and the eight quarters after enactment, creating two observations (before and after JGTRRA) for each firm. As discussed above, the reason for aggregation is that, unlike regular, quarterly dividends, repurchases are irregular events, which can lead to highly volatile quarterly measures of *DIV%*. In this section, we relax this restriction and treat each quarter as a different observation, resulting in 16 observations for each firm. The reason that we shift to quarterly measures here is to enable us to pinpoint the time when investors and managers responded to JGTRRA.

To get GMM quarterly coefficient estimates for the same key six variables examined throughout this study, we suppress the intercept and include a categorical variable for each

quarter from the earliest quarter (eight quarters before enactment—the quarter including May 2001) to the most recent quarter (eight quarters after enactment—the quarter including May 2005). We then interact the categorical variable for each of the 16 quarters with the six variables of interest.

Table 6 reports 16 quarters of GMM coefficient estimates for the six key variables for the Dividend Payers sample. We find little change across the quarters for the three tax clientele regressions. That is not surprising for estimates when *NONEXEC* or *MF* is the dependent variable because we find no evidence anywhere in this study that suggests that non-executive individuals or mutual fund investors rebalanced their portfolios in favor of stocks that pay a larger portion of their payouts through dividends. However, because we find some support for clientele effects among insiders, it is a bit surprising that we cannot detect any cross-quarter changes in coefficient estimates.

Conversely, for manager responses to JGTRRA, we find a sharp increase in the quarterly coefficient estimates during the second quarter following passage, which would be the quarter ending December 31, 2003, for most companies (i.e., those with March, June, September and December year-ends). In eight of the nine quarters before then, including the quarter immediately following the quarter of enactment (quarter +1), the *INSIDER* coefficient is negative. Beginning with quarter +2, the *INSIDER* coefficient is positive in every quarter, except one, and significantly greater than zero in four of the seven quarters. Likewise, the quarterly pattern for the *NONEXEC* coefficients shows a similar break in quarter +2. The *NONEXEC* coefficient is negative during all nine quarters before quarter +2. The coefficient turns positive in that quarter and remains positive in four of the remaining six quarters. Similarly, the *MF* coefficient is negative in six of the eight pre-enactment quarters and negative

only once thereafter. The *MF* coefficient is actually positive in quarter +1, but its coefficient triples from quarter +1 to quarter +2.

We conclude from the quarterly findings that companies with disproportionately large individual ownership began to substantially adjust their payout policy in response to JGTRRA during the last quarter of 2003 and the changes were sustained for the remainder of the investigation period. A delay of one quarter before firms responded to the tax incentives of individual investors is consistent with firms being unable or unwilling to respond to the new tax rates in the quarter immediately following passage. Perhaps they had already made their dividend and repurchase decisions for the third quarter of 2003 by May 2003. However, by the last quarter of 2003, it appears that firms held disproportionately by individuals were beginning to shift from repurchases to dividends, at the margin.

This delay of one quarter may partially explain Brown et al. (2007)'s inability to find non-dividend initiators substituting dividends for share repurchases in 2003 and Aboody and Kasznick's (2008) failure to link repurchases, stock options, and individual ownership. Both studies treat all dividends paid and shares repurchased in 2003 as post-enactment payouts.²⁵ If few firms were adjusting their distribution policy before the last quarter of 2003 and, in fact, firms were making distribution choices before then, as though prior tax law applied (as implied

²⁵ Our quarterly results, indicating no response to JGTRRA before the second half of 2003 and very little until the last quarter of 2003, raise concerns about the pre/post JGTRRA classifications in Brown et al. (2007), Chetty and Saez (2006, 2005), and Aboody and Kasznick (2008). Those studies treat all dividends paid and shares repurchased in 2003 as responses to JGTRRA, even those declared months before the May 23rd passage of the legislation, (e.g., Microsoft's initial dividend announcement on January 7, 2003). By using the day that the dividends were paid, they even include some dividends declared in 2002, well before President Bush ever mentioned possible dividend tax relief in January 2003. Brav et al. (2007) state that it is implausible that firms were so clairvoyant that they declared tax-motivated dividends months before passage. Among other factors, President Bush's initial comments were vague and preliminary, and weeks passed before details of his proposal emerged. Furthermore, passage of the highly controversial legislation was uncertain until Vice-President Richard Cheney cast a tie-breaking vote in the U.S. Senate to gain passage of the legislation.

by the negative coefficients), then it is understandable that their tests would have struggled to detect any movement from repurchases to dividends.

V. CLOSING REMARKS

This paper extends our understanding of the effects of shareholder taxes on firm payout policy by estimating a system of equations to quantify the investor and managerial responses to the unprecedented 2003 cuts in dividend and capital gains tax rates. We hypothesize that, in response to the legislation, individual investors (the only ones affected by the rate reductions) rebalanced their portfolios to increase their dividend income while firms boosted the portion of their profits that they returned as dividends. Comparing firm-level individual ownership and dividend-repurchase mix, before and after 2003, we find evidence consistent with directors and officers rebalancing their portfolios, but not other individual investors. We also find evidence consistent with those firms with large individual ownership boosted the dividend portion of their total payouts. The payouts adjustments began a few months following enactment of the tax cuts. The regression coefficient estimates imply that both the portfolio rebalancing and distribution policy changes following JGTRRA were economically significant.

To our knowledge, this is the first study to evaluate investor and managerial responses to JGTRRA using simultaneous equations. We find that the results are much stronger than they would have been if we had used standard OLS estimates of separate regressions, consistent with investors and managers acting concurrently. Both statistical and economic significance increased substantially using GMM. Furthermore, this is the most comprehensive analysis of the JGTRRA to date. Other studies focus on either investor responses or managerial responses; we study both. We analyze the set of firms that pay almost all dividends (i.e., non-dividend

initiators, three different groups of individual investors (insiders, non-executive individuals, and mutual funds), and the 16 quarters centered on passage of the legislation. The methodological and sample enhancements enable us to construct a more powerful test of the association between shareholder taxes and corporate distribution policy.

Finally, the results in this paper suggest that additional research is needed to understand the role of insiders in the interaction of shareholder taxes and distribution policies. We find that insiders are the only individuals who rebalanced their portfolio in response to the rate changes. We also find that firms were particularly responsive to the changed tax incentives if directors and officers held large positions. These results join Brown, et al.'s (2007) finding that insiders played key roles in initiating dividends at the expense of share repurchases in 2003 to suggest that corporate governance needs to be introduced into analyses of the shareholder tax-payout choice. Questions that future research could explore include the following: To what extent are insiders motivated by their own personal tax considerations when setting distribution policy? How do the tax incentives of insiders affect the returns to other investors? From a distribution policy perspective, did other individual investors benefit from holding stocks in companies with high insider interests while non-individual shareholdings suffered? To what extent does compensation of executives with stock affect a firm's distribution policy? To what extent do changes in shareholder taxes affect a firm's value differently depending on the extent of its insider holdings? We look forward to answers to these and similar questions in future studies.

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TABLE 1
Descriptive Statistics
Means and Medians for Regression Variables

This table reports descriptive statistics for the 421 (294) firms that paid dividends (both dividends and repurchases) in the period surrounding the JGTRRA. Total Dividends is dividends as reported by Compustat (data16xdata61). If the firm uses the treasury stock method, Total Repurchases is the change in treasury stock (data98). If there is a net decrease in treasury stock, Total Repurchases is set to zero (i.e., if there are net stock issuances). If the firm does not use the treasury stock method, then Total Repurchases is the repurchase amount from the statement of cash flows (data 93) less decreases in preferred stock (change in data55 and data71). Dividends per Assets is Total Dividends scaled by lagged assets (data44). Repurchases per Assets is Total Repurchases scaled by lagged assets (data44). DIV% is Total Dividends over the sum of Total Dividends and Total Repurchases. INSIDER is the percentage of shares held by insiders as measured by holdings of directors and officers as reported in Thomson Financial's Insider Filing Data. NONEXEC is one less the percentage of shares that are held by institutional investors as reported in 13-F filings and collected by Thomson Financial's Institutional Holdings database less INSIDER less non-officer/director beneficial owners as reported in Thomson Financial's Insider Filing data. MF is the percentage of the firm owned by mutual funds as reported in 13-F filings and collected by Thomson Financial's Institutional Holdings database. RE is lagged retained earnings scaled by lagged assets (data58/data44). PERM is operating income (data21 – data5 – data22) scaled by lagged assets (data44). TRANS is net income scaled by lagged assets (data69/data44) less PERM. FCF is defined as income before extraordinary items (data 8) plus interest expense (data 22) less the change in the applicable balance sheet accounts: (assets (data44), liabilities (data54), debt (data45, data51)) scaled by lagged assets (data44). DYIELD is the lagged ratio of dividends per share to price, expressed in percentages (data16/data14). LEVERAGE is lagged long-term debt (data51 + data 45) scaled by lagged assets (data44). SIZE is the natural log of assets (data44). S&PRATING is the S&P Common Stock Ranking (SPCSR 7 = A+ etc)÷100. AGE is the number of years the firm is reported on CRSP÷100 as of 2003. SP500 is 1 if the firm is in the S&P500 Index, 0 otherwise. LIQUIDITY is the log of average monthly volume over shares outstanding for the prior year. BETA is market beta estimated over the prior 12 months. IRISK is unsystematic risk, which is estimated as the standard deviation of daily market model residuals over the prior year multiplied by 100. MKTADJRET is the market adjusted returns over the prior year expressed as a%. SALESGR average sales growth over the prior two years (data2/data44). R&DINT is R&D intensity estimated as R&D expense over lagged assets (data4/data44). Missing R&D is set to zero.

	Dividends 421 firms (at least one dividend before enactment of the JGTRRA)				Dividend Payers and Repurchasers Sample 294 firms (at least one dividend and one repurchase before enactment of the JGTRRA)			
	MEANS		MEDIANS		MEANS		MEDIANS	
	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
Total Dividends	152	200	17	27*	193	252	19	30 *
Total Repurchases	140	251	2	3	200	327	13	9 *
Dividends per Assets	0.03	0.04 *	0.02	0.03	0.03	0.04 *	0.02	0.03
Repurchases per Assets	0.03	0.04	0.00	0.00	0.05	0.05	0.01	0.01 **
DIV%	0.78	0.78	0.89	0.89	0.68	0.72	0.75	0.81 **
INSIDER	0.10	0.09	0.04	0.04	0.11	0.09	0.05	0.04
NONEXEC	0.35	0.30 **	0.32	0.25 **	0.35	0.30 **	0.30	0.25 **
MF	0.27	0.29 *	0.26	0.29 **	0.26	0.29 *	0.26	0.29 *
RE	0.32	0.32	0.32	0.32	0.34	0.33	0.34	0.36
PERM	0.16	0.18 *	0.13	0.16 *	0.18	0.20	0.16	0.18
TRANS	-0.07	-0.07	-0.06	-0.06	-0.08	-0.08	-0.07	-0.07
FCF	0.06	0.02 **	0.08	0.03 **	0.07	0.03 **	0.08	0.04 **
DYIELD	0.53	0.44	0.40	0.36	0.55	0.43	0.38	0.37
LEVERAGE	0.22	0.20 *	0.22	0.18 *	0.21	0.18	0.20	0.17
SIZE	6.85	7.03	6.74	6.93	6.94	7.12	6.74	6.94
S&PRATING	12	13 **	16	16 **	11	13 **	16	16 *
AGE	25	25	22	22	25	25	22	22
SP500	0.23	0.24	0	0	0.25	0.26	0	0
LIQUIDITY	-0.50	-0.21 **	-0.36	-0.14 **	-0.48	-0.23 **	-0.30	-0.14**
BETA	0.63	0.92 **	0.60	0.92 **	0.65	0.91 **	0.61	0.90 **
IRISK	2.46	1.83 **	2.29	1.67 **	2.42	2.26 **	1.81	1.63 **
MKTADJRET	0.12	0.05 **	0.12	0.03 **	0.11	0.05 **	0.11	0.03 **
SALESGR	0.12	0.26 **	0.06	0.19 **	0.11	0.23 **	0.06	0.18 **
R&DINT	0.01	0.01	0	0	0.01	0.01	0	0

* (**) indicates significance at the 5% (1%) level, using a two-tailed test

TABLE 2

Estimated Coefficients from Ordinary Least Squares, where the Dependent Variables are the percentages of Ownerships by Insider, Non-Executive and Mutual Fund and the Observations Aggregate Eight Quarters Before and After Enactment of the JGTRRA

This table reports estimated regression statistics for the 421 (294) firms that paid dividends (both dividends and repurchases) in the period surrounding the JGTRRA. POST is a categorical variable that equals 1 if the dividend/repurchase was declared in the eight quarters after 5/23/03; zero, otherwise. All other variables are defined in Table 1.

		<i>Equation 1: INSIDER (Insider % Ownership)</i>		<i>Equation (2): NONEXEC (Non-Executive % Ownership)</i>		<i>Equation (3): MF (Mutual Fund % Ownership)</i>	
	<i>Pred</i>	<i>Dividend Payers</i>	<i>Dividend Payers & Repurchasers</i>	<i>Dividend Payers</i>	<i>Dividend Payers & Repurchasers</i>	<i>Dividend Payers</i>	<i>Dividend Payers & Repurchasers</i>
Intercept		-0.027	-0.040	0.273 **	0.300 **	0.414 **	0.422 **
POST		-0.013	-0.006	0.049	0.022	-0.020	-0.020
DIV%		-0.006	0.021	-0.008	-0.039	0.022	0.003
DIV% * POST	(+)	0.048	0.038	-0.004	0.003	-0.026	-0.011
S&PRATING		-0.029	-0.018	-0.144	-0.020	0.002 *	0.184 *
AGE		-0.084 **	-0.063	0.064	0.072	-0.037	-0.076 *
SP500		-0.001	-0.011	0.030	0.023	-0.093 **	-0.082 **
LIQUIDITY		-0.045 **	-0.044 **	-0.107 **	-0.108 **	0.094 **	0.089 **
BETA		-0.011	-0.003	-0.082 **	-0.068 **	0.030 **	0.028 **
IRISK		2.211 **	2.543 **	5.831 **	2.968 **	-3.785 **	-2.783 **
MKTADJRET		11.088 *	15.281 **	14.383	12.398	-7.804	-9.263
SALESGR		0.015	0.019	0.004	-0.019	-0.016	-0.004
R&DINT		0.133	0.191	-0.173	-0.423 *	-0.291 **	-0.255 *
n		842	588	842	588	842	588

* (**) indicate that the coefficients are significantly different from zero at the 5% (1%) level, using a one-tailed test where there are predictions; otherwise, using a two-tailed tests

TABLE 3

Estimated Coefficients from Ordinary Least Squares, where the Dependent Variable is the percentage of Shareholder Payouts that are Dividends and the Observations Aggregate Eight Quarters Before and After Enactment of the JGTRRA

This table reports estimated regression statistics for the 421 (294) firms that paid dividends (both dividends and repurchases) in the period surrounding the JGTRRA. POST is a categorical variable that equals 1 if the dividend/repurchase was declared in eight quarters after 5/23/03; zero, otherwise. All other variables are defined in Table 1.

<i>Equation (4): DIV%</i>			
	Pred	Dividend Payers (n=842)	Dividend Payers & Repurchasers (n=588)
Intercept		0.95 **	0.94 **
<i>POST</i>		-0.03	-0.03
<i>INSIDER</i>		-0.01	-0.02
<i>INSIDER*POST</i>	(+)	0.28 *	0.31 *
<i>NONEXEC</i>		0.02	-0.04
<i>NONEXEC*POST</i>	(+)	0.02	0.06
<i>MF</i>		0.03	-0.15
<i>MF*POST</i>	(+)	0.04	0.09
<i>RE</i>		0.11 **	0.10 **
<i>PERM</i>		-0.42 **	-0.28 **
<i>TRANS</i>		0.14	0.25
<i>FCF</i>		-0.16 **	-0.16 **
<i>DYIELD</i>		0.11	0.14
<i>LEVERAGE</i>		0.08	0.01
<i>SIZE</i>		-0.02 **	-0.02 *
Industry dummies?		Yes	yes

* (**) indicate that the coefficients are significantly different from zero at the 5% (1%) level, using a one-tailed test where there are predictions; otherwise, using a two-tailed test

TABLE 4
Estimated Coefficients (p-values) from Generalized Method of Moments where the Dependent Variables are the percentage of Shareholder Payouts that are Dividend and percentages of Ownerships by Insiders, Individuals, and Mutual Funds and the Observations Aggregate Eight Quarters Before and After Enactment of the JGTRRA

This table reports estimated regression statistics for the 421 (294) firms that paid dividends (both dividends and repurchases) in the period surrounding the JGTRRA. POST is a categorical variable that equals 1 if the dividend/repurchase was declared in the eight quarters after 5/23/03; zero, otherwise. Note that all control variables in Tables 2 and 3 are included in the estimation of the model but excluded from the table for brevity. All other variables are defined in Table 1.

Equation	Dependent Variable	Explanatory Variable	Pred	<i>Dividend Payers</i> (n=842)	<i>Dividend Payers & Repurchasers</i> (n=588)
1	<i>INSIDER</i>	<i>DIV%*POST</i>	(+)	0.11 *	0.10
2	<i>NONEXEC</i>	<i>DIV%*POST</i>	(+)	0.09	-0.04
3	<i>MF</i>	<i>DIV%*POST</i>	(+)	-0.02	0.01
4	<i>DIV%</i>	<i>INSIDER*POST</i>	(+)	0.32 **	0.42 **
4	<i>DIV%</i>	<i>NONEXEC*POST</i>	(+)	0.19 *	0.18 *
4	<i>DIV%</i>	<i>MF*POST</i>	(+)	0.28 *	0.33 *

* (**) indicate that the coefficients are significantly different from zero at the 5% (1%) level, using a one-tailed test.

TABLE 5

Estimated Coefficients (p-values) from Generalized Method of Moments where the Dependent Variables are the percentage of Shareholder Payouts that are Dividend and the percentages of Ownerships by Insiders, Individuals, and Mutual Funds; Comparison of Quarters Surrounding Various Non-event Periods and Quarters Surrounding the Enactment of the JGTRRA, sample are firms that issue at least one dividend during the two years preceding the assumed date of legislative passage

This table reports estimated regression statistics for the 421 firms that paid dividends in the period surrounding the JGTRRA from Table 4. POST is a categorical variable that equals 1 if the dividend/repurchase was declared in the eight quarters after 5/23/03; zero, otherwise. Note that all control variables in Tables 2 and 3 are included in the estimation of the model but excluded from the table for brevity. All other variables are defined in Table 1.

Equation	1	2	3	4	4	4
Dependent Variable	<i>INSIDER</i>	<i>NONEXEC</i>	<i>MF</i>	<i>DIV%</i>	<i>DIV%</i>	<i>DIV%</i>
Explanatory Variable	<i>DIV%*</i> <i>POST</i>	<i>DIV%*</i> <i>POST</i>	<i>DIV%*</i> <i>POST</i>	<i>INSIDER*</i> <i>POST</i>	<i>NONEXEC*</i> <i>POST</i>	<i>MF*</i> <i>POST</i>
2003 Estimated Regression Coefficients (from Table 4)	0.11 *	0.09	-0.02	0.32 **	0.19 *	0.28 *
<i>Assume Law Had Passed in May of:</i>						
1994	-0.04	0.23	0.01	0.15	0.03	0.02
1995	-0.02	0.12	-0.02	0.22 *	0.08	0.02
1996	0.01	0.21	0.01	0.16	0.20 *	0.24
1997	-0.02	0.04	0.02	-0.07	-0.02	-0.05
1998	0.09	-0.14	0.03	-0.18	-0.20 *	0.01
1999	-0.10	-0.12	0.04	-0.22	-0.15	0.13
2000	0.05	0.03	-0.02	-0.17	0.01	0.13
2001	0.15 *	-0.01	-0.08	0.14	0.01	-0.01
<i>Descriptive Stats for 1994—2001 Coefficients</i>						
Mean	0.02	0.05	0.00	0.00	-0.01	0.06
Median	-0.01	0.04	0.01	0.04	0.01	0.02
Standard Deviation	0.08	0.14	0.04	0.18	0.13	0.10
Maximum	0.15	0.23	0.04	0.22	0.20	0.24
Prob that 2003 coefficient could be randomly drawn from a distribution of 1994-2001 coefficients using <i>t</i> -test (sign test)	0.02 (0.07)	0.38 (0.73)	0.21 (0.38)	0.01 (0.01)	0.01 (0.07)	0.01 (0.01)

* (**) indicate that the estimated regression coefficient is significantly different from zero at the 5% (1%) level. Bold and italicized coefficients are significantly different from their 2003 counterparts at the 5% level.

TABLE 6

Estimated Coefficients (p-values) from Generalized Method of Moments where the Dependent Variables are the percentage of Shareholder Payouts that are Dividend and the percentages of Ownerships by Insiders, Individuals, and Mutual Funds, where each of the 16 quarters surrounding the enactment of the JGTRRA are treated as separate observations and the firms are the 421 firms that issued dividends at least once during the 2 years before JGTRRA

This table reports estimated regression statistics for the 421 firms that paid dividends in the period surrounding the JGTRRA. *EVENT* is a categorical variable that equals 1 if the dividend was declared in applicable quarter; zero, otherwise. Note that all control variables in Tables 2 and 3 are included in the estimation of the model but excluded from the table for brevity. All other variables are defined in Table 1.

Equation	1	2	3	4	4	4
Dependent Variable	<i>INSIDER</i>	<i>NONEXEC</i>	<i>MF</i>	<i>DIV%</i>	<i>DIV%</i>	<i>DIV%</i>
Explanatory Variable	<i>DIV%*</i> <i>EVENT</i>	<i>DIV%*</i> <i>EVENT</i>	<i>DIV%*</i> <i>EVENT</i>	<i>INSIDER*</i> <i>EVENT</i>	<i>NONEXEC*</i> <i>EVENT</i>	<i>MF*</i> <i>EVENT</i>
-8	-0.01	-0.02	0.02	-0.17	-0.18	-0.08
-7	0.01	-0.01	0.03	-0.07	-0.08	0.20
-6	-0.03	-0.02	0.02	-0.32 **	-0.25 *	-0.15
-5	-0.01	0.01	0.01	-0.18	-0.13	-0.09
-4	0.02	-0.07 **	0.03 *	0.08	-0.15	-0.01
-3	-0.01	-0.05 *	0.03	-0.01	-0.05	-0.01
-2	0.01	-0.05	0.04 *	-0.06	-0.14	0.01
-1	-0.00	-0.01	-0.00	-0.09	-0.14	-0.38 *
Enactment Quarter	n/a	n/a	n/a	n/a	n/a	n/a
+1	-0.00	-0.01	0.02	-0.04	-0.03	0.06
+2	0.02	0.00	0.01	0.27 *	0.06	0.18
+3	0.02	-0.02	0.02	0.30 *	0.10	0.23
+4	0.01	-0.01	0.01	0.19	0.07	0.22
+5	-0.02	0.02	0.02	0.20	0.34 **	0.52 **
+6	-0.00	0.00	-0.02	-0.03	-0.11	-0.11
+7	0.04 *	-0.03	-0.01	0.25 *	-0.11	0.00
+8	0.01	0.01	-0.01	0.26 *	0.19	0.14

* (**) indicate that the coefficients are significantly different from zero at the 5% (1%) level, using two-tailed tests.