Dividend Taxes and Firm Valuation: New Evidence

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The Jobs and Growth Tax Relief Act of 2003 (JGTRA03) reduced the tax rates on dividends, with the highest statutory tax rate of 35 percent falling to 15 percent. An interesting twist on the dividend tax cut was its temporary nature; the provision as passed was effective only through 2008, and (as recent Congressional deliberations have illustrated), the extension its supporters envisioned was by no means certain. This large dividend tax reduction, along with its sunset provision, offers an unusual natural research experiment on the effects of dividend taxation.

The theory of dividend taxation suggests three possible scenarios for the effects of the dividend tax reduction. Under the "tax irrelevance" view, the marginal shareholder is a tax-free entity (or a taxable investor who ignores or can offset incremental taxes), and the dividend tax reduction has no effect on equity values or firm behavior. Under the "traditional" view the marginal source of equity finance is new share issuance, and the tax reduction feeds through to the firm's user cost and stimulates extra capital formation. Share values rise in the short run but, after full adjustment, the higher capital level reduces the marginal revenue product of capital enough to offset the dividend tax reduction, leaving equity prices the same. Under the "new" view, the marginal source of finance is retained earnings and the dividend tax cut is capitalized into the share price of the firm but has no investment effect. Understanding the economic consequences of the dividend tax reduction requires knowledge of the empirical relevance of these competing views.

Our previous paper (Auerbach and Hassett 2005) performed an event-study analysis of a large panel of firms to determine how firm attributes affected the valuation response over eight key event dates leading up to the 2003 legislation. Our results, taken together, rejected outright

the tax irrelevance view and generally conformed to the predictions of the new view for firms that had paid dividends. We also found that additional theory was required, though, particularly with respect to the many firms that do not pay dividends and hence are not covered directly by the standard theories. Among our findings were:

1. For "mature" firms—those that had previously paid a dividend—a one percentage point increase in dividend yield led to a 0.5 to 1.5 percent abnormal return over the event dates.
2. Within this same set of firms, those more 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.
3. "Immature" firms—those that never had paid a dividend—significantly outperformed mature firms on our event dates, by excess returns from 3.7 and 8.6 percent.

To enhance our ability to distinguish among different potential explanations for these findings, we studied the pattern of abnormal returns leading up to another key event, the 2004 Presidential election, using the daily closing prices from the Iowa Electronic Markets U.S. Presidential Winner Takes All Market as measures of each candidate's election probability. We found that a higher probability of George Bush being reelected (which we associated with a higher probability of the dividend tax cut being extended past 2008) had the following effects[1]:

1'. It reduced the positive valuation effect of the dividend yield.

2'. It enhanced the positive valuation effect of being likely to issue new shares.

3'. It enhanced the bonus to being immature.

We argued that result 1' contradicted the prediction of the traditional view of dividend taxation that the positive valuation of high-yield firms in result 1 comes through a larger reduction in the cost of capital; under that view, a longer period of lower dividend taxes should have enhanced

that positive valuation effect. By contrast, results 1 and 1' are consistent with the new view of dividend taxation, which sees the current dividend yield as a matter of the timing of dividend payments; under this view, result 1 reflects a bonus to a firm paying a larger share of its dividends during the low-tax period between 2003 and 2008, and result 1' reflects the decreased importance of dividend timing when the probability of an extension increases.

Results 2 and 3 reflect the fact that, for firms likely to issue new shares (either by explicit prediction or by inference from their immaturity), the present value of dividends *exceeds* the value of existing equity. Intuitively, if a firm was planning to sell new shares tomorrow, and the dividend tax is reduced permanently today, then the firm benefits twice, first seeing the present value of dividends on its existing shares rise (because future dividends on those shares will face a lower rate of tax), and second, because it can sell the new shares tomorrow for a higher price (as those shares, too, will benefit from lower dividend taxes). Thus, a permanent dividend tax cut should provide a larger bonus for such firms. The reinforcing effects of greater permanence in results 2' and 3' conform to the story. While issuing shares necessarily takes firms beyond the realm of the simple new view—in which retained earnings always serve as the marginal source of equity funds—the importance of new share issue probabilities in predicting excess returns also further reduces support for the traditional view of dividend taxation, which treats new share issues as a regular activity of all firms and hence not useful in distinguishing among them.

Taken together these results suggested that the bonus accruing to high-yield firms was not associated with a decline in the cost of capital. Hence, except for immature firms and firms likely to issue new shares, the legislation may have done more to increase share values and perhaps also to promote other activities, such as dividend payments (as found by Raj Chetty and Emmanuel Saez 2005), than to increase investment.

In this paper, we extend our analysis in two ways. First, we consider the impact of the 2004 Presidential election on yet another aspect of firm valuation—the prices of outstanding options—to gain further insight into and confirmation of the mechanism through which the 2003 legislation affected firm values. Second, we provide further evidence for the 2003 event dates, exploring in more detail the determinants of the "immaturity premium" noted in results 3 and 3' above. In particular, and in contrast to claims in a recent paper by Gene Amromin et al. (2005), we find that the premium is associated with the likelihood of new share issuance, as inferred but not demonstrated in our original analysis.

I. Option Prices and the 2004 Election: Theory

Option prices reflect uncertainty. A Presidential election—particularly one in which the candidates have quite different views about capital income taxation—eliminates an important source of uncertainty for firms, and therefore should affect option prices. Indeed, using the Black-Scholes formula, we can estimate the volatility (the standard deviation of the underlying stock's rate of return) implied by an option price and calculate the decline in this volatility around the 2004 election. Our primary interest here is how this decline in volatility varied across firms, and whether the change in volatility agrees with our previous analysis.

As argued earlier, the reelection of George Bush in 2004 should have extended the expected duration of the 2003 tax cut. The findings outlined above suggest that this should have been most important to the firms whose dividends, on average, lie further in the future. Hence, the uncertainty surrounding the election should have increased volatility more for these firms during the pre-election period, and the resolution of uncertainty with the election should have been the most significant for them as well. Thus, we test whether the decline in volatility

follows the same pattern as the effects 1'-3', increasing with immaturity and the likelihood of issuing new shares, and decreasing with the firm's dividend yield.

II. Option Methodology, Data and Results

We start with the universe of firms from our previous paper—all firms for which we can obtain stock-price data from CRSP and balance-sheet and income-statement data from Compustat from 2002 onward. We consider all call options for this initial sample of firms that had a strike price/current price ratio on November 1, 2004 (the day before Election Day) between 0.85 and 1.15 and expired in November 2004, December 2004, or January 2005. The first restriction eliminates options far in or out of the money that have limited trading volume; the second enhances or ability to discern changes in implied volatility, which represents an average expected volatility over the option's remaining life. This filtering procedure leaves 5333 options in our sample, of which 2945 are for mature firms (firms that had paid a dividend as of the end of 2002) and the balance are for immature firms. We calculate the change in implied volatility based on closing prices of each option and its underlying stock on November 1 and November 3.[2]

Table 1 presents the results of cross-section regressions with this change in implied volatility as the dependent variable. The table's first three columns are based on unweighted regressions; the last three present the same equations, weighted by the daily dollar volume of option trades. In addition to coefficient estimates, the table also presents standard errors, clustered by 3-digit industry. The table's first column, which relates the change in volatility for the full sample of options to a constant and a dummy variable for mature firms, suggests a decline in volatility for both mature and immature firms, but the decline for immature firms is larger by a statistically significant difference. Indeed, for the weighted version of this regression, the entire decline in volatility is accounted for by immature firms, a difference that again is

statistically significant. Thus, our prediction that immature firms should have experienced a larger decline in volatility is borne out.[3]

The second and third specifications consider the impact of dividend yield and other covariates, and so are limited to the options of mature firms. The second specification has only the dividend yield as a covariate, while the third also includes the probability of a firm's issuing shares or repurchasing them based on a bivariate probit model described in more detail in our earlier paper.[4] In both versions of these two specifications, the constant has the expected negative sign and is generally significant, but the other two variables for which we offered predictions above, the dividend yield (predicted sign positive) and the new share probability (predicted sign negative) are insignificant in five out of six cases and of the wrong sign in half of the cases, with the only significant coefficient being of the wrong sign. Thus, there is no clear impact of our covariates within the mature sample. But, as expected, there is a clear relative decline in volatility for the immature firms that would have in theory been most affected by uncertainty concerning the dividend tax after 2008.

III. Additional Evidence on the Immaturity Premium

In our earlier paper, we did not focus in detail on explaining the immaturity premium. Amromin et al. (2005) challenge our interpretation of this premium, as well as those of other findings we reported. They replicate a subset of our event study results, but go on to make arguments that the evidence is more consistent with the tax irrelevance view. They base their alternative interpretation on three additional observations:

A. U.S. shares did not outperform those, such as European stocks, that should have been unaffected by the U.S. tax change.

B. The statistical significance of the results diminishes if the event window is extended through July, 2003, several weeks past the tax reduction.

C. Immature firms generally had good stock market performance during this time, and that performance appears unrelated to share issuance.

We find this analysis unconvincing. First, the authors without clarification ignored most of our event dates, making comparison of results difficult. Second, result A is drawn from an approach that has no power to distinguish between its null and alternative hypotheses. Poterba (2004), for example, estimates that the dividend tax could have boosted U.S. equity prices by 6 percent. This change would have been spread out over the entire period through which the probability of a dividend tax change evolved from zero to one. The authors report standard error bounds for their approach that are at times as wide as 13 percent, suggesting that even if the full effect predicted by theory occurred during their limited event windows, their approach would have little chance of uncovering a significant effect. It is incorrect to conclude, as the authors do, that there was "no" effect in these circumstances. The correct conclusion is that their approach by construction could find no effect, and that event study analysis using micro data is likely to be a much more fruitful research approach.

As to result B, it is common for statistical significance to decline as event windows widen and signal to noise ratios decline. This reflects the increased volatility of share prices over longer time frames, and not the absence of an effect, as the authors argued.

Finally, in arriving at result C, the authors use share repurchases as a proxy for the likelihood of new share issuance, reasoning that firms that have recently repurchased are unlikely to issue new shares, and find that immature firms grouped by repurchasing activity do not differ significantly in their immaturity premium. While repurchasing may be an indicator of a lower

probability of share issuance, this univariate approach is very crude. A superior approach would have been to predict the probability of future share issuance using a model such as the one outlined in our paper, and explore whether the immaturity premium is related to the probability of issuing new shares in the future. We perform this task in Table 2, using the sample and event study approach from our earlier paper, this time considering the probability of issuing and repurchasing shares for immature firms as well as mature firms.[5] Consistent with our earlier interpretation, we see clear evidence that the immature firms' excess returns are highly correlated with the probability that they will issue new shares in the future. This result is significant in both the weighted and unweighted runs. Also consistent with our earlier findings for mature firms, we find mixed evidence concerning share repurchases, suggesting that they alone are a poor proxy for the factors that determine the marginal source of finance, and hence, dividend tax effects.

IV. Conclusions

This paper reports additional evidence that the 2003 dividend tax reductions significantly affected equity markets. Together with our earlier study, this evidence rejects the view that taxes are irrelevant. Among firms that pay dividends and rarely issue shares, the main impact of the tax reduction appears to have been to boost share prices and encourage other activities, such as dividend payment, rather than to reduce the cost of capital. For firms that have yet to pay dividends and those likely to issue new shares, the effect is more complex. Firms expecting to issue new shares may well have experienced some reduction in their cost of finance and hence an investment stimulus, consistent with the traditional view of dividend taxation. In future work, we plan to explore whether investment responded to the lower dividend taxes in a manner suggested by our analysis of financial variables; that is, whether investment responses were stronger among firms more likely to have experienced a reduction in the cost of capital.

References

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Notes

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[1] Including in these equations dummy variables for groups of industries likely to favor Bush or Kerry based on other elements of their respective platforms had little impact on the results reported here.

[2] Options data, including calculations of implied volatility, come from the IvyDB OptionMetrics data set available through Wharton Research Data Services, which covers all U.S. listed equity options. The option pricing model used to calculate volatility incorporates dividend payments.

[3] To test whether this difference between mature firms might be due to other important differences related to volatility, notably firm size, we ran this regression separately for groups of firms broken into four quartiles by firm size. Doing so had little impact on the coefficients but increased standard errors.

[4] Covariates in the bivariate probit includes two lagged values of investment, cash flow, market value, and debt, all scaled by firm assets, as well as the firm's bond rating, the number of analysts following the stock, and categorical dummies for firm size and industry. The sample size drops somewhat with the addition of these covariates because of missing values for additional variables used in estimating the probit equation. The errors in the two branches of the bivariate probit have an estimated correlation of -0.968.

[5] The results in Table 2 for mature firms are repeated from our earlier paper.

Table 1. Election-Day Changes in Implied Volatility

(standard errors in parentheses)

Sample:	Full	Mature	Mature	Full	Mature	Mature
	Unweighted			Dollar Volume Weighted		
Constant	-0.018	-0.011	-0.014	-0.025	-0.008	-0.017
	(0.002)	(0.001)	(0.002)	(0.008)	(0.009)	(0.006)
Dividend yield		0.014	-0.045		0.449	0.035
		(0.059)	(0.055)		(0.345)	(0.131)
Issue probability			0.007			0.041
			(0.007)			(0.018)
Repurchase probability			0.017			-0.050
			(0.012)			(0.049)
Mature dummy	0.008			0.025		
	(0.002)			(0.011)		
R^2	0.006	.0001	.003	.050	.066	.042
N	5333	2945	2643	5333	2945	2643

Table 2. Cumulative Abnormal Returns: 2003 Event Dates

(standard errors in parentheses)

Sample:	Mature	Immature	Mature	Immature
	Unweighted		Weighted	
Constant	-0.026	0.058	-0.086	-0.086
	(0.016)	(0.026)	(0.028)	(0.060)
Dividend yield	0.507		1.495	
	(0.333)		(0.602)	
Issue probability	0.187	0.223	0.160	0.235
	(0.042)	(0.043)	(0.070)	(0.114)
Repurchase probability	-0.121	-0.386	0.087	0.143
	(0.066)	(0.111)	(0.119)	(0.075)
R^2	0.002	0.001	0.003	0.005
N	512,073	889,587	512,073	889,587