The 2003 Dividend Tax Cuts and the Value of the Firm:
An Event Study

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Abstract

The "Jobs and Growth Tax Relief Act of 2003" (JGTRA03) contained a number of significant tax provisions, but the most noteworthy may have been the reduction in dividend tax rates. The political debate over the dividend tax reductions of 2003 took a number of surprising twists and turns. Accordingly, it is likely that the views of market participants concerning the probability of significant dividend tax reduction fluctuated significantly during 2003. In this paper, we use this fact to estimate the effects of dividend tax policy on firm value. We find that firms with higher dividend yields benefited more than other dividend paying firms, a result that, in itself, is consistent with both new and traditional views of dividend taxation. But further evidence points toward the new view and away from the traditional view. We also find that non-dividend-paying firms experienced *larger* abnormal returns than other firms as the result of the dividend tax cut, and that a similar bonus accrued to firms likely to issue new shares, two results that may appear surprising at first but are consistent with the theory developed in the paper.

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I. Introduction

On June 20th, 2003, President Bush signed the "Jobs and Growth Tax Relief Act of 2003" (JGTRA03) into law. This act contained a number of significant tax provisions, but the most noteworthy may have been the changes in the dividend and capital gains tax rates. The top capital gains rate of 20 percentage points was reduced to 15 percentage points. The top rate on dividend income was reduced from the highest statutory income tax rate of 35 percentage points to 15 percentage points. Capital gains and dividend tax rates for low income individuals were reduced to 5 percent, dropping to zero in 2008.

The likely impact of these tax changes on economic activity has been explored in some detail.[1] A key consideration in this analysis is the marginal source of finance for firms that pay dividends. Under the "new view" of dividend taxation developed in Auerbach (1979), Bradford (1981) and King (1977) the marginal source of finance for new investment projects is retained earnings. In this case, the tax advantage of retentions precisely offsets the double taxation of subsequent dividends: taxes on dividends have no impact on the investment incentives of firms using retentions as a marginal source of funds and paying dividends with residual cash flows. Alternatively, the dividend tax affects the marginal source of finance under the "traditional view" where firms rely on new share issuance as the marginal source of funds.

To date, there has been a significant debate concerning the relative importance of the new and traditional views of dividend taxation. Poterba and Summers (1985) found evidence suggesting that the traditional view might best characterize the investment behavior of U.K. firms. Auerbach and Hassett (2003) analyzed dividend payout behavior and found support for both views in different subsamples of U.S. firms. Desai and Goolsbee (2004), on the other hand,

[1] See Carroll, Hassett and Mackie (2003).

reported evidence that suggests that investment behavior in the United States may be most consistent with the new view.

The political debate over the dividend tax reductions of 2003 took a number of surprising twists and turns. The original proposal put forward by President Bush was eventually dropped, and replaced with a simpler version. There were times when the dividend tax reduction seemed almost dead, only to be revived by clever legislative gamesmanship. Accordingly, it is likely that the views of market participants concerning the probability of significant dividend tax reduction fluctuated significantly during 2003. In this paper, we use this fact to estimate the effects of dividend tax policy on firm value. One of our aims in doing so is to shed new light on the academic debate concerning the economic impact of dividend tax policy and relevance of the two competing views of the impact of dividend taxation.

Specifically, embedded in the two views of dividend tax policy are different implications concerning the likely pattern of share price responses to news about lower dividend tax rates. These different implications allow us to use standard event study methodology from the empirical finance literature to investigate whether observed share prices responses are more consistent with the predictions of the new view, or with those of the traditional view. We also consider the effects of the dividend tax cut on the values of firms that pay no dividends, an important segment of the overall firm population. Such firms are not well characterized either by the new view, which presumes the availability of internal funds adequate to finance investment, or the traditional view, which presumes the need for firms to distribute dividends, even as they may be issuing shares. A simplistic, static perspective might see these firms as gaining little from a reduction in dividend taxes, for there are no immediate tax consequences for them, but we argue not only that these firms, too, would benefit from dividend tax cuts, but also that they might benefit even more than dividend-paying firms.

Briefly, we find that firms with higher dividend yields benefited more than other dividend paying firms, a result that, in itself, is consistent with both new and traditional views. But further evidence points toward the new view and away from the traditional view. We also find that non-dividend-paying firms experienced *larger* abnormal returns than other firms as the result of the dividend tax cut, and that a similar bonus accrued to firms likely to issue new shares, two results that may appear surprising at first but are consistent with the theory developed below.

The next section develops our predictions concerning the likely share price response to news concerning the tax rate on dividends.[2] Section III discusses the methodology that we employ to evaluate whether these effects are visible in the data. Section IV presents our basic results regarding changes in firm valuation during the legislative window, roughly the first half of 2003. To help interpret and extend our basic findings, section V extends our empirical investigation by considering changes in firm valuation during the months leading up to the 2004 presidential election, a close race in which the two candidates differed markedly in their attitudes toward the 2003 legislation. Section VI considers alternative specifications to check the robustness of our results and section VII concludes.

II. Theory

To consider the potential effects on market value of changes in the rate of dividend taxation, one must confront the alternative views of how dividend taxes affect market value. We

[2] We focus here on the change in dividend taxation, as this should have been by far the most important change affecting firm value. The top capital gains tax rate was also reduced to 15 percent, but this represented a much smaller change from the previous top marginal rate of 20 percent. The "bonus depreciation" provision (discussed and analyzed by House and Shapiro 2005) provided immediate expensing of 50 percent of qualifying investment. But the provision applied only through the end of 2004, and represented a minor change in the law passed in 2002, which had provided 30 percent bonus depreciation for investment through September, 2004.

follow the presentation in Auerbach (2002), to which the reader is referred for a more complete discussion.

We start with the expression derived there for the valuation at date t of a firm with a representative shareholder facing a tax rate θ on dividends and a tax rate c on accrued capital gains that reflects both the favorable capital gains rate and the deferral advantage conferred by the fact that gains are actually taxed only upon realization:

$$(1) \qquad V_t = \int_t^{\infty} e^{-\frac{\rho}{1-c_s}(s-t)} \left[D_s \left(\frac{1-\theta_s}{1-c_s} \right) - S_s \right] ds$$

where ρ is the shareholder's after-tax discount rate, D_s is the flow of dividends at date s, and S_s is the flow of proceeds from new share issues at date s.

Expression (1) is valid for any path of dividends and share issues, but there are a variety of constraints on the choice of these two variables. Dividends cannot be negative ($D_t \geq 0$), but there may be further restrictions on the payment of dividends, which is often summarized by a minimum distribution constraint, such as a requirement that dividends be at least some fraction total returns to the firm, or:

$$(2) \qquad D_t \geq p(D_t + \dot{V}_t - S_t)$$

To represent the potential difficulties of engaging in share repurchases, we impose the simple constraint that rules them out:

$$(3) \qquad S_t \geq 0$$

Associating the Lagrange multipliers λ_t and μ_t with the constraints (2) and (3), we obtain the following expression for the value of the firm under optimal equity policy:

$$(4) \qquad V_t = \int_t^\infty e^{-\int_t^s \frac{\rho}{(1-c_s)(1-\lambda_v p)}dv} \left(1 - \frac{\mu_s}{1-\lambda_s p}\right) G_s ds$$

where $G_t \equiv D_t - S_t$ is the net cash flow at date s from the firm's operations before the determination of dividends and new share issues, and the two multipliers satisfy the relationship:

$$(5) \qquad \lambda_t + \mu_t = 1 - \frac{1-\theta_t}{1-c_t}$$

Assuming that $\theta > c$, at least one of the multipliers in (5) must be nonzero. At the margin, issuing new shares to pay dividends increases taxes (the increase in dividend taxes exceeding the reduction in capital gains taxes) and reduces the value of shares. To maximize value, firms will wish to decrease both new shares and dividends until at least one of the constraints binds. We may distinguish three regimes, according to whether λ, μ, or both are positive, and firms may make transitions among these regimes over time.

When only the minimum-dividend constraint, (2), binds at all dates (i.e., $\mu \equiv 0$), expression (4) reduces to:

$$(6) \qquad V_t = \int_t^\infty e^{-\frac{\rho}{[1-(1-p)c_s - p\theta_s]}(s-t)} G_s ds ,$$

which is the "traditional" view of the effects of dividend taxation. According to this expression, the value of the firm equals the present value of its cash flows net of new share issues and dividends, discounted with a before-personal-tax discount rate based on an individual tax rate that is a weighted average of the tax rates on dividends and capital gains, with weights based on the payout rate p, $\frac{\rho}{[1-(1-p)c-p\theta]}$. On the other hand, if only the repurchase constraint, (3), binds at all dates (i.e., $\lambda \equiv 0$), expression (4) simplifies to:

$$(7) \qquad V_t = \int_t^{\infty} e^{-\frac{\rho}{1-c_s}(s-t)} \left(\frac{1-\theta_s}{1-c_s} \right) G_s ds ,$$

which is the "new" view of dividend taxation, under which the appropriate discount rate, $\frac{\rho}{(1-c)}$, is unaffected by the tax rate on dividends, and the net cash flows of the firm are multiplied by the ratio $\left(\frac{1-\theta}{1-c} \right) \leq 1$ in determining the firm's value.

How would a reduction in the tax rate on dividends affect the firm's value? We consider first the firm in isolation, and then discuss how the responses of other firms may modify our initial conclusions.

A. Announcement Effects under the New View

Under the new view, a reduction in θ would directly increase the firm's value, with no further direct behavioral responses. As a pure lump-sum transfer to the owners of the firm, its only additional impact on firm value would come indirectly through potential effects on other firms' behavior or through wealth effects on consumption.

Note that, for a *permanent* reduction in θ, the firm's payout rate should not play a role in the impact on firm value, because the size of the lump-sum transfer to shareholders is independent of when dividends are distributed – the tax term is constant and factors out of the integral. That is, new-view firms with the same present value of cash flows G_s in (7) should experience the same percentage change in value, even if the time pattern of these flows, and hence the share of earnings retained, differs across firms; the present value of dividend taxes on these flows is invariant to their timing, and so is any associated tax reduction.

If the tax cut is perceived to be temporary, though, the payout rate could matter, for a larger share of distributions would be subject to reduced taxes for the firm with a higher payout rate.

B. Announcement Effects under the Traditional View

Under the traditional view, dividend tax cuts should also increase firm value, but through a different mechanism. Rather than providing a lump-sum transfer to shareholders, the dividend tax cut would reduce the firm's discount rate. The larger the payout rate, p, the larger the decline in the discount rate and, for a given trajectory of cash flows G_s (assuming all flows are positive) the higher the percentage increase in value.

Because of the decline in the discount rate, the firm's optimal investment policy will also be affected, with an increase in investment now desirable. For the firm in isolation (i.e., ignoring the behavioral responses of other firms), though, shifting to the new optimal investment policy will simply reinforce the initial increase in market value – the first-order effect on value is a lower bound for the individual firm.

These predictions contrast with those in the simple model of several identical firms. There, the tax shock raises the market value of the representative firm temporarily, and then investment drives the marginal product of capital back down to its eternal resting place of $q = 1$. In our regressions, we would expect the path of the marginal product of capital for a firm to depend on the behavior of other firms, with profits (and hence market value responses) accruing to firms that occupy industries with relatively unresponsive competitors.

C. Announcement Effects with Transitions in Regime

There are some firms for which neither the new view nor the traditional view provides an adequate characterization. The most important case, empirically, are firms that have yet to pay dividends. The new view clearly does not apply, for these firms are retaining all of their earnings and not paying dividends as a residual. On the other hand, they do not pay any positive share of their earnings as dividends, and so a reduction in dividend taxation would have no immediate impact on their cost of capital. This has led some observers to argue that such "immature" firms would not benefit from a reduction in dividend taxation.

But, as markets are forward-looking, we should expect these firms to experience an increase in value based on expected future dividend policy, not simply current policy. Firms that are projected to follow a life cycle over which they eventually mature and commence paying dividends might gain from a dividend tax cut of sufficient duration.[3] Indeed, such firms might gain *more*, as a share of current market value.

To explain this point, consider a firm in the model described above, facing the constraints (2) and (3) on dividends and repurchases, but with the minimum payout rate in (2), p, set equal to zero. Suppose that constraint (2) initially binds, as the firm is in a high-growth stage and devotes all its earnings to investment, but that, over time, investment opportunities diminish and the firm makes a transition to paying dividends each year, in which case only constraint (3) binds. During this transition from being a traditional-view firm (with $p = 0$) to being a new-view firm,

[3] Sinn (1991) analyzes the dynamics of such firms in making the transition from "traditional view" firms to "new view" firms.

the firm may spend some time in the intermediate regime when both constraints bind, in which case no dividends are paid and no shares are issued. In this intermediate regime, additional investment is profitable if financed through after-tax retentions, but not profitable if financed through before-tax new share issues, so the firm is at a kink-point.

Based on expression (4) and the definition of G_s, we may write the value at date t for this firm as:

$$(8) \qquad V_t = \int_t^T e^{-\frac{\rho}{1-c_s}(s-t)} \left(-S_s\right) ds + e^{-\frac{\rho}{1-c_{T'}} T'} \int_{T'}^{\infty} e^{-\frac{\rho}{1-c_s}(s-T')} \left(\frac{1-\theta_s}{1-c_s}\right) D_s ds$$

where the firm exits the traditional-view regime at date T and enters the new-view regime at date $T' \geq T$. Recall that the interval between T and T' does not show up in the value formula because dividends and issuance have stopped. Consider the impact of a reduction in the dividend tax rate θ on the firm's market value. If we compare expression (8) to expression (7), and note that $G_s = D_s$ in (7), we observe that the present value of dividends in (7), multiplied by $(1-\theta)/(1-c)$, equals the value of the firm. But, in (8), the present value of dividends multiplied by $(1-\theta)/(1-c)$ – the second integral in the expression – *exceeds* the value of the firm, because the first integral is negative. Because the firm will first issue additional shares before it begins paying dividends, the present value of its future dividends must equals the value of its current equity *plus* the value of the equity that will be issued in the future. In a competitive market for shares, any increases in the future after-tax value of dividends due to a tax cut will increase the amount for which shares can be sold, thus increasing the value of *current* equity.

The immature firm described in (8) will wish to invest more *before* entering the new-view regime at date T', because during the *transition* between regimes it will face a lower cost of capital. Absent adjustment costs, this extra investment would occur immediately before the transition begins, beginning at date T, but with adjustment costs, the investment may begin much earlier than date T, because of the desire to smooth investment. Note, also, that the firm's response will likely change the dates T and T'. As under the traditional view, the firm's individual investment response will simply enhance the first-order increase in its market value.

To illustrate this scenario, and confirm the predicted impacts on valuation and investment behavior, we consider an explicit model that can give rise to the discrete-time version of the life-cycle transition described by (8). We suppose the firm has a production technology in one factor, capital, $F(K)$, invests subject to quadratic adjustment costs, $C(I) = q(I) - \frac{1}{2}\alpha I^2$, and starts with an initial capital stock, K_0. For simplicity, we assume that capital does not depreciate, that the capital gains tax and the corporate tax is zero, and that the production function, too, is quadratic, $F(K) = \gamma K - \frac{1}{2}\delta K^2$. Clearly, this is a model in which the firm stops investing when it reaches its optimal capital stock, and thus ends up in the new-view regime. If its capital stock starts close enough to this value, $K_\infty = (\gamma - q\rho)/\delta$, it will start off as a new-view firm; but if its initial capital stock is sufficiently low, it will wish to invest rapidly at first, pushing it into the zero-dividend, traditional-view regime. For the particular parameterization chosen, $\rho = .5$, $q = \alpha = 1$, $\gamma = .2$, $\delta = .03$, and θ initially equal to .3, for which $K_\infty = 5$, the firm pays dividends from the start if, for example, $K_0 = 3$, and initially issues shares and pays no dividends if, for example, $K_0 = .5$. In the latter case, the trajectory of investment and the timing of transitions among regimes also changes if θ changes.

These changes are shown in Figure 1 for a reduction in θ from .3 to .1, with the left axis measuring investment, and the right axis measuring the capitalization factor q^*, which equals 1 in the traditional-view regime, $(1-\theta)/(1-c)$ in the new-view regime, and lies between these values in the intermediate regime. Under the initial trajectory, the firm transits out of the traditional-view regime after three periods and into the new-view regime after seven periods. As predicted, the dividend tax reduction speeds up investment from the start, and this delays by one period the cessation of new share issues and the departure from the traditional-view regime. However, with this faster capital accumulation, the firm also enters the new-view regime faster, after just five periods. And what of the impact on market value? For the firm with $K_0 = 3$, or for any new-view firm, value increases by 28.57 percent, equal to [(1-.1) – (1-.3)]/[1-.3]. For $K_0 = .5$, the change depicted in Figure 1, the firm's value increases by 30.40 percent, higher as predicted.

The reasoning in this example carries over for firms experiencing more general shifts among regimes, such as mature firms that typically do not issue shares but may occasionally find it desirable to do so, because of unusually strong investment opportunities. These firms, like the transitional immature firm just analyzed, will have a present value of dividends that exceeds their current equity value, and hence will stand to gain more, as a fraction of that value, from a permanent reduction in dividend taxes.

For immature firms, as under the new view, one must qualify one's conclusions if tax cuts are perceived to be temporary. While the present value of dividends is higher as a share of equity value than for mature firms, these dividends are also likely to occur further in the future than for mature firms. Thus, a tax cut that is expected to expire would reduce the valuation impact more for immature firms, leaving the net effect for immature relative to mature firms uncertain.

D. The Impact of Collective Behavioral Responses

The analysis so far applies to firms in isolation, ignoring the behavioral responses of other firms. But it is still relevant in comparing the relative impacts on the values of different firms, as long as the responses among competing firms are held constant. Thus, if all firms are new-view firms, we would expect no behavioral responses at all, and so the above analysis applies.

If, on the other hand, all firms were traditional-view firms, we would expect that, in the long-run, increased investment would drive down before-tax rates of return. With adjustment costs, as in the standard q-theory of investment, firm values would jump temporarily as investment increases, with the temporary gain then eroding over time. But firms with a higher reduction in their costs of capital would still experience greater increases in value, both in the long run, and in the short run.[4]

If, however, the responses of competitive firms differ, then our predictions might require modification. For example, suppose that there are two industries populated by traditional-view firms: in industry *A*, the typical payout ratio *p* is high, whereas in industry *B* the ratio is low. Then, a dividend tax cut might spur industry-wide investment more in *A* than in *B*, depressing values in *A* more than *B*. Thus, a firm with a given value of *p* in industry *A* would be predicted to have a smaller net increase in value than a firm with the same value of *p* in industry *B*.

E. Summary

Based on the preceding discussion, we would expect the effects on market value of a dividend tax reduction to interact with characteristics of firms as follows:

dividend yield: positive under the traditional view; neutral under the new view but positive if the tax cut is not perceived as permanent

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[4] Modeling the coexistence of firms with different costs of capital in the same market is beyond the scope of this paper, but it would be straightforward to do so using a standard model of monopolistic competition, under which each firm would face a downward-sloping demand curve.

propensity to issue new shares: positive

"immaturity" (firms not paying dividends): positive if the tax cut is perceived as permanent; unclear if the tax cut is perceived as temporary

competitive firms' payout ratios: irrelevant under the new view; negative under the traditional view.

Our approach is to explore whether these predictions are confirmed in the data. We now turn to a discussion of our methods.

III. Methodology and Data

A. Event Study Methodology

The multivariate regression model has been used extensively to measure abnormal returns (*AR*s) in stock market event studies. Although we must take into account how intertemporal and contemporaneous correlations affect the estimates of the variances of different measures of abnormal returns, these issues can mostly be easily overcome and have been extensively addressed in the literature.

The basic event-study methodology starts with the following regressions based on the capital asset pricing model (CAPM):

(9) $$r_{it} = \alpha_i + \beta_i r_{mt} + \gamma_{it} D_t + \varepsilon_{it}$$

where r_{it} is the return for firm *i* in period *t* and r_{mt} is the return on the market in period *t*.[5] D_t is a dummy variable that is equal to one if a given event occurs on date *t* and zero otherwise.

[5] A slightly different version of the CAPM would subtract the risk-free rate from the firm and market returns in (9). The results were not sensitive to the choice between these alternatives. Results based on a popular multifactor alternative to the basic CAPM are discussed below in Section VI.

The coefficient γ_{it} estimates the abnormal return caused by the event for firm *i*; as discussed below, we will parameterize γ_{it} as a function of variables associated with the theory of dividend taxation to distinguish the effects of events on firms with different attributes.

Cumulative abnormal returns (*CAR*s) are estimated by summing estimated abnormal returns over an event window. However, the variance of the *CAR*s is not the sum of the variances of the individual *AR*s. There is intertemporal correlation between the *AR*s since the same estimated market model parameters enter the calculation of all *AR*s for a firm.

It is, however, easy to estimate the variances of *CAR*s (see Salinger (1992, p. 40-42) for a fuller discussion of the correlation between the *AR*s and how the following procedure corrects for it). Because $CAR_t = CAR_{t-1} + AR_t$, we can rewrite equation (9) as:

$$(9') \qquad r_{i,t} = \alpha_i + \beta_i r_{mt} + \gamma_{it}^{CAR} D_t - \gamma_{i,t-1}^{CAR} D_{t-1} + \varepsilon_{it}$$

where γ_{it}^{CAR} is an estimate of the cumulative abnormal return at date *t*. The difference between this procedure and the standard dummy variable procedure is that, for *t* in the event window, the dummy for period *t* takes on the value of 1 and the dummy for period *t*-1 takes on the value of -1. Using the dummy variable procedure for estimating *CAR*s and their standard errors simplifies things greatly, because the standard errors are reported directly by the regression package. To account for contemporaneous correlation of the abnormal returns of similar firms, though, we cluster standard errors by 3-digit industry.

Specifications in this application

In order to investigate the relevance of the various theories of dividend taxation, we estimate the following extensions of the basic expression (9) using daily stock price data:

(i) $$r_{it} = \alpha_i + \beta_i r_t^m + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{0}D_{n,m} + \varepsilon_{it}$$

(ii) $$r_{it} = \alpha_i + \beta_i r_t^m + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{0}D_{n,m} + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{1}D_{n,m} \times Div_i + \varepsilon_{it}$$

(iii) $$r_{it} = \alpha_i + \beta_i r_t^m + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{0}D_{n,m} + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{1}D_{n,m} \times Div_i$$
$$+ \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{2}D_{n,m} \times ProbIss_i + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{3}D_{n,m} \times ProbPurch_i + \varepsilon_{it}$$

(iv) $$r_{it} = \alpha_i + \beta_i r_t^m + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{0}D_{n,m} + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{1}D_{n,m} \times Div_i$$
$$+ \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{4}D_{n,m} \times \overline{Div_i} + \varepsilon_{it}$$

where r_t^m equals the daily return on the CRSP total market value-weighted index, $D_{n,m}$ is a dummy equal to one for event m on day n of the five-day event window, Div_i equals the 2002 dividend payout ratio for firm i, $ProbIss_i$ equals the 2002 new share issuance probability for firm i, $ProbPurch_i$ equals the 2002 repurchase probability for firm i, and $\overline{Div_i}$ equals the average 2002 dividend yield among mature firms in the same industry as firm i based on 3-digit SIC code and weighted by market capitalization. Construction of the probabilities is discussed in the data section below. We choose the five-day window centered on the event in case news of the event leaks out early to the market, or takes a while to be fully digested.

For "mature" firms, that is, firms that have already paid a dividend, we estimate specifications (i)-(iv). For the full sample, we estimate a version that includes an interaction between our event dummies and a dummy variable for whether a firm is mature or not:

(v) $$r_{it} = \alpha_i + \beta_i r_t^m + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{0}D_{n,m} + \sum_{m=1}^{8}\sum_{n=1}^{5}\gamma_{n,m}^{5}D_{n,m} \times Mature_i + \varepsilon_{it}$$

where $Mature_i$ is a dummy variable equal to one if firm *i* was a mature firm in 2002 (i.e. had paid a dividend in 2002 or any prior year).

In all of these regressions, the *cumulative* abnormal returns (*CAR*s) were estimated, not the *AR*s (i.e., we use the versions of (i)-(v) based on (9′), not (9)). Each specification was estimated both unweighted and weighted by market capitalization. Similar regressions were run cumulating the abnormal returns across all eight events. Also, as mentioned above, the standard errors reported are clustered by 3-digit SIC code in all specifications.

B. Using the 2004 Election as an Alternative Experiment

As an alternative to our event study, we also consider identifying the effect of dividend tax changes using futures prices from the 2004 Presidential election. Since the dividend tax reduction is currently scheduled to expire, and since Senator Kerry expressed no desire to extend it, the probability that Bush would win should have been positively associated with the probability of continued low dividend taxes in the future. Accordingly, we estimate the following regressions:

(vi) $$r_{it} = \alpha_i + \beta_i r_t^m + \gamma^6 \Delta Bush_t + \gamma^7 \Delta Bush_t \times Div_i + \varepsilon_{it}$$

(vii) $$r_{it} = \alpha_i + \beta_i r_t^m + \gamma^6 \Delta Bush_t + \gamma^7 \Delta Bush_t \times Div_i + \gamma^8 \Delta Bush_t \times ProbIss_i + \gamma^9 \Delta Bush_t \times ProbPurch_i + \varepsilon_{it}$$

(viii) $$r_{it} = \alpha_i + \beta_i r_t^m + \gamma^6 \Delta Bush_t + \gamma^{10} \Delta Bush_t \times Mature_i + \varepsilon_{it}$$

where r_t^m equals the daily return on the CRSP total market value-weighted index, $\Delta Bush_t$ is the change in the probability of a George W. Bush victory on date *t*, and the remaining variables are defined as before: Div_i equals the 2002 dividend payout ratio for firm *i*, $ProbIss_i$ equals the 2002 new share issuance probability for firm *i*, $ProbPurch_i$ equals the 2002 repurchase probability for firm *i*, and $Mature_i$ indicates whether firm *i* has ever paid a dividend. In principle, and as discussed further below, the interaction terms from this regression should provide evidence that is consistent with that provided by our event study coefficients. Moreover, to the extent that the election specifically contains information concerning the permanence or lack thereof of the dividend taxes, it may allow us to distinguish the effects of permanent dividend tax cuts from the effects of temporary ones.

C. Data

Event Dates

An event study is only as good as the events chosen, and there is always the risk that poorly chosen event days will cloud any empirical analysis. In order to acquire event days for this study, we asked the Senior Economist for the House Ways and Means Committee (Alex Brill) to review his notes from that time and construct a list of dates on which important news concerning the dividend tax was released to the public. We then used the list he provided to us as our event list, and did not alter the list after our research began. The events are contained in Table 1. While our focus here is on formal statistical analysis, we include in Table 1 the percent change in the S&P 500 on the day of each event. While some of the events were associated with a positive swing in equity prices, some were not.

The list contains eight five-day event windows within which significant news concerning the likelihood of passage of the dividend tax cut was made public. The first event was a story by Edmund Andrews in the *New York Times* that first revealed that the White House would push for a 50 percent decrease in the tax rate on dividends.[6] Then, on January 7th, 2003, President Bush formally announced his plan. On February 27th, the plan was introduced in the House, and on March 4th, hearings began. Because we use a window around each event of five days, these two events are grouped together.

After the president's plan appeared to lose steam, the dividend tax debate reignited on March 27th when Chairman Thomas of the House Ways and Means Committee floated a plan that would reduce the tax rates on dividends and capital gains to 8 and 18 percent, a simpler plan than that initially proposed by President Bush. On April 30th, Thomas announced a modified version of his initial plan that moved the rates to 5 and 15 percent. On May 6th, this plan passed the Ways and Means Committee, and on May 9th it passed the House. These two events also ran together given our event window rules. On May 15th, the Senate passed an alternative bill that would have brought the tax rate on dividends to zero, but only for one year before its sunset. On May 23rd, the Thomas version of the bill, with a sunset date of December 31, 2008, emerged from the conference and passed both houses, passing in the Senate only with Vice President Cheney casting the tie breaking vote. While different versions of a dividend tax cut were debated during this five-month period, all shared the property of cutting dividend tax rates substantially more than capital gains tax rates.

[6] Although unrelated to our choice of event dates, this article contained a quote by one of us voicing skepticism about the policy: "'One wouldn't think of this as the first or second or even third measure to stimulate consumption or investment,' said Alan Auerbach, an economist at the University of California at Berkeley who has studied the issue for years." There was (and is) disagreement between the authors concerning the advisability of this proposal. In any case, our views have not colored our analysis in this paper.

Firm Data

The data sources, variable definitions, and procedures for excluding outlying observations follow Auerbach and Hassett (2003) very closely.

Balance sheet data come from the Compustat annual database, for the period 1980-2002. Variables include:

Dividends = cash dividends paid on common stock

Investment = capital expenditures

Cash flow = after-tax income (net of preferred dividends) plus depreciation

Value = end-of-year market value

Debt = short-term plus long-term debt

Bond rating = the long-term credit rating assigned by Standard & Poor's.

Financial firms (SIC codes 6000-6900) and firms that underwent a major merger during the period were eliminated. Questionable observations were dropped if any of the following conditions were met: (i) investment-assets ratio less than 0 or greater than 1, (ii) cash flow-assets ratio less than -1 or greater than 1, (iii) dividends-assets ratio above 0.5, (iv) debt-assets ratio greater than 1, or (v) equity value-assets ratio greater than 20.

A variable measuring the number of analysts following the firm and providing earnings per share estimates in a given year comes from I/B/E/S. The daily price and stock-return data come from CRSP, for the period January 2, 2002-September 30, 2003.

New issues and share repurchase probabilities were estimated from the marginal probability distributions from a bivariate probit model, using the same specification as that in Auerbach and Hassett (2003). The dependent variables are indicator variables for whether a firm issued new shares (net new share issues above 2% of outstanding shares) or repurchased shares (net new share issues below -2% of outstanding shares) in a given year. The dependent variables include two lags of the investment, cash flow, value, and debt, as defined above. The estimation also includes year dummies, size dummies (four quartiles based on total assets), industry dummies (based on 3-digit SIC code), and categorical dummies for bond rating and number of analysts. The estimation was run only on the mature sample for the years 1985-2002.

Political Data

Daily closing prices from the Iowa Electronic Markets 2004 U.S. Presidential Winner Takes All Market were used to calculate implied probabilities of a George W. Bush win in the November election. The market opened on June 1, 2004 and closed on November 5, 2004. The Bush contract was structured to pay $1 in the event George Bush received the most popular votes. On September 22, the contract spun-off into two separate contracts (one which paid if Bush won the most popular votes with less than 52 percent of the total two-party vote and one that paid if Bush won the most popular votes with more than 52 percent of the total two-party vote) and therefore we calculate the probability as the sum of the prices on the two Bush contracts.

IV. Basic Results

Table 2 presents the first set of regression results based on the methodology just described. The sample consists of all mature firms, defined as described above as firms that have paid dividends in the past. The table presents two sets of results, one in which observations are weighted by firm value, the other in which observations are not weighted. Standard errors of these least squares estimates are adjusted by clustering by 3-digit industries, to account for the likely correlation of return shocks within industries. All subsequent tables follow this same format of presenting both weighted and unweighted estimates and clustering standard errors by 3-digit industry.[7] Although the estimation procedure requires simultaneous estimation of event-date parameters and market-model parameters for every firm and, we present only the former parameters in the tables.

The first eight rows of Table 2 present the coefficients for each of the eight event windows described above. For each event, the coefficient represents the cumulative abnormal return for a five-day window centered on the event date. The ninth row, in boldface, presents the cumulative abnormal return for the eight events taken together, calculated by re-running the regression with the eight event windows treated as a single, noncontiguous 40-day episode. The cumulative effect is positive in both unweighted and weighted samples, but significant only in the latter, for which the point estimate is three times higher than that estimated using the unweighted sample. This coefficient of about 1.5 indicates a positive abnormal return of 1.5 percent for each percentage-point increase in the firm's dividend yield.[8]

The abnormal returns estimated for individual events are noisier, although at least one of the columns shows a positive abnormal return for five of the eight events. The three events for which this does not occur are events 4, 5, and 6. Each of these dates involved activity by the House Ways and Means Committee. Events 4 and 5, in particular, involved modifications to the original Bush plan that could potentially have indicated that a reduction in dividend taxes faced

[7] In our 2003 paper, we found that the likelihood that a firm fell under either view was related to firm size, but not monotonically. Very large firms and very small firms appeared to have dividend patterns consistent with the new view, whereas firms in between exhibited payout behavior consistent with the traditional view. Accordingly, weighting will likely have an important impact on the results, although the nonmonotonic relationship makes it difficult to predict ex ante what that impact might be. We also found that very large firms appeared to rely more on debt finance, which might make weighted regressions less likely to discern between the two views that work off of different marginal sources of finance.

[8] This is of the same order of magnitude as the aggregate gain as a share of market value of 6 percent suggested by Poterba (2004), but it is difficult to compare the two numbers because of the differences in methodology. Poterba's calculation is based on an infinite-horizon valuation model that assumes no behavioral changes, while our results are based on cross-section differences among firms.

legislative hurdles. The last two events, associated with Senate passage and the conference agreement, eliminated any doubt of the tax cut's ultimate success, and each event is associated with large, positive abnormal returns.

Table 3 extends the analysis of Table 2 by adding further variables to explain the event-window abnormal returns. As discussed above, future issuance of new shares increases the present value of future dividends, relative to current market value, thereby increasing the potential gain as a share of current value from a permanent dividend tax cut. We include firm-specific estimated probabilities of new issues and repurchases, interacted with event-date dummies, as explanatory variables in the models presented in Table 3. Our logic suggests that the new issue propensity should increase abnormal returns. We have no equally clear intuition regarding the probability of repurchases, but include it for the sake of completeness.

Adding these new explanatory variables has little impact on the estimated effect of the dividend yield – its cumulative point estimates are very similar to those in Table 2 for both weighted and unweighted samples, and the precision of these estimates is slightly higher than before. As hypothesized, the probability of issuing shares has a positive impact on the cumulative abnormal return, indicating that a one-percent increase in the probability of issuing shares in a given year leads to an abnormal return of just under 0.2 percent. As to the individual event dates, the largest positive effects for the new share probability tend to occur on the same dates as those for the dividend yield. For the weighted sample, for example, the three largest coefficients for new share issues (the last two of which are significant) are for events 2 (when President Bush first announced his plan), 7 and 8; these events also have the three largest coefficients for the dividend yield, all significant. This concentration of the new-issue and dividend-yield effects within the same event windows suggests that these variables are, indeed, picking up the effects of expected changes in dividend tax policy, rather than other contemporaneous news. Finally, the probability of repurchasing, for which we do not have a clearly predicted impact, also has no clear impact in the regressions, its cumulative effect being negative and insignificant for the unweighted model and positive and insignificant for the weighted model.

Table 4 presents estimates for the entire sample of firms, including both mature and immature firms. As discussed above, we should expect immature firms to gain more from a permanent tax cut, following the same logic that explains the positive impact of future new issues among mature firms. Of course, this reasoning depends on the tax cut being permanent, or at least of sufficient duration for the future dividends from new share issues to qualify for the tax cut. In Table 4, we interact the event-date dummies with a dummy variable for whether the firm is mature, to test this prediction.[9]

The results, for both unweighted and weighted estimates, confirm the prediction of higher abnormal returns for immature firms. Being immature generates an abnormal return of between 3.7 percent and 8.6 percent of value – a very large impact, relative to the impact of dividend yield among mature firms. The estimated effects in this case are larger for the unweighted sample, but note that, again, the windows around dates 2, 7, and 8 are among the most important.

V. Further Results

Our theoretical predictions of various effects hinge on the expected permanence of the tax cut that eventually passed in 2003. In particular, if our theory underlies the empirical results presented so far, it should also be the case that increases in the expected duration of the tax cut

[9] We do not include the mature firm explanatory variables from Table 3, as these would have the same coefficients as before in a model for which they are set to zero for the immature firms added to the sample.

should further enhance the relative returns to immature firms, as well as the returns to mature firms predicted to issue new shares in the future. Thus, increases in the tax cut's expected duration should reinforce the empirical results already found.

A different story applies for the estimated positive effect of the firm's dividend yield. Recall that, under the new view of dividend taxation, the positive impact of the dividend yield is attributable solely to the timing of the path of future dividends, with higher yields corresponding to a higher share of the firm's future dividends being paid out before the tax cut expires. Thus, an increase in the expected duration of the tax cut should *reduce* the importance of the dividend yield, mitigating the positive effect already found. Under the traditional view, on the other hand, a tax cut of longer duration should *increase* the bonus from a high dividend yield, for it would lower the discount rates applied to future cash flows. Thus, an event that affected the tax cut's expected permanence would provide an opportunity to confirm the theoretical model presented above, and to distinguish between the new and traditional views with respect to the effects of dividend taxation.

Such an event, we argue, indeed a series of such events, occurred during the 2004 Presidential campaign, which pitted the dividend tax cut's sponsor, George W. Bush, against an opponent, John Kerry, who had included in his campaign platform a plan to eliminate all of the Bush tax cuts, including those enacted in 2003, for individuals earning over $200,000, a group that accounts for a significant fraction of taxable dividends. With the dividend tax cut already subject to a sunset after 2008, a President Kerry, even without a consenting Congress, could have shepherded the dividend tax cut into oblivion before the end of his first term. Thus, changes in the predicted election outcome should have changed the forecast of the tax cut's permanence among market participants. Daily trading in futures markets tied to the presidential election's outcome provide us with a record of the fluctuations in expectations during the 2004 campaign.

For the period during which the Iowa Electronic Futures Presidential Winner Takes All market was open, June 1 – November 5, 2004, we simultaneously estimate market model parameters for all firms and coefficients on the daily change in the price of a Bush contract, which we interpret as Bush's reelection probability.[10] We also interact this change in probability with other firm attributes of interest, including the firm's dividend yield, its new issue and repurchase probabilities, and whether it is a mature firm. Tables 5, 6 and 7 present the results, and may be compared to Tables 2, 3, and 4, to determine how the effects found during the 2003 event windows were altered by the changing election probabilities in 2004.

In Tables 5 and 6, the effect of an increase in the Bush reelection probability is to reduce the premium associated with a high dividend yield, consistent with the new view and inconsistent with the traditional view. This effect, though, is significant only in the unweighted version. In Table 6, we see that the impact of being likely to issue shares is reinforced by a higher Bush election probability as our theory would predict, but again with only one of the specifications (this time, the weighted version) having a significant coefficient. Once again, the repurchase probability is not significant. In Table 7, the impact of being mature is significantly reduced by an increase in the Bush election probability (in the weighted specification). That is, as predicted, the bonus to being an immature firm was enhanced by the prospect of a more permanent dividend tax cut. Taken together, the results in Tables 5-7, though noisy, reinforce our basic results regarding the bonuses received by immature firms and mature firms issuing shares, and provide some new evidence as to why firms with high dividend yields experienced

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[10] Very similar results were found using contract prices from intrade.com.

higher abnormal returns. In particular, the source of these gains appears connected to the timing of dividend payments, as hypothesized under the new view, rather than to a cost-of-capital reduction, as hypothesized under the traditional view.

One final piece of evidence concerning the new and traditional views comes from Table 8, which augments Table 2 by including not only the firm's own 2002 dividend yield, but also the value-weighted dividend yield from that year in the firm's own 3-digit industry. Recall that, under the traditional view, larger reductions in the cost of capital should induce more investment and a sharper drop in the before-tax rate of return. Thus, *ceteris paribus*, firms in an industry experiencing a larger reduction in the cost of capital – arguably an industry with a high dividend yield – should experience lower abnormal returns. If the industry is populated by new-view firms, though, the industry dividend yield should have no impact whatsoever, because the dividend tax cut has no impact on investment behavior. Contrary to either of these predictions, though, the industry dividend yield has a *positive* impact on firm abnormal returns. This could occur under the traditional view if there were large positive technology spillovers within an industry associated with increased investment. However, the literature claiming to document such effects has been largely discredited (see Auerbach, Hassett, and Oliner, 1994). On the other hand, this result could be due to the noisiness of our measures of firm-specific yields. For example, if all firms were new-view firms, and we measured each firm's dividend yield with some noise, the coefficient of the firm's measured dividend yield, which should be positive (as already discussed, due to the tax cut's temporary nature), would be downward biased, and the coefficient of the industry dividend yield, a variable which would likely be positively correlated with the firm's "true" yield, would therefore be upward biased (from zero). Under a scenario in which all firms respond according to the traditional view, though, it is harder to explain the results in Table 8, even if the firm's own yield is measured with error.

VI. Robustness and Sensitivity Analysis

How robust are the results presented thus far to changes in specification? To what extent are there alternative possible explanations to the ones we have offered? This section provides some additional results aimed at addressing both questions.

At the foundation of all of the results in Tables 2-8 is the standard CAPM, based on a single factor, the daily aggregate market return. In recent years, many empirical studies have adopted as an alternative the three-factor model of Fama and French (1993), whose two additional factors are based on the differences in returns between portfolios of high- and low-book-to-market value firms and small- and large-capitalization firms.

While inclusion of these additional factors may lack theoretical grounding, it has been found to improve the model's predictive performance. Moreover, these factors are potentially related to the types of heterogeneity we have studied. For example, immature firms are likely to be smaller than mature firms, and high dividend yields are more common among the slow-growing firms with low values of Tobin's q – the ratio of market value to book value. Thus, there may be some suspicion that our findings relating to dividend yield and firm maturity are spurious, with these variables simply picking up the missing Fama-French factors. This turns out, however, not to be the case. Table 3' (the first two columns) and Table 4' repeat the estimates of Tables 3 and 4 for mature firms and all firms, using the three Fama-French factors rather than just the market return as control variables. As a comparison of the original and new tables shows, the cumulative effects are little changed. In Table 3', the cumulative coefficient of the dividend yield interaction is slightly larger than before in both weighted and unweighted samples, while the new share and repurchase coefficients are slightly smaller (in absolute value). In Table 4, the mature firm dummy variable's cumulative coefficient is only slightly smaller.

Another issue involves differences in corporate governance. Recent papers by Chetty and Saez (2004) and Brown et al. (2004) find that dividend payout policy responses to the 2003 legislation varied with respect to variables measuring managerial incentives and shareholder oversight. In general, firms with managers' incentives aligned with value maximization and firms with large institutional shareholders were more responsive to the tax cut. One might argue that these factors leading to more responsive financial decisions might also lead to larger increases in market value.

To test this hypothesis we considered three variables based on the methodology and data sources of Chetty and Saez: the ratio to firm value of unexercisable options among top-five executives; the fraction of the firm's shares owned by the top five executives, and the fraction of the firm's shares held by institutional investors. The first two of these variables had little explanatory power when interacted with the event dates (not shown). The results with only the third variable added are shown in the last two columns of Table 3'.[11] While having little impact on the other key variables in the equation, the institutional ownership variable itself has an insignificant effect in the weighted version of the model and a significant *negative* effect in the unweighted version. Rerunning this equation with holdings of clearly tax-exempt entities excluded from the institutional ownership calculation (not shown) has little impact on the other variables of interest but does improve the performance of the institutional ownership variable, making it more positive, and significant, in the weighted version and less negative, though still significant, in the unweighted version. This improvement is consistent with the evidence Chetty

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[11] We consider the specifications using these corporate governance variables only for the mature-firm sample, as their coverage is not as complete among immature firms.

and Saez present that dividend policy in 2003 responded to ownership by taxable rather than all institutional investors.

The variables on which we have focused might also be acting as proxies in the results in Tables 5-7, which relate changes in President Bush's election probability to firm excess returns. For example, suppose that high-yield firms are also firms in industries that would have benefited from a Kerry presidency? Then the results in Tables 5 and 6 would simply be picking up these firms' underperformance on pro-Bush days. As to Table 7, perhaps immature firms liked Bush.

To control for these explanations, we designated some firms as pro-Bush and others as pro-Kerry, and interacted the associated dummy variables with the change in the Bush election probability. Our categories of firms were those that Knight (2004, Tables 2a and 2b) identified as being either pro-Bush or pro-Gore in the 2000 elections. All other firms were assigned to neither category. The results are shown in Tables 6' and 7'. None of the new variables are significant, and there is little impact on the other coefficients of interest. It is somewhat puzzling that, although they are not significant, the coefficients for the Bush firms tend to be negative and those for the Kerry firms positive, both opposite the predicted sign. As a check to see whether these results were attributable to the assignment method, we tried an alternative in which no firms were assigned to Kerry, and *all* firms in the following industries – evident from Knight's breakdown to be prevalently pro-Bush – were assigned to the pro-Bush camp: Pharmaceuticals (SIC 283), Defense (SIC 372, 376, and 381), Energy (SIC 130 and 291), and Tobacco (SIC 211-214). The resulting pro-Bush dummy variable also had a negative sign (not shown) when added to the specifications in Tables 6 and 7.

Finally, there is the issue of how one chooses event dates. As discussed above, we used a list of event dates based on information about the legislative process, and did not modify the list once our empirical investigation began. These dates were intended to represent the important dates on which the process of legislative passage moved forward. On other dates, presumably, little was happening, so these dates *together* should provide a reasonable measure of the value of passage, even if the information on some of the dates was unfavorable for passage.

While we have strived to include all important dates within the legislative window that began in late-December, 2002, we have also assumed that little of note took place before then. There was always some possibility that a dividend tax cut would be introduced and become law, but we judge this possibility to have been quite remote until our first event date. Some, though, trace the origin of Bush's commitment to a dividend tax cut to his "economic summit" in Waco, Texas on August 13, 2002, after an exchange with brokerage magnate Charles Schwab. However, while Bush indicated an interest in reducing dividend taxes, he also expressed interest in other proposals, and, according to Tax Notes (August 19, 2002), "offered no indication whether the administration would throw any weight behind the tax changes." We are skeptical of this date's relevance given the lack of activity and press coverage of potential dividend tax changes prior to our chosen event window. Nevertheless, we estimated an alternative version of our model with this date added as a ninth event. The results for this date (not shown) were generally insignificant and of the wrong sign. For example, the dividend interactions in the mature-sample regressions (e.g., Table 2) were negative and insignificant for this event window, while the mature firm interactions in the full-sample regressions (e.g., Table 4) were positive and insignificant.

VII. Conclusions

We find strong evidence that the 2003 change in the dividend tax law had a significant impact on equity markets. First, looking only at firms that have previously paid a dividend, we find that firms with higher yields outperformed firms with lower yields. In one specification, a one percentage point increase in yields led to a 1.5 percent higher abnormal return. Within this same set of firms, we also found that firms that were likely to issue new shares also benefited abnormally from the tax cut, with a one percent increase in the probability of new share issuance associated with a 0.2 percent increase in abnormal return.

When we included all firms, even those not paying dividends (so called "immature" firms), in our analysis, we found that immature firms significantly outperformed mature firms on our event dates. The range of higher returns was from 3.7 to 8.6 percent. We found evidence consistent with our event analysis relying on a second approach that used the Bush election probability as a proxy for expected future dividend policy. Here we found that higher probability of Bush being elected was associated with reduced importance of the dividend yield, and also enhanced the excess return "bonus" to being immature.

While these results at times seem counterintuitive, for the most part they are consistent with the predictions of the model developed in Section II, and in particular with the predictions for mature firms of the new view of dividend taxation. However, the difference in point estimates between weighted and unweighted regressions suggests that significant heterogeneity (perhaps consistent with that found in our 2003 paper) may exist below the surface. While the new-view model best describes the aggregate share price responses we have seen, it may well be that significant traditional-view patterns would appear with careful splits of the data. But a full treatment of firm heterogeneity also requires further consideration of the competitive environment when firms differ in their financial policies and constraints.

References

Auerbach, Alan J., 1979, "Share Valuation and Corporate Equity Policy," *Journal of Public Economics* 11(3), June, 291-305.

Auerbach, Alan J., 2002, "Taxation and Corporate Financial Policy," in A. Auerbach and M. Feldstein, eds., *Handbook of Public Economics,* vol. 3 (Amsterdam: North-Holland/Elsevier), 1251-1292.

Auerbach, Alan J and Kevin A. Hassett, 2003, "On the Marginal Source of Investment Funds," *Journal of Public Economics* 87 (1), January, 205-232.

Auerbach, Alan J., Kevin A. Hassett, and Stephen D. Oliner, 1994, "Reassessing the Social Returns to Equipment Investment," *Quarterly Journal of Economics* 109(3), August, 789-802.

Binder, John J., 1985, "On the Use of the Multivariate Regression Model in Event Studies," *Journal of Accounting Research* 23(1), Spring, 370-383.

Bradford, David, 1981, "The Incidence and Allocation Effects of a Tax on Corporate Distributions," *Journal of Public Economics* 15(1), April, 1-22.

Brown, Jeffrey R., Nellie Liang, and Scott Weisbenner, 2004, "Executive Financial Incentives and Payout Policy: Firm Responses to the 2003 Dividend Tax Cut," NBER Working Paper 11002, December.

Carroll, Robert, Kevin A. Hassett, and James B. Mackie III, 2003, "The Effect of Dividend Tax Relief on Investment Incentives," *National Tax Journal* 56(3), September, 629-651.

Chetty, Raj, and Emmanuel Saez, 2004, "Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut," NBER Working Paper 10841, October.

Desai, Mihir A. and Austan D. Goolsbee, 2004, "Investment, Overhang, and Tax Policy," *Brookings Papers on Economic Activity* 35(2), Fall, 285-338.

Fama, Eugene F., and Kenneth R. French, 1993, "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics* 33(1), February, 3-56.

House, Christopher L., and Matthew Shapiro, 2005, "Temporary Investment Incentives: Theory and Evidence from Bonus Depreciation," University of Michigan, January.

Jaffe, Jeffrey F., 1974, "Special Information and Insider Trading," *The Journal of Business* 47(3), July, 410-428.

King, Mervyn, 1977, *Public Policy and the Corporation* (London: Chapman and Hall).

Knight, Brian, 2004, "Are Policy Platforms Capitalized into Equity Prices? Evidence from the Bush/Gore 2000 Presidential Election," NBER Working Paper 10333, March.

Mandelker, Gershon, 1974, "Risk and Return: The Case of Merging Firms," *Journal of Financial Economics* 1(4), December, 303-335.

Poterba, James M., 2004, "Taxation and Corporate Payout Policy," *American Economic Review* 94(2), May, 171-175.

Poterba, James M. and Lawrence H. Summers, 1985, "The Economic Effects of Dividend Taxation," in E. Altman and M. Subrahmanyam, eds., *Recent Advances in Corporate Finance* (Homewood, IL: Richard D. Irwin), 227-284.

Salinger, Michael, 1992, "Standard Errors in Event Studies," *Journal of Financial and Quantitative Analysis* 27(1), March, 39-53.

Sinn, Hans-Werner, 1991, "The Vanishing Harberger Triangle," *Journal of Public Economics* 45(3), August, 271-300.

Table 1
Key Event Dates for JGTRA03

Event #	Event Date	Event Window	Description	S&P 500 (% Change)
1	12/25/2002	12/23-12/30	NYT Article	-0.31
2	1/7/2003	1/3-1/9	Bush announces plan	-0.65
3	2/27/2003 3/4/2003	2/27-3/5	Introduced into House First hearing in House	1.18 -1.54
4	3/27/2003	3/25-3/31	Thomas floats 8/18 plan	-0.16
5	4/30/2003	4/28-5/2	Thomas floats 5/15 plan	-0.10
6	5/6/2003 5/9/2003	5/6-5/12	Ways & Means passes House passes	0.85 1.43
7	5/15/2003	5/13-5/19	Senate passes	0.79
8	5/23/2003	5/21-5/28	Conference version passes	0.14

Table 2
Mature Sample--Dividend Interactions Only
(t-statistics in parentheses)

	Unweighted	Weighted
Dividend yield 1	0.120	0.107
	(2.58)	(1.05)
Dividend yield 2	0.049	0.414
	(0.55)	(2.26)
Dividend yield 3	0.225	0.283
	(2.02)	(1.70)
Dividend yield 4	-0.116	0.157
	(-0.92)	(0.91)
Dividend yield 5	-0.251	-0.038
	(-3.56)	(-0.17)
Dividend yield 6	0.100	-0.217
	(0.62)	(-3.20)
Dividend yield 7	0.265	0.358
	(2.37)	(1.71)
Dividend yield 8	0.164	0.419
	(1.27)	(2.62)
Dividend yield (Cumulative)	**0.556**	**1.484**
	(1.42)	**(2.20)**
R^2	0.0014	0.0018
N	512,073	512,073

Table 3
Mature Sample--All Interactions
(t-statistics in parentheses)

	Unweighted	Weighted
Dividend yield 1	0.123	0.114
	(2.69)	(1.14)
Dividend yield 2	0.033	0.410
	(0.43)	(2.37)
Dividend yield 3	0.225	0.255
	(2.07)	(1.51)
Dividend yield 4	-0.124	0.150
	(-1.08)	(0.85)
Dividend yield 5	-0.256	-0.013
	(-3.46)	(-0.06)
Dividend yield 6	0.094	-0.224
	(0.58)	(-3.36)
Dividend yield 7	0.247	0.361
	(2.49)	(2.05)
Dividend yield 8	0.166	0.442
	(1.34)	(3.02)
Dividend yield (Cumulative)	**0.507**	**1.495**
	(1.52)	**(2.48)**
Probability of issuance 1	0.015	0.001
	(1.34)	(0.06)
Probability of issuance 2	0.029	0.045
	(1.89)	(1.58)
Probability of issuance 3	0.020	-0.015
	(1.42)	(-0.81)
Probability of issuance 4	0.050	0.006
	(3.86)	(0.35)
Probability of issuance 5	0.004	0.007
	(0.23)	(0.38)
Probability of issuance 6	-0.006	0.005
	(-0.52)	(0.45)

Table 3 (continued)

Probability of issuance 7	0.035 (1.88)	0.068 (3.05)
Probability of issuance 8	0.039 (3.11)	0.043 (2.60)
Probability of issuance (Cumulative)	**0.187** **(4.42)**	**0.160** **(2.30)**
Probability of purchase 1	0.020 (1.13)	0.014 (0.43)
Probability of purchase 2	-0.059 (-2.86)	0.009 (0.26)
Probability of purchase 3	0.007 (0.31)	-0.066 (-2.36)
Probability of purchase 4	-0.012 (-0.58)	-0.012 (-0.38)
Probability of purchase 5	-0.019 (-0.58)	0.058 (1.58)
Probability of purchase 6	-0.028 (-1.27)	-0.014 (-0.50)
Probability of purchase 7	-0.055 (-2.44)	0.030 (1.00)
Probability of purchase 8	0.026 (1.30)	0.070 (2.88)
Probability of purchase (Cumulative)	**-0.121** **(-1.85)**	**0.087** **(0.73)**
R^2	0.0018	0.0027
N	512,073	512,073

Table 4
Full Sample
(t-statistics in parentheses)

	Unweighted	Weighted
Mature dummy 1	0.006	0.001
	(2.97)	(0.09)
Mature dummy 2	-0.011	-0.024
	(-2.23)	(-3.80)
Mature dummy 3	0.002	-0.004
	(0.89)	(-0.69)
Mature dummy 4	-0.017	-0.003
	(-4.82)	(-0.63)
Mature dummy 5	-0.010	0.000
	(-3.84)	(-0.05)
Mature dummy 6	-0.006	0.008
	(-1.86)	(1.17)
Mature dummy 7	-0.031	-0.010
	(-6.13)	(-0.90)
Mature dummy 8	-0.020	-0.004
	(-3.42)	(-0.47)
Mature dummy (Cumulative)	**-0.086**	**-0.037**
	(-7.14)	**(-2.29)**
R^2	0.0007	0.0011
N	1,855,535	1,855,535

Table 5
Mature Sample, Iowa Futures--Dividend Interactions Only
(t-statistics in parentheses)

	Unweighted	Weighted
ΔBush	0.035	-0.008
	(4.77)	(-0.68)
ΔBush x Dividend yield	-0.413	-0.106
	(-2.46)	(-0.47)
R^2	0.0007	0.0002
N	93,981	93,981

Table 6
Mature Sample, Iowa Futures--All Interactions
(t-statistics in parentheses)

	Unweighted	Weighted
ΔBush	0.023	-0.046
	(1.91)	(-1.63)
ΔBush x Dividend yield	-0.419	-0.079
	(-2.62)	(-0.37)
ΔBush x Probability of issuance	0.052	0.152
	(1.68)	(3.04)
ΔBush x Probability of purchase	0.005	0.106
	(0.08)	(1.06)
R^2	0.0007	0.0011
N	93,981	93,981

Table 7
Full Sample, Iowa Futures
(t-statistics in parentheses)

	Unweighted	Weighted
ΔBush	0.023	0.031
	(3.86)	(3.94)
ΔBush x Mature dummy	0.005	-0.039
	(0.84)	(-3.15)
R^2	0.0002	0.0004
N	333,158	333,158

Table 8
Mature Sample--Dividend and Industry Average Dividend Interactions
(t-statistics in parentheses)

	Unweighted	Weighted
Dividend yield 1	0.028	-0.080
	(0.49)	(-0.71)
Dividend yield 2	0.024	0.565
	(0.30)	(3.37)
Dividend yield 3	0.118	0.252
	(1.18)	(1.63)
Dividend yield 4	-0.199	-0.191
	(-1.61)	(-1.03)
Dividend yield 5	-0.125	0.064
	(-1.66)	(0.18)
Dividend yield 6	0.221	-0.095
	(1.28)	(-1.10)
Dividend yield 7	0.094	-0.157
	(1.12)	(-0.79)
Dividend yield 8	0.050	0.323
	(0.40)	(1.28)
Dividend yield (Cumulative)	**0.211**	**0.682**
	(0.68)	**(0.77)**

Table 8 (continued)

Industry average dividend yield 1	0.254	0.274
	(4.26)	(1.87)
Industry average dividend yield 2	0.068	-0.222
	(0.58)	(-0.96)
Industry average dividend yield 3	0.294	0.045
	(2.29)	(0.23)
Industry average dividend yield 4	0.226	0.512
	(1.90)	(2.45)
Industry average dividend yield 5	-0.346	-0.150
	(-3.18)	(-0.49)
Industry average dividend yield 6	-0.330	-0.181
	(-2.26)	(-2.12)
Industry average dividend yield 7	0.466	0.766
	(3.60)	(3.29)
Industry average dividend yield 8	0.313	0.142
	(2.53)	(0.56)
Industry average dividend yield (Cumulative)	**0.946**	**1.187**
	(2.54)	**(1.70)**
R^2	0.0017	0.0023
N	512,073	512,073

Table 3’
Mature Sample--All Interactions
(t-statistics in parentheses)

	3-Factor Model		**Institutional Ownership**	
	Unweighted	Weighted	Unweighted	Weighted
Dividend yield 1	0.123	0.126	0.135	0.130
	(2.71)	(1.22)	(2.89)	(1.18)
Dividend yield 2	0.008	0.382	-0.033	0.364
	(0.11)	(2.17)	(-0.42)	(1.97)
Dividend yield 3	0.191	0.204	0.214	0.201
	(2.05)	(1.17)	(1.89)	(1.18)
Dividend yield 4	-0.099	0.183	-0.127	0.204
	(-0.77)	(1.03)	(-1.04)	(1.13)
Dividend yield 5	-0.161	0.174	-0.302	-0.001
	(-2.19)	(0.79)	(-3.61)	(-0.00)
Dividend yield 6	0.098	-0.240	0.070	-0.201
	(0.63)	(-3.73)	(0.40)	(-3.30)
Dividend yield 7	0.189	0.224	0.257	0.389
	(2.24)	(1.30)	(2.40)	(2.08)
Dividend yield 8	0.224	0.546	0.170	0.507
	(1.49)	(3.63)	(1.27)	(3.60)
Dividend yield (Cumulative)	**0.573**	**1.600**	**0.385**	**1.594**
	(1.58)	**(2.65)**	**(1.13)**	**(2.74)**
Probability of issuance 1	0.015	0.003	0.014	-3.47E-04
	(1.34)	(0.16)	(1.26)	(-0.02)
Probability of issuance 2	0.030	0.057	0.033	0.050
	(1.94)	(2.06)	(2.24)	(1.64)
Probability of issuance 3	0.020	-0.006	0.022	-0.010
	(1.48)	(-0.34)	(1.55)	(-0.54)
Probability of issuance 4	0.048	-0.007	0.053	0.002
	(3.71)	(-0.37)	(4.02)	(0.10)
Probability of issuance 5	0.007	-0.001	0.004	0.006
	(0.34)	(-0.06)	(0.21)	(0.34)
Probability of issuance 6	-0.009	-0.007	-0.004	0.003
	(-0.73)	(-0.62)	(-0.33)	(0.30)

Table 3' (continued)

Probability of issuance 7	0.031 (1.60)	0.058 (2.41)	0.038 (1.96)	0.066 (3.05)
Probability of issuance 8	0.040 (3.01)	0.033 (1.91)	0.040 (3.15)	0.037 (2.27)
Probability of issuance (Cumulative)	**0.182** **(4.33)**	**0.130** **(1.82)**	**0.200** **(4.69)**	**0.153** **(2.16)**
Probability of purchase 1	0.020 (1.12)	0.016 (0.48)	0.022 (1.21)	0.011 (0.31)
Probability of purchase 2	-0.068 (-3.29)	0.014 (0.44)	-0.030 (-1.51)	0.019 (0.53)
Probability of purchase 3	-0.001 (-0.04)	-0.063 (-2.25)	0.015 (0.67)	-0.054 (-1.83)
Probability of purchase 4	-0.002 (-0.11)	-0.018 (-0.53)	-0.009 (-0.44)	-0.023 (-0.72)
Probability of purchase 5	-0.003 (-0.09)	0.060 (1.65)	-0.006 (-0.19)	0.054 (1.54)
Probability of purchase 6	-0.021 (-0.96)	-0.023 (-0.75)	-0.020 (-0.94)	-0.021 (-0.70)
Probability of purchase 7	-0.057 (-2.53)	0.018 (0.59)	-0.043 (-1.95)	0.026 (0.94)
Probability of purchase 8	0.039 (1.92)	0.068 (2.89)	0.025 (1.31)	0.057 (2.38)
Probability of purchase (Cumulative)	**-0.094** **(-1.41)**	**0.073** **(0.60)**	**-0.047** **(-0.76)**	**0.069** **(0.59)**
Institutional Ownership 1	--	--	-0.002 (-0.35)	0.008 (0.60)
Institutional Ownership 2	--	--	-0.042 (-4.11)	-0.025 (-1.25)
Institutional Ownership 3	--	--	-0.011 (-1.48)	-0.028 (-2.38)
Institutional Ownership 4	--	--	-0.002 (-0.29)	0.025 (2.00)
Institutional Ownership 5	--	--	-0.021 (-2.03)	0.006 (0.59)

Table 3' (continued)

Institutional Ownership 6	--	--	-0.012	0.015
			(-1.41)	(1.70)
Institutional Ownership 7	--	--	-0.016	0.010
			(-2.05)	(0.61)
Institutional Ownership 8	--	--	0.006	0.033
			(0.75)	(3.40)
Institutional Ownership (Cumulative)	--	--	**-0.100**	**0.045**
			(-4.20)	**(1.08)**
R^2	0.0011	0.0026	0.0021	0.0031
N	512,073	512,073	503,792	503,792

Table 4'
Full Sample-3 Factor Model
(t-statistics in parentheses)

	Unweighted	Weighted
Mature dummy 1	0.006	0.001
	(2.94)	(0.09)
Mature dummy 2	-0.013	-0.028
	(-2.74)	(-4.77)
Mature dummy 3	-0.001	-0.009
	(-0.32)	(-1.56)
Mature dummy 4	-0.014	0.001
	(-4.08)	(0.27)
Mature dummy 5	-0.002	0.014
	(-0.66)	(2.47)
Mature dummy 6	-0.005	0.008
	(-1.60)	(1.20)
Mature dummy 7	-0.035	-0.019
	(-6.47)	(-1.75)
Mature dummy 8	-0.014	0.005
	(-2.61)	(0.59)
Mature dummy (Cumulative)	**-0.079**	**-0.028**
	(-6.59)	**(-1.77)**
R^2	0.0004	0.0010
N	1,855,535	1,855,535

Table 6'
Mature Sample, Iowa Futures--All Interactions
(t-statistics in parentheses)

	Unweighted	Weighted
ΔBush	0.024	-0.040
	(2.01)	(-2.09)
ΔBush x Dividend yield	-0.413	0.054
	(-2.55)	(0.21)
ΔBush x Probability of issuance	0.051	0.135
	(1.68)	(4.26)
ΔBush x Probability of purchase	0.005	0.088
	(0.08)	(1.11)
ΔBush x Bush Favor	-0.021	-0.030
	(-0.73)	(-0.88)
ΔBush x Dem Favor	0.005	0.016
	(-0.08)	(0.23)
R^2	0.0008	0.0012
N	93,981	93,981

Table 7'
Full Sample, Iowa Futures
(t-statistics in parentheses)

	Unweighted	Weighted
ΔBush	0.023	0.031
	(3.82)	(3.59)
ΔBush x Mature dummy	0.006	-0.036
	(0.89)	(-2.77)
ΔBush x Bush Favor	-0.027	-0.024
	(-1.26)	(-0.81)
ΔBush x Dem Favor	0.059	0.056
	(1.54)	(1.67)
R^2	0.0002	0.0001
N	333,158	333,158

Figure 1. Investment and Transition for Immature Firms