The Job and Growth Tax Relief Reconciliation Act
Tax Effects on Dividends

John Consler and Greg M. Lepak

Introduction

The Job and Growth Tax Relief Reconciliation Act, which was announced May 22, 2003, reduced the Federal income tax rate on dividends for ordinary income tax rates to a range of 5% to 15%. This reduction in tax rate should make dividends more valuable to investors. The maximum long-term capital gains tax rate was 20%. Companies may respond by raising dividends. Preliminary evidence from a *Wall Street Journal* editorial (2004) shows "aggregate dividend payments by the S&P 500 rose by some $33.4 billion from May 2003 to May 2004." Establishing a relationship between tax change and dividend change would be a departure from past studies where no relationship was found. De Angelo et.al. (2004) and Kalay and Michaely (2000) provide good summaries of these studies.

It is the purpose of this paper to investigate if the tax effect has resulted in measurable change in cash dividends per share or if other factors dominate. Most companies that pay dividends follow a constant or slightly increasing dividend per share over time. Many companies follow the signaling hypothesis and won't raise dividends per share unless future earnings support such an increase (Arnott and Asness 2003; Mougoue and Rao 2003; and Nissim and Ziv 2001). These other factors' relative strength may delay the tax effect on dividends to an uncertain future negating any measurable change around May of 2003.

This study will provide information which will add to the body of knowledge concerning the relationship between tax changes and cash dividends. Dividends per share should show a tax effect if it exists, rather than using aggregate dividends, which could give misleading results. Capital needs might disguise any tax effect present as shares outstanding increase. Contra wise, companies engaging in stock repurchase programs might be less likely to repurchase shares in lieu of cash dividends after the tax change on dividends, since dividends would have more value than previously. Using dividends per share avoids this complicating factor that aggregate dividends might change due to share repurchase programs and capital needs. Most investors focus on dividends per share, not aggregate dividends.

The tax change event took place on May 22, 2003. Using quarterly data, no measurable effect is likely to be present until the third quarter of 2003. Boards of director meetings are set in advance. Dividends are declared at these quarterly meetings and paid usually about one month later. Few companies would be able to react to the tax change in the second quarter. Only companies that had scheduled board meetings after 5/22/03 would be able to react in the second quarter. Therefore, it is the expectation that a measurable tax effect would not show up until the third quarter of 2003 or later.

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Literature Review

De Angelo et.al. (2004) and Kalay and Michaely (2000) find no link in tax changes to dividend changes. Kalay and Michaely (2000) conclude "...current theories do not link time-series return variations to taxes." Prior work done by Black and Scholes (1974) and Litzenberger and Ramaswamy (1979) provided a basis for Kalay and Michaely's work. They found the significant dividend-yield coefficient resulted from time-series return variations caused by risk changes. Kalay and Michaely (2000) also found "...the long-run risk-adjusted returns are not correlated with dividend yields" which is consistent with this prior work. Other less significant prior studies do not refute these general results.

Based upon the major prior work, there would be an expectation of no link between the May 2003 tax change on dividends and subsequent cash dividend payments. However, in the present case, the tax effect may be so large that a significant link can be empirically established. If this is accomplished, a contribution will be made to the body of knowledge of dividend behavior.

Sample and Data

The 46 companies in the sample were obtained from using *Value Line* investment service on-line screens as a starting point. Several screens were used in this study: domestic companies only, all industries, total assets ≥ \$50,000 million, declared dividends per share ≥ \$.30 (although most companies in the sample had larger dividends, see Table I mean dividends annual totals), and common shares outstanding ≥ 300 million. This resulted in 51 companies before additional constraints were applied. Four companies did not pay dividends quarterly and one has not paid 2005 dividends. Since the companies must exist over the test period, first quarter 2001 through second quarter 2005, and also pay dividends quarterly, the adjustments to the sample were made. This left 46 companies. The screens were run on 8/22/05, and running the screens on another date could yield different results.

A sample size from 30–50 companies was desired: this was large enough to give significant results, but not too large to make manual data collection difficult. The screens were varied until an appropriate sample size resulted. Many studies only look at industrial firms when studying dividends due to data availability. All industries are included for two reasons: the nature of the data collected was available for all industries (declared dividends per share by quarter), and financial companies make up a significant portion of the increase in cash dividends from May 2003 to May 2004 (*Wall Street Journal* 2004).

The resulting 46 companies are large companies with many shares outstanding. They should represent the companies that pay a large proportion of aggregate cash dividends.

Five of the companies had fiscal years that differed from the calendar year. In some of these cases, it was necessary to realign source data to match the proper calendar quarter. A fiscal year can mismatch the calendar by as little as one month or by as much as two quarters.

Quarterly data for 18 quarters were obtained, ending with second quarter, 2005. The event of the tax change took place in the second quarter of 2003. This allows 9 quarters pre- and post-event for test purposes.

Value Line investment service on-line provided quarterly dividends declared per share in dollars and cents. Missing data were sought from other sources such as *Moody's* investment service on-line.

Analysis and Results

The mean dividends per share for the 46 sample firms at each quarter from the first quarter 2001 to second quarter 2005 are displayed in Table I and Figure 1. From the figure, it is reasonable to model mean dividends by a linear function over this period, with a level shift in the third quarter of 2003 (time period 11). Also, it appears reasonable to test for a change in slope following the enactment of the new tax law. Therefore, it is of interest to determine whether or not the change in tax law has had an impact on both the level and rate of increase of cash dividend payments per share.

Inspection of dividends per share versus time for the sample suggests an approximate linear increase in dividends over time for most sample firms. The estimated intercepts and slopes from least squares regression showed substantial firm-to-firm variation. Since we intend to make inferences about the population from which the sample was drawn, we use random effects to model the intercepts and slopes of the individual firms. Also, the dividend jumps for sample firms in the third quarter of 2003 appear random, which may be due to the different degrees of clientele effect from firm-to-firm. However, the subsequent slope change after the jump is assumed to be non-random as firms are not expected to change their overall dividend policy, just their level of payment. Thus, the models below allow for the possibility of random level change and common slope change in assessing the impact of the new tax law on dividend trends for firms in the population. The reader is referred to Pinheiro and Bates (2000) for discussion on linear mixed-effects modeling.

Model for Random Level Change

A model which includes a linear time function to represent the uptrend in dividends and a term for level change to measure the impact of the new tax law can be expressed as

$$(1) \qquad y_{it} = (\beta_0 + b_{0i}) + (\beta_1 + b_{1i})\, t + (\beta_2 + b_{2i})\, I_t + \varepsilon_{it} \qquad (i = 1,\ldots,46;\ t = 1,\ldots,18)$$

where y_{it} represents the dividend (\$/share) for the ith company at time t; I_t is a binary variable taking the value one if $t \geq t_0$ and zero otherwise, with t_0 denoting the third quarter of 2003; β_0, β_1 are the population average intercept and average slope, respectively, for the period first quarter 2001 to second quarter 2005; β_2 represents the population average level change; the vector of random coefficients $\mathbf{b}_i=(b_{0i},b_{1i},b_{2i})$ are independent and identically distributed with a $N(\mathbf{0},\boldsymbol{\Psi})$ distribution; and the ε_{it} are the within-firm errors, which are independent and identically distributed with a $N(0,\sigma^2)$ distribution, independent of the random effects. Several nested versions of the model in equation (1) were estimated, and, as expected, likelihood ratio testing gave strong evidence in favor of the model in equation (1), where intercepts, slopes, and level changes are random.

Estimation results for equation (1) using restricted maximum likelihood are given in Table II. The estimates of the population intercept and slope are statistically significant ($p < 0.0001$ for both estimates). In addition, the estimate of β_2 is statistically significant ($p <$

0.0001); thus, there is strong evidence to support a positive level change in the population beginning in the third quarter of 2003.

Confounding between differential quarterly effects and the expected level change effect in the third quarter of 2003 may bias our results. We estimated an extended form of the model in equation (1) by including terms which represent quarterly seasonal effects and found little changes in the main interpretations and conclusions.

Two points are noteworthy concerning the estimation results for the model representation in equation (1). First, the low estimated correlations between random effects in Table 2 suggest that the covariance matrix $\boldsymbol{\Psi}$ in equation (1) is diagonal. We refit a nested form of the model in equation (1) by assuming that the random effects are independent. A likelihood ratio test confirmed the reasonableness in using the simpler structure for $\boldsymbol{\Psi}$. Second, the random effects across firms in a model with diagonal $\boldsymbol{\Psi}$ matrix do not sufficiently account for the autocorrelation in the within-firm errors. The mixed-effects linear model in equation (1) can be extended to allow the within-firm errors ε_{it} to be serially correlated. We examined different correlation structures for the within-firm residuals and found that a moving average representation (cf. Box et al. 1994) with a parameter at lags 1 and 2 provided a good fit to the data.

The re-estimated model in equation (1) with diagonal covariance matrix for random effects and moving average correlation structure for within-firm errors is given in Table II. Conventional diagnostic checks suggest that the estimated model is adequate. After accounting for serial correlation with a moving average error structure, the within-firm errors behave approximately as Gaussian white noise. Although there is some asymmetry noted when assessing the assumption of normality for random effects, this assumption appears plausible for all random effects. We conclude that the re-estimated model in equation (1) in Table II provides a reasonable fit to the data. Interestingly, the estimates for fixed effects remain relatively stable over both model fits in Table II. There is strong statistical evidence of a positive level shift in dividends per share in the population as a result of the new tax legislation ($p = 0.0055$).

Model for Common Slope Change

An alternate model which measures the slope change associated with the new tax law is given as

$$(2) \qquad y_{it} = (\beta_0 + b_{0i}) + (\beta_1 + b_{1i})\, t + (\beta_2)(t - t_0)\, I_t + \varepsilon_{it} \qquad (i = 1,\ldots,46;\ t = 1,\ldots,18)$$

where β_2 now represents the population average change in slope resulting from the tax change in 2003 and the remaining terms in equation (2) were defined in equation (1). Note that the parameter associated with slope change does not have a corresponding random component in the model in equation (2).

The restricted maximum likelihood estimation results for the mixed-effects model in equation (2) are given in Table III. The statistically significant estimate for slope change in Table III gives strong evidence that the new tax law has increased the population slope in dividend payments per share ($p < 0.0001$). As discussed above, further checks revealed that the initial model fit should be re-estimated with independent random effects and moving average error structure for the within-firm errors. The re-estimated model is reported in

Table III; diagnostic checks indicate that the model is reasonable. In the population represented here, there is strong statistical support for a positive adjustment to the linear increase in cash dividends per share following the tax change ($p = 0.0004$), at least through the second quarter of 2005.

Summary and Discussion

This study provides clear evidence that the Job and Growth Relief Reconciliation Act of 2003 had a significant positive effect on dividends per share for the 46 large companies in the sample. There is strong statistical evidence of a positive level shift in dividends per share in the population as a result of the new tax law. The shift occurs in the third quarter of 2003.

The evidence is provided by a developed model which includes a linear time function to represent the uptrend in dividends and a term for level change to measure the impact of the new tax law. The model is refined using a diagonal covariance matrix for random effects and moving average correlation structure for within-firm errors.

An alternate way to look at the same problem is another model constructed to measure the slope change associated with the change in tax law. The population average change in slope is not considered random. Strong statistical evidence shows that the new tax law has increased the population slope in dividend payments per share.

Both models developed indicate strong likelihood that the event of a tax change on dividends in 2003 resulted in a significant increase in dividends per share. The tax effect was clearly measurable.

While these results seem incompatible with the signaling hypothesis at first glance, they are specific to the event of the change in tax law. Individual firm's dividend policy is not expected to be greatly altered in the long run concerning signaling. It is likely this is primarily a one time jump in dividends per share with future firm dividend policy remaining relatively unchanged.

Future work on dividends should find increasing dividend importance compared to capital gains for investors. The longer the time since the tax change, the more likely it is to observe this effect.

Figure 1
Averages of Dividend Per Share Over 46 Sample Companies

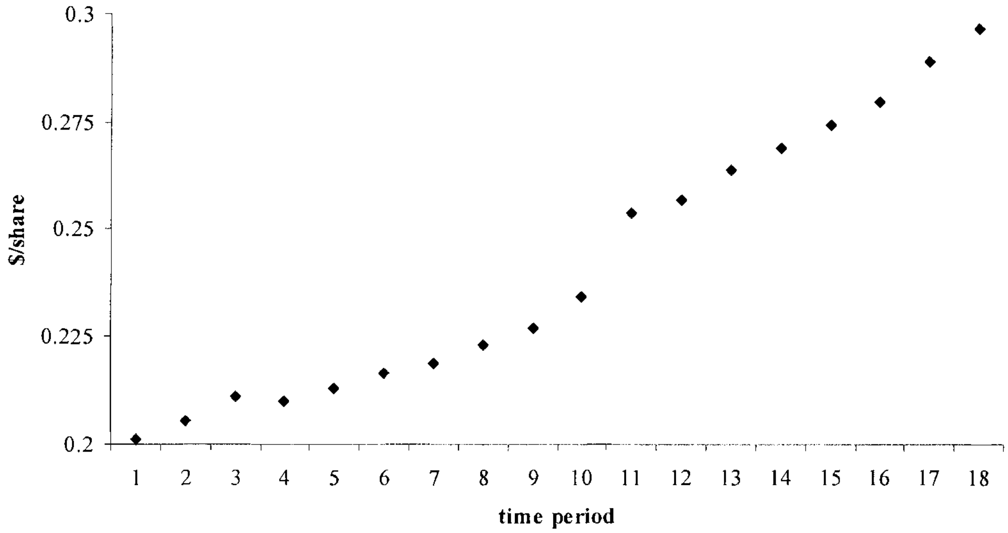

Table I
Mean Dividends in $/Share (± Standard Error of the Mean)

Year	2001	2002	2003	2004	2005
Quarter 1	0.204 ± 0.019	0.220 ± 0.019	0.234 ± 0.020	0.276 ± 0.022	0.294 ± 0.023
Quarter 2	0.208 ± 0.019	0.225 ± 0.019	0.241 ± 0.020	0.274 ± 0.021	0.301 ± 0.022
Quarter 3	0.215 ± 0.019	0.227 ± 0.019	0.260 ± 0.021	0.280 ± 0.022	NA
Quarter 4	0.217 ± 0.019	0.230 ± 0.019	0.262 ± 0.022	0.286 ± 0.022	NA
Annual	0.844	0.902	0.997	1.116	NA

Table II
Restricted Maximum Likelihood Estimates for Level Change Model

Model Terms	Estimate	Std. Error	p-value
Estimated model for equation (1)			
Fixed Effects			
Intercept	0.193	0.017	< 0.0001
Slope	0.004	0.001	< 0.0001
Level Change	0.019	0.006	0.0018
Random Effects (standard deviation)			
Intercept	0.114		
Slope	0.005		
Level Change	0.039		
Random Effects (correlation)			
Intercept vs. Slope	-0.119		
Intercept vs. Level Change	-0.077		
Slope vs. Level Change	-0.019		
Residual Standard Error	0.015		
Re-estimated model for equation (1)			
Fixed Effects			
Intercept	0.192	0.017	< 0.0001
Slope	0.005	0.001	< 0.0001
Level Change	0.016	0.006	0.0055
Random Effects (standard deviation)			
Intercept	0.114		
Slope	0.004		
Level Change	0.037		
Correlation Structure (within-firm)			
Moving Average (lag 1)	0.749		
Moving Average (lag 2)	0.401		
Residual Standard Error	0.016		

Table III
Restricted Maximum Likelihood Estimates for Slope Change Model

Model Terms	Estimate	Std. Error	p-value
Estimated model for equation (2)			
Fixed Effects			
Intercept	0.193	0.017	< 0.0001
Slope	0.005	0.001	< 0.0001
Slope Change	0.003	0.001	< 0.0001
Random Effects (standard deviation)			
Intercept	0.116		
Slope	0.006		
Random Effects (correlation)			
Intercept vs. Slope	-0.202		
Residual Standard Error	0.018		
Re-estimated model for equation (2)			
Fixed Effects			
Intercept	0.192	0.017	< 0.0001
Slope	0.005	0.001	< 0.0001
Slope Change	0.003	0.001	0.0004
Random Effects (standard deviation)			
Intercept	0.115		
Slope	0.005		
Correlation Structure (within-firm)			
Moving Average (lag 1)	0.689		
Moving Average (lag 2)	0.370		
Residual Standard Error	0.019		

Bibliography

Arnott, R.D. and Asness, C.S. (2003). "Surprise! Higher Dividends = Higher Earnings Growth." *Financial Analysts Journal*, v59, issue 1, January/February, 70-88.

Black, F. and Scholes, M. (1974). "The Effects of Dividend-Yield and Dividend Policy on Common Stock Prices and Returns." *Journal of Financial Economics*, v1, issue 1, 1-22.

Box, G.E.P, Jenkins, G.M., and Reinsel, G.C. (1994). *Time Series Analysis: Forecasting and Control*, third edition, Prentice Hall, Englewood Cliffs, New Jersey.

De Angelo, H., De Angelo, L., and Skinner, D. (2004). "Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings." *Journal of Financial Economics*, v72, issue 3, June, 425-457.

Editorial (2004), "Many Happy Returns." *Wall Street Journal*, November 3, 2004, A14.

Kalay, A. and Michaely, R. (2000). "Dividends and Taxes: A Re-Examination." *Financial Management*, v29, issue 2, Summer, 55-75.

Litzenberger, R. and Ramaswamy, K. (1979). "The Effects of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence." *Journal of Financial Economics*, v7, issue 2, 163-195.

Michaely, R. (1991). "Ex–Dividend Day Stock Price Behavior: The Case of the 1986 Tax Reform Act." *Journal of Finance*, v46, issue 3, 845-860.

Mougoue, M. and Rao, R.P. (2003). "The Information Signaling Hypothesis of Dividends: Evidence from Cointegration and Causality Tests." *Journal of Business Finance and Accounting*, v30, issue 3/4, April, 441-479.

Nissim, D. and Ziv, A. (2001). "Dividend Changes and Future Profitability." *Journal of Finance*, v56, issue 6, December, 2111-2134.

Pinheiro, J.C. and Bates, D.M. (2000). *Mixed-Effects Models in S and S-PLUS*, Springer-Verlag, New York.