ONE

The Effects of Taxes on Market Responses to Dividend Announcements and Payments: What Can We Learn from the 2003 Dividend Tax Cut?*

Raj Chetty
University of California, Berkeley and NBER

Joseph Rosenberg
University of California, Berkeley

Emmanuel Saez
University of California, Berkeley and NBER

1. Introduction

There is a long-standing debate in the finance and public economics literatures about the role of taxation in corporate dividend payout policies. Starting with Elton and Gruber (1970), researchers have investigated whether the tax-favored treatment of capital gains relative to dividends affects excess returns on ex-dividend and announcement dates.[1] The answers to these questions can potentially shed light on the efficiency consequences of dividend taxation as well as the reasons why corporations pay dividends despite their tax disadvantage, as explained in greater detail below.[2] Despite substantial research, the empirical literature on this topic remains controversial (see Allen and Michaely, 2003 for a recent survey).

[1] The ex-day is the date at which the dividend leaves the share.

[2] Note, however, that ex-dividend day price behavior does not allow us to distinguish the old view from the new view of dividend payout policies (see Auerbach, 1983).

* Raj Chetty, chetty@econ.Berkeley.edu; Joseph Rosenberg, jwr@econ.berkeley.edu; and Emmanuel Saez, saez@econ.berkeley.edu; University of California, Department of Economics, 549 Evans Hall, Room 3880, Berkeley, CA 94720. We thank Alan Auerbach, Douglas Bernheim, Gustavo Grullon, Francisco Perez-Gonzalez, James Poterba, Douglas Skinner, and Joel Slemrod for helpful comments and discussions. Financial support from NSF Grant SES-0134946 and the Sloan Foundation is gratefully acknowledged.

This paper proposes to use the 2003 dividend tax cut in the United States to cast light on these issues. The 2003 tax cut, part of the Jobs and Growth Tax Relief Reconciliation Act of 2003, eliminated most of the tax disadvantage of dividends relative to capital gains. Blouin et al. (2004) and Chetty and Saez (2005) have shown that the reform indeed raised dividend payments significantly and in particular induced many firms to initiate dividend payments. Here, we aim to investigate whether this reform had a significant effect on the ex-day and announcement-day price behavior as well. Consistent with the no-arbitrage conditions in standard models, we find that the ex-dividend day premium increased from 2002 to 2004, when the dividend tax rate was cut. Consistent with the signaling theory of dividends (and in contradiction with the agency models of dividends), we find that the excess return for dividend increase announcements went down from 2002 to 2004.

In order to have a broader perspective and assess with greater confidence whether there was a sharp change after 2003, we construct a time series of ex-day price changes and excess returns around dividend increase announcements at an annual level since 1962 (the first year daily price data became available) for all companies in the Center for Research in Security Prices (CRSP) data. To the best of our knowledge, despite the large number of studies on these issues, such a time series had not been constructed and examined in prior work. A number of useful findings emerge from this long-run analysis.

First, we find that there is substantial year-to-year volatility in the annual time series of excess returns around both the ex-day and announcement day that is unrelated to tax changes. The annual variation in the time series is not simply due to idiosyncratic firm level noise, because this variation should be averaged out given the very large samples we are using. Powerful year effects (aggregate shocks) unrelated to taxes are responsible for this pattern. Unfortunately, the time-series pattern is non-monotonic and therefore is unlikely to be explained by a single change (such as the elimination of discrete pricing in the U.S. stock market) or by a gradual trend (such as the rise of the share of corporate stocks owned by pension funds). Moreover, we are unable to find a set of covariates that had much explanatory power in smoothing the aggregate fluctuations. A simple power analysis shows that even the effects of large tax reforms would be difficult to detect given the aggregate volatility of the series. We conclude that one should be careful when comparing individual years (e.g., around a reform) to detect a tax effect. The 2003 tax change illustrates this point well. As mentioned above, the ex-day premium pattern suggests a strong tax effect if one compares

2002 to 2004, but a placebo test comparing 2002 to 2000 would produce a false positive.

Second, the long-run time pattern of the ex-day price behavior does not follow the long-run reduction in the advantage of capital gains versus dividends. Therefore, overall it is difficult to detect any robust pattern that one could attribute with confidence to a tax effect along the lines that Elton and Gruber (1970) originally proposed. More work is needed to test the various theories of ex-day price changes using the full time-series evidence rather than a focus on particular years, as has been the tradition in the literature.

Third, consistent with the empirical results of the influential study by Bernheim and Wantz (1995), we find that the overall effect of dividend increase announcements on prices has declined over time while the tax disadvantage of dividends has fallen. This finding supports the signaling theory of dividend payments, which argues that firms pay dividends despite their tax disadvantage in order to send a signal to the market about their profitability. However, again because of the large year-to-year variation in the time series of price effects, it is impossible to detect systematic effects around the major tax reforms in the United States since 1962, including the 2003 dividend tax cut. Therefore, the conclusion supporting the signaling theory rests on the strong assumption that no other long-term trend has driven the price effects down. However, it is quite plausible that factors other than tax changes (such as the increased availability of information about corporate activities) could have caused the secular decline in announcement premiums.

Our general assessment is therefore that little knowledge about tax effects can be gained even from large reforms such as the 2003 tax cut because of the extreme aggregate volatility in the time series of the data. The estimates of prior studies – which obtain significant results by making strong assumptions about the functional form or statistical properties of the error terms in regressions or by focusing on particular windows around tax changes – should therefore be viewed with caution. To be clear, we are not advocating time-series analysis instead of focusing on sharp tax experiments. Rather, we argue that credible empirical analysis requires examination of whether the changes in excess returns around a tax experiment are exceptional relative to the fluctuations in a long time series.

The remainder of the paper is organized as follows. Section 2 presents the conceptual framework and discusses previous work. Section 3 describes the data and our methodology. Sections 4 and 5 present the empirical results on ex-dividend premiums and dividend increase announcements, respectively. Section 6 describes the main methodological conclusions that we draw from this analysis.

2. Conceptual Framework and Previous Work

Dividend payments affect short-term stock price behavior in two ways. First, firms announce dividend payments about four to six weeks before the actual payment is made. Announcements of dividend initiations (by a firm starting to pay dividends) or dividend increases (by a firm already paying dividends) are generally viewed as good news and generate, on average, a positive excess return around the announcement date (see Allen and Michaely, 2003 for a survey). This is because increases in regular dividend payments are perceived by the market as a strong commitment to pay more dividends in the future. Historically, regular dividend payments (in general, quarterly, but sometimes annual or semi-annual) tend to be very smooth: Firms do not increase their dividend payments very often, and they are extremely reluctant to decrease or terminate dividend payments.

Second, when the dividend is paid, the book value of the corporation is reduced by the amount paid out, which generates a negative excess return around the payment event. More precisely, when a corporation announces a dividend payment, it sets two key dates: the ex-dividend date and the payment date. The payment date is the date when the corporation effectively pays out the dividend and is in general about two weeks after the ex-dividend date. Dividends, however, are paid out to stockholders according to stock ownership just before the ex-dividend date (and not according to stock ownership at the time of payment). In other words, a stockholder is entitled to the dividend payment if and only if he or she owns the stock just before the start of the ex-dividend day.[3] Therefore, we should expect a drop in price between the end of day preceding the ex-day (sometimes called the "cum-day" to mean that the stock is trading *with* the dividend on that day) and the beginning of the ex-day because those buying the stock after the beginning of the ex-day are no longer entitled to the dividend payment.

The effects of dividend announcements and ex-dates on stock prices can be nicely illustrated with the extremely large special dividend payment of $3 per share made by Microsoft at the end of 2004. This special dividend (along with a doubling of the regular dividend) was announced on July 20, 2004.[4] One can clearly see in Figure 1 that the share price rose quickly in the days surrounding the announcement (illustrated with vertical lines in

[3] An individual purchasing the stock between the ex-day and payment day would not receive the dividend, but the former owner would.

[4] On the same day, Microsoft announced an increase in its regular dividend payment. Microsoft had previously paid an annual dividend of 16 cents per share and announced that it was switching to quarterly payments of 8 cents per share, effectively doubling its regular dividend payments.

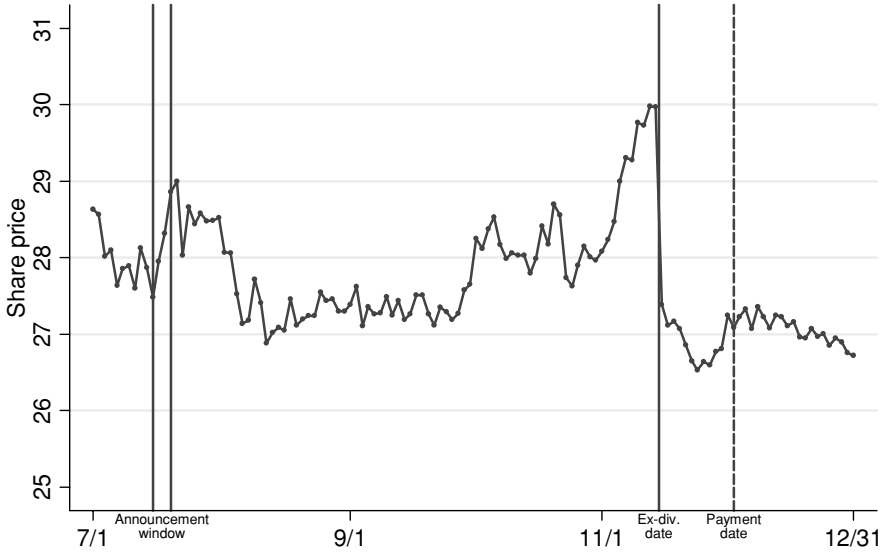

Figure 1. Microsoft Dividend Announcement and Ex-Day Price Effects

The Figure reports the daily closing prices of Microsoft shares from July 1, 2005 to December 31, 2005 from CRSP data. On July 20, Microsoft announced a doubling of its regular dividend payment as well as the payment of a very large one-time special dividend of $3 per share. The three-day window around the announcement date, which is used to estimate abnormal returns, is depicted by the first two vertical lines. The ex-day for the $3 special dividend is November 15. The drop in price from the cum-day (November 14) to the ex-day (November 15) is depicted by the third vertical line. The payment date, December 2, is also depicted by a dashed line.

Figure 1). This jump represents the "excess return" around the announcement date, which we define formally below. The ex-dividend day for the special dividend was set as November 15, 2004. Hence, all individuals and institutions owning Microsoft shares before the start of November 15, 2004 were entitled to a $3 dividend per share. The sharp drop in the price at this time is consistent with the negative excess return that we expect around the ex-date. Finally, dividend payments were made by Microsoft to those shareholders on December 2, 2004 (irrespective of whether they had sold their stock after November 15).

Our analysis roughly seeks to answer the question "How would the excess returns around the announcement and ex-dates in the Microsoft figure have differed if these events had occurred prior to the 2003 tax cut?" We answer this question essentially by averaging excess returns around the ex-day and announcement dates for many firms and comparing the means during different tax regimes. Because the timing of the tax change is quite important for our analysis, it will be helpful to review the details of the

reform here. The Jobs and Growth Tax Relief Reconciliation Act of 2003 introduced favorable treatment for individual dividend income whereby dividends are taxed at a rate of 15 percent instead of facing the regular progressive individual income tax schedule with a top rate of 35 percent.[5] The reform was officially signed into law on May 28, 2003, but was first proposed by the Bush administration on January 7, 2003.[6] The tax cut on dividend income was made retroactive to the beginning of 2003. Therefore, during the first two quarters of 2003, corporations knew that dividends would face lower taxes with some probability. President Bush initially proposed a full exemption of dividend taxation at the individual level, potentially biasing pre-enactment expectations toward a larger tax reduction than what actually occurred. The tax rate on long-term realized capital gains was also reduced by the Jobs and Growth Tax Relief Reconciliation Act of 2003, but the reduction was smaller, from 20 percent to 15 percent, and applied only to capital gains realized after May 28, 2003. Thus, this change reduced significantly the tax disadvantage of dividends relative to capital gains. The tax cut is scheduled to expire by 2009, but it could be made permanent during the second Bush administration.

2.1. Ex-Dividend Day Returns and Taxes

The profit from selling at the end of cum-day (just preceding the ex-day) should equal the profit from selling at the beginning of the ex-day in order to eliminate arbitrage opportunities. In a world without taxes, this would mean that the drop in share price around the ex-day should equal the dividend per share. However, as first recognized by Elton and Gruber (1970), dividend and capital gains taxation can prevent this equality from holding. Ignoring overnight interest, the no-arbitrage condition with taxes is:

$$P_B - t_g(P_B - P_0) = P_A - t_g(P_A - P_0) + D(1 - t_d), \tag{1}$$

[5] More precisely, taxpayers in the bottom two income tax brackets (facing a regular marginal tax rate of 10 or 15 percent) face a new dividend tax rate of 5 percent, while taxpayers in the top four brackets (facing marginal tax rates of 25, 28, 33, or 35 percent) face a new dividend tax rate of 15 percent. Taxpayers on the Alternative Minimum Tax schedule (flat rate of 28 percent) benefit from the reduced 15 percent tax rate on their dividend income as well. Individual dividend income earned through tax-favored accounts such as 401(k)s and dividend income earned by government agencies, non-profit organizations, and corporations are not affected by the tax change.

[6] Auerbach and Hassett (2007) discuss the timing of the tax reform legislative process in detail. They find that the reduction of dividend taxation was not discussed seriously before the end of 2002. It was not mentioned in the Bush 2000 campaign platform either, suggesting that there was no anticipation that such a tax change would take place before the very end of 2002.

where

P_A is the stock price cum-dividend (just before the ex-dividend day starts),
P_B is the expected stock price on the ex-day,
P_0 is the stock price at initial purchase (tax base),
D is dividend amount per share,
t_g is the tax rate on realized capital gains, and
t_d is the tax rate on dividend income.
Rearranging equation (1), we obtain:

$$\frac{P_A - P_B}{D} = \frac{1 - t_d}{1 - t_g} \equiv \rho. \tag{2}$$

The left-hand side of this expression is called the *ex-day premium*. The right-hand side variable captures the differential tax treatment of dividends versus realized capital gains and is called the *ex-day tax preference ratio*, which we denote by ρ. Without taxes, the premium is expected to be equal to one: The price falls by the exact amount of the dividend premium.[7]

Figure 1 depicts the case of the large $3 special dividend payment from Microsoft. This special payment represented about 10 percent of the share price value and thus was large relative to day-to-day variation in stock prices, making the ex-dividend day drop in price clearly visible on the graph.[8] The drop in price is $2.58, generating a premium of 0.86. This value is fairly close to the value of one predicted by equation (2) in 2004, when the statutory rates for dividends and long-term realized capital gains were equal.[9]

There is a controversial debate in the literature about whether taxes actually affect the premium as in equation (2). Traditionally, the individual tax rate of dividend income has been substantially higher than the individual tax rate on (long-term) realized capital gains. Elton and Gruber (1970) estimated premiums for U.S. corporations in 1966–7 lower than one and argued that the differential tax could explain those results. Consistent with this claim, Barclay (1987) showed that the premium was not significantly

[7] This simple derivation hides complexities that can arise if the marginal investor considers *buying* (instead of selling) just before or after the ex-day. If the resulting capital loss incurred at the ex-day can be offset against capital gains, the same premium formula applies. The premium formula would be different, however, if the capital loss could not be offset or was offset against ordinary income.

[8] Most dividend payments are small relative to day-to-day price variations, making the drop in price impossible to detect looking at a single firm price series.

[9] More precisely, the rates were 15 percent for taxable individuals who had owned the stock at least one year. Hence, we would observe a premium equal to one if only taxable individuals had been trading.

different from one in the United States before the individual income tax was introduced in 1913, but it was significantly below one in 1962–5, when the tax differential was large. However, Michaely (1991) found no significant increase in the premium around the Tax Reform Act of 1986 (TRA86), which eliminated the favorable tax treatment of realized capital gains and thereby raised ρ sharply.[10]

One limitation of equation (2), which could explain why it fails to explain observed premiums well, is that it assumes that all agents face the same tax rates. In practice, however, there is substantial heterogeneity in the tax preferences of shareholders, as pointed out by Michaely (1991). Table 1 reports the overall ex-day tax preference ratio weighted by share of stock ownership in the U.S. economy. The estimates are based on Poterba (2004) as well as an unpublished appendix series kindly made available to us by the author.[11] Long-term individual owners in high-income tax brackets have typically faced a tax preference less than one. The tax ratio was equal to one briefly after TRA86 and again after the 2003 dividend tax cut. All non-taxable institutions – such as pension funds and individual pension accounts (IRAs and 401(k)s), nonprofit organizations, and government agencies, as well as individuals holding stock for the short term – have faced a tax ratio equal to one. In contrast, corporations have typically faced a ratio above one because only a fraction of dividend income received by a corporation is taxable and realized capital gains made by a corporation are fully taxable at normal rates.

A number of studies (see, e.g., Auerbach, 1983 in the public economics literature or, more recently, Michaely and Villa, 1995 in the finance literature) have developed models with heterogeneous risk-averse investors. Those studies show that equation (2) can be generalized. In that case, the premium equals the average of the tax ratios weighted by risk tolerance. Kalay (1982) and Eades, Hess, and Kim (1984) point out that discreteness in prices may cause a bias in measuring the ex-day price drop relative to the dividend (until recently, the minimum tick size was one-eighth in the United States). This bias may cause the average price drop to be less than

[10] Similarly, Lakonishok and Vermaelen (1983) did not find that the premium moved in the expected direction following a tax change in Canada. Poterba and Summers (1984), however, did find evidence consistent with the predicted tax effect in the case of the United Kingdom.

[11] Poterba (2004) includes only 25 percent of the statutory realized capital gains tax rate because he wants to estimate the effective burden on accrued capital gains. For the ex-dividend date tax ratio, however, the statutory tax rate on realized capital gains is the relevant one, and this is what we use for our analysis of ex-day premiums.

Table 1. *Ex-Dividend Day Statistics and Results*

	(1)	(2)	(3)	(4)	(5)
Year	Tax Preference (ρ)	Number of Events	Median Premium	Weighted-Mean Premium	Trimmed-Mean Premium
1963	0.80	4,089	0.95	0.95	0.95
1964	0.81	4,418	0.95	0.98	0.97
1965	0.81	4,767	0.91	0.89	0.85
1966	0.82	5,029	0.89	0.95	0.90
1967	0.82	5,259	0.85	0.81	0.84
1968	0.80	4,697	0.88	0.74	0.69
1969	0.81	5,074	0.74	0.71	0.67
1970	0.82	4,910	0.71	0.69	0.66
1971	0.84	4,851	0.81	0.78	0.76
1972	0.83	4,974	0.85	0.81	0.85
1973	0.84	5,232	0.84	0.90	0.90
1974	0.85	5,317	0.87	0.89	0.89
1975	0.86	5,451	0.96	0.93	0.91
1976	0.83	5,782	0.97	0.97	0.98
1977	0.84	6,234	1.02	1.03	1.02
1978	0.84	6,347	1.03	1.05	1.08
1979	0.84	6,034	1.00	0.97	0.96
1980	0.84	6,035	1.05	0.99	0.99
1981	0.86	5,712	0.94	0.89	0.88
1982	0.90	5,239	0.85	0.84	0.82
1983	0.91	5,404	0.83	0.80	0.76
1984	0.91	5,977	0.76	0.76	0.75
1985	0.92	6,813	0.67	0.67	0.64
1986	0.92	7,345	0.79	0.80	0.70
1987	1.00	7,498	0.83	0.83	0.75
1988	1.02	7,432	0.81	0.76	0.67
1989	1.02	7,334	0.76	0.77	0.69
1990	1.01	6,882	0.75	0.69	0.67
1991	1.01	6,484	0.88	0.80	0.79
1992	1.01	6,807	0.80	0.80	0.79
1993	0.99	7,231	0.87	0.85	0.76
1994	0.99	7,594	0.83	0.81	0.76
1995	0.99	8,030	0.69	0.61	0.56
1996	0.99	8,022	0.74	0.67	0.61
1997	0.96	7,764	0.68	0.63	0.62
1998	0.93	6,984	0.66	0.56	0.55
1999	0.93	7,190	0.70	0.61	0.64

(*continued*)

Table 1 *(continued)*

Year	(1) Tax Preference (ρ)	(2) Number of Events	(3) Median Premium	(4) Weighted-Mean Premium	(5) Trimmed-Mean Premium
2000	0.94	6,058	0.46	0.39	0.32
2001	0.95	5,661	0.47	0.43	0.39
2002	0.95	5,905	0.61	0.60	0.45
2003	1.02	6,147	0.69	0.64	0.57
2004	1.02	6,347	0.74	0.81	0.77
Std deviation	*0.08*		*0.14*	*0.15*	*0.17*
Total	0.90	256,360	0.81	0.79	0.76

Column (1) reports the tax preference ratio $\rho = (1 - t_d)/(1 - t_g)$ measuring the tax preference of realized capital gains over dividends for U.S. corporate stock (weighted by ownership) from 1963 to 2004. This ratio is constructed based on the data appendix from Poterba (2004).

Column (2) reports the annual number of ex-dividend days in the sample for all taxable regular and special dividends.

Columns (3), (4), and (5) report the corresponding time-series measures of the (market-adjusted) dividend premium $\Delta P/D$. Column (3) reports the median. Column (4) reports the dividend-yield weighted mean. Column (5) reports the mean (trimmed for the smallest 25 percent dividend yield events).

the dividend amount. In principle, these other effects should not eliminate the tax effects, but rather describe other channels that can potentially affect ex-day premiums.

2.2. Dividend Increase Announcement-Day Returns and Taxes

Corporations distribute profits to shareholders in two main forms: dividends and share repurchases. In a world without taxes and with perfect information, share repurchases and dividends are equivalent. However, the market appears to treat these two forms of payout very differently in practice. Reducing or terminating regular dividend payments carries a very negative signal and is heavily penalized by investors. In contrast, share repurchases (or one-time special dividend payments) are not seen as a commitment to continue paying in the future, and accordingly announcements of repurchases generate far lower excess returns than announcements of dividends.

One reason that these two forms of payout may not be equivalent in the current equilibrium is that their tax treatment differs. Under U.S. tax