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Ex-Day Behavior: Tax or Short-Term Trading Effects

M. AMEZIANE LASFER*

ABSTRACT

This study examines the behavior of share prices around the ex-dividend dates before and after the introduction of the 1988 Income and Corporation Taxes Act that reduced substantially the tax differential between dividends and capital gains in the United Kingdom. We find that, in the pre-1988 period when the differential taxation of dividends and capital gains is high, ex-day returns are positive and significant. In contrast, in the post-1988 period, ex-day returns are, in most cases, negative and insignificant. Further analysis reveals that, while ex-day returns are significantly related to dividend yield and to the length of the settlement period, they are not affected by the commonly used measures of transaction costs, such as the bid-ask spread and trading volume, or by the day of week, month of the year, type of dividend distribution, or number of days to the actual receipt of the cash dividend. We conclude that taxation affects significantly ex-day share prices in the United Kingdom.

PREVIOUS STUDIES HAVE documented that the risk-adjusted abnormal returns on the ex-dividend dates are positive and significantly related to the dividend yield. The interpretation of these findings is, however, controversial. The question relates to what category of investors sets ex-day prices. Elton and Gruber (1970) argue that ex-day share prices are set in such a way as the marginal long-term traders are indifferent between buying and/or selling before and after the ex-day and, as a consequence, the ex-day premium should reflect the differential taxation of dividends and capital gains of these long-term investors. Kalay (1982), on the other hand, showed that, in a world of certainty, investors not subject to this differential taxation of dividends and capital gains, referred to as short-term traders, will capture dividends and will eliminate any excess returns on the ex-day. In this case ex-day returns, if any, will reflect transactions costs of short-term traders. Heath and Jarrow (1988) relaxed the assumption of risk neutrality and showed that ex-day share prices are not likely to be set by any category of investors.

The empirical evidence provided to date remains inconclusive partly because ex-day returns may be affected by more than one of the above factors, i.e., differential taxation of dividends and capital gains, transaction costs, and

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risk exposure. To avoid this ambiguity, Lakonishok and Vermaelen (1986) study the trading volume around ex-days and report evidence of unusual patterns around ex-days consistent with short-term trading activity. Short-term traders are also found to capture dividends in the New York Stock Exchange (NYSE) (e.g., Karpoff and Walkling (1988) and Eades, Hess, and Kim (1994)), in National Association of Securities Dealers Automated Quotation system (Nasdaq) (Karpoff and Walkling (1990)), and in the Canadian market (Booth and Johnston (1984)). In contrast, U.K.-based studies support the tax hypothesis but do not provide a complete investigation of the dividend capture hypothesis.¹

In this article we attempt to discriminate between the above contending hypotheses by examining the behavior of share prices around the ex-days that resulted from the regulatory changes in the United Kingdom that affected only the differential taxation of dividends and capital gains.² Our analysis centers on the 1988 U.K. Income and Corporation Taxes Act (ICTA), an equivalent to the 1986 Tax Reform Act in the United States, which eliminated the preferential tax treatment of long-term capital gains. The abolition in 1988 of all rates of income tax above 40 percent and the taxation of capital gains at the taxpayer's highest income tax rate offer a unique controlled experiment to test for the impact of taxation on the behavior of share prices on the ex-dividend days. We hypothesize that, since the 1988 ICTA abolished the tax differential on dividend income and capital gains for the ordinary investor, ex-day tax premium should decline in the post-1988 period and even become negative to reflect the tax credit associated with the cash dividend received. We test this hypothesis using 10,123 ex-day events on the London Stock Exchange (LSE) over the period April 6, 1985 to April 5, 1994.

Further research in this area is important for at least three reasons. First, determining the identity of the marginal investor who sets the ex-day prices will be crucial in assessing the likely impact of dividend yield on security

¹ Poterba and Summers (1984) analyze short-term trading activity in the U.K. by comparing ex-day returns before and after the introduction of the legislation against dividend capture and provide a weak evidence for this activity. Kaplanis (1986) analyzes the ex-day share price behavior using option prices and finds that the actual ex-day falloff is not significantly different from the expected falloff, a result that is inconsistent with the short-term trading hypothesis. Lasfer (1995) used market value of equity as a proxy for transaction costs to find that ex-day returns are not monotonically distributed across size groups.

² Similar approach is adopted in the United States by Eades, Hess, and Kim (1984) and Lakonishok and Vermaelen (1986) to test the effect of the repeal of the fixed commission trading system in 1975, Grammatikos (1989) to test the effect of increasing short-term traders' risk exposure following the 1984 Tax Reform Act, Barclay (1987) to study the effects of the enactment of the federal income tax in 1913, and a number of other studies to assess the impact of the 1986 Tax Reform Act (e.g., Fedenia and Grammatikos (1991) and Michaely (1991)). Poterba and Summers (1984) investigate the effects of major changes in the British tax system, while Lakonishok and Vermaelen (1983) and Booth and Johnston (1984) analyze the effects of Canadian tax reforms. Lack of relevant data prevents us from analyzing the impact of the "Big-Bang" in October 1986 when the LSE abandoned fixed minimum commission scales on security dealing and allowed member firms to operate both as agents and as market makers.

returns (e.g., Miller and Scholes (1982) and Keim (1988)) and will help corporate managers in setting their dividend policies (e.g., Hamada and Scholes (1985)). Second, the U.K. environment provides a diametrically opposite influence on short-term trading. While the after-tax returns on dividend capture are likely to outweigh the transaction costs and the holding risks because of the tax credit associated with the cash dividends and the relatively high semiannual dividend yield, short-term trading is not likely to occur because of the institutional regulation. Thus, evidence from this analysis should be of relevance to tax regulators in assessing the effectiveness of short-term trading rules, to policy makers involved in the design of efficient trading systems and to market participants by contributing to the current debate on the transparency of the LSE. Third, while existing empirical evidence has largely centered on the U.S. markets, it would be of great interest to extend this work to a dealership market, such as the LSE, where trading practices are different from the U.S. markets (e.g., Schwartz (1991)).

Using various event study methodologies, we find that, on average, ex-day returns have decreased from 0.46 percent in the 1985 to 1987 period to 0.30 percent in the post-1988 period. Further analysis revealed that ex-dividend dates are confounded with the beginning of the LSE account when returns are high to reflect the financing advantage brought by the new account period. After adjusting for settlement date effect, we find that ex-day returns in the pre-1988 period are still positive and significant while the post-1988 period returns are negative and insignificant. We find significant decreases in ex-day returns over the two periods in all but the lowest dividend yield group. These results suggest that taxes affect ex-day share prices.

Two additional pieces of evidence support the tax interpretation of ex-day returns. First, we examine the behavior of share prices in the period surrounding the ex-dividend dates and find that the pre- and post-ex-dates abnormal returns are not significant. While an indication of significant abnormal returns outside the ex-dividend days may not be inconsistent with the tax hypothesis, the results confirm that short-term trading activity is not driving prices and compressing ex-day returns, in particular in the post-1988 period. Second, we analyze the post-1988 ex-day returns sorted by dividend yield and bid-ask spread to test the hypothesis that higher dividend yield and lower bid-ask spread shares are affected by short-term trading activity. We find that ex-day returns are not monotonically distributed across bid-ask spread categories. The regression results show a strong positive relationship between ex-day returns, dividend yield, and the length of the settlement period. In contrast, the relationship between ex-day returns and the commonly used measures of transaction costs such as bid-ask spread and trading volume is weak.

The rest of the article is organized as follows. Section I presents the institutional framework and the hypotheses to be tested. Section II discusses the data and the methodology. Section III discusses the empirical results. The conclusion is in Section IV.

I. Institutional Framework

This section builds on previous U.S. studies by Elton and Gruber (1970), Kalay (1982), Lakonishok and Vermaelen (1986), and Karpoff and Walkling (1990), and relates ex-day returns to the differential taxation of dividends and capital gains in the United Kingdom. We show that dividend capture is profitable, but this activity is subject to tighter institutional regulation.

A. The U.K. Imputation System and Ex-Day Returns

Elton and Gruber (1970) show that, in a risk-neutral world with preferential treatment of capital gains and no restrictions on short sales, shareholders are indifferent between buying or selling shares before or after the ex-day if these two days' after-tax returns are equal,³ i.e.,

$$P_{cum} - (P_{cum} - P_0)z = P_{ex} - (P_{ex} - P_0)z + d \frac{(1 - m)}{(1 - s)} \quad (1)$$

where P_{cum} is the price of a share immediately before it goes ex-dividend, P_{ex} its price immediately after it goes ex-dividend, P_0 is the original purchase price, m is the marginal tax rate on dividend income, z the effective capital gains tax rate, and d is the net cash dividend received. Under the U.K. imputation system, d is the dividend net of the tax credit deducted at firm level at rate s . For tax purposes, all investors are deemed to have received a tax credit, equal to $sd/(1 - s)$. Thus, $d/(1 - s)$ represents the gross dividend to be taxed at rate m .

This indifference condition can be arranged to yield ex-day return, R_{ex} , as:

$$R_{ex} = \frac{P_{ex} + d - P_{cum}}{P_{cum}} = \left(1 - \frac{1 - m}{(1 - s)(1 - z)} \right) \frac{d}{P_{cum}} \quad (2)$$

and the ex-day drop-off ratio, DOR_{ex} , as:

$$DOR_{ex} = \frac{P_{cum} - P_{ex}}{d} = \frac{1 - m}{(1 - s)(1 - z)} \quad (3)$$

The terms on the right-hand side of equations (2) and (3) reflect the tax differential between dividends and capital gains. Under the tax hypothesis, ex-day returns are positively associated with dividend yield and the income tax rate, m , but negatively related to the capital gains tax rate, z , and the rate of tax credit, s . If the long-term investor that sets ex-day prices is a tax

³ In the original Elton and Gruber model, the decision to hold or to sell shares before the ex-dividend day is for reasons unrelated to the dividend. The risks and transaction costs are fixed costs and, thus, irrelevant for determining equilibrium prices (e.g., Lakonishok and Vermaelen (1986)).

exempt institution for which $m = z = 0$, or an investor taxed at the basic rate of income tax, $m = s$, ex-day returns will be negative and the drop-off ratio higher than one. In contrast, if the long-term investor's capital gains tax, z , is lower than the tax on gross dividends, i.e., $(m - s)/(1 - s)$, then ex-day returns will be positive.

An examination of the price behavior on ex-days is unlikely to discriminate between the tax and the short-term trading hypotheses. In particular, one difficulty encountered when testing the tax hypothesis is on the computation of the effective tax rates. For instance, the effective capital gains tax rates are likely to be significantly lower than the observed statutory capital gains tax rates because of the various allowances, indexation together with deferral and tax timing options associated with capital gains (e.g., Booth and Johnston (1984) and Grammatikos (1989)).⁴ Stiglitz (1983) showed that capital gains tax rates can, in fact, be avoided altogether in a perfect capital market where transactions are costless by borrowing, hedging, accelerating losses, and deferring gains. In the United Kingdom, capital gains are treated more favorably than other forms of income because capital gains tax is payable in arrears, deferred on gifts, and gives relief on retirement and exemptions on death (e.g., Robinson (1989)). Thus a drop in ex-day prices in a particular period cannot be related directly to the differential taxation of dividends and capital gains because the effective capital gains tax rates are not known. In this article, to isolate the impact of taxation on ex-day returns, we study the behavior of share prices around the ex-days that resulted from the regulatory changes that affected only the differential taxation of dividends and capital gains. A major reform in the taxation of income and capital gains in the United Kingdom occurred in 1988.

B. The 1988 ICTA and the Tax Hypothesis

While taxation issues have always been the major "battle field" between the two main political parties in the United Kingdom, the provisions contained in the 1988 budget relative to the structure of the taxation of income and capital gains have been the only radical change in the tax code. Before 1988 a progressive income tax system was in operation where various income bands above the basic threshold were taxed at no less than 5 higher rates of income tax ranging from 40 to 60 percent. Capital gains, on the other hand, were taxed, since the tax was first introduced in 1965, at a single rate of 30 percent. Therefore, anyone paying tax at the higher rate paid less on capital gains than on income.

⁴ For instance, the annual capital gains tax exemption to husband and wife, individually, entitles shareholders to tax-free gains (of £5,800 in 1993) when shares are sold. Investors are also entitled to an indexation allowance, which gives protection from the effects of post-1982 inflation, and losses can be offset against gains or carried forward indefinitely to be set against future gains. The net unrealized gains when a person dies is not subject to capital gains tax but only to inheritance tax.

With the 1988 ICTA, all rates of income tax above 40 percent were abolished, thereby reducing the top band from 60 to 40 percent.⁵ The rate of the tax credit that is equal to the basic rate of income tax was cut from 27 to 25 percent.⁶ At the same time, capital gains tax rates were brought into line with those of income tax, so that capital gains are taxed at the taxpayer's highest income tax rate. For corporate investors capital gains were taxed after 1987 at the relevant corporation tax rate, i.e., 35 percent, instead of the prevailing capital gains tax rate of 30 percent.

The 1988 ICTA is not likely to have affected significantly the after-tax ex-day returns of tax exempt investors and investors taxed at the basic rate of income tax.⁷ In contrast, for investors taxed at the higher rate of income tax, the effect is likely to be substantial. Before 1988, the tax differential between dividends and capital gains is likely to be high because capital gains are taxed at a single rate of 30 percent, while dividends are taxed at up to 45 percent $((60 - 27 \text{ percent}) / (1 - 27 \text{ percent}))$ when the rate of the tax credit was 27 percent. As a result, ex-day prices are expected to decrease by less than the amount of the dividend. In the post-1988 period, on the other hand, ex-day prices should decrease by the full amount of the dividend because the statutory capital gains tax is equal to the income tax rate. However, ex-day returns depend on the magnitude of these investors' effective, rather than the statutory, capital gains tax rate, z , relative to their tax on dividends, $(m - s) / (1 - s)$. For instance, if the effective capital gains tax rate is lower than 20 percent, the tax differential between dividends and capital gains is positive, and ex-day prices should decrease by less than the amount of the dividend. Corporate investors, such as the investment trusts, are totally exempt from tax on their chargeable gains while dividends are taxed, i.e., $(m - s) / (1 - s) > 0$.⁸ Thus, even after the 1988 ICTA, ex-day returns may still be positive, but their magnitude is expected to be lower than their pre-1988 levels.

C. Dividend Capture in the United Kingdom

Kalay (1982) argues that, when ex-day returns include the tax premium, investors taxed at the same rate on dividends and capital gains will capture the dividend making ex-day prices fall by the full amount of the dividend. Elton, Gruber, and Rentzler (1984) argue, however, that short-term traders will be constrained by transaction costs. Moreover, Heath and Jarrow (1988) show that ex-day stock returns must include a risk premium because ex-day share prices are unknown. Thus, ex-day returns with short-term traders will

⁵ See the 1988 Finance Act, Section 98, and the 1992 Taxation of Chargeable Gains Act, Sections 4 and 6. There was also an increase in personal allowances in real terms and, by 1990, joint income by husband and wife was replaced by independent taxation.

⁶ Before 1988, the rate of the tax credit was cut from 30 to 29 percent in 1986 and to 27 percent in 1987. In 1993 this rate was reduced to 22.5 percent, and to 20 percent thereafter. See the 1988 Taxes Act, s. 14(3) and the 1993 Finance Act, s. 78(1) and s. 78(2).

⁷ The reduction in the rate of the tax credit, s , from an average of 28.5 percent in the 1985 to 1987 period to 25 percent in 1988 is not likely to affect these investors' ex-day returns.

⁸ See the 1980 Finance Act, s. 81(1) and the 1988 Finance Act, s. 117.

be negatively related to the holding risks and the implied transaction costs (e.g., Karpoff and Walkling (1990)). Empirically, corporate investors, who receive part of intercorporate dividend exclusion and have the full ex-day price drop treated as capital loss, are found to capture dividends in the US (e.g., Lakonishok and Vermaelen (1986) and Karpoff and Walkling (1986, 1990)).⁹ This strategy yields higher returns than the more traditional money market investment alternatives (e.g., Brown and Lummer (1986)).

In the United Kingdom, this activity is subject to institutional regulation introduced in the 1970 Finance Act and could incur tax penalties.¹⁰ The tax penalty depends upon the identity and motives of the trader. If an individual investor sells shares before the ex-day and repurchases them later to reduce his tax liability by more than 10 percent, then the tax savings from these transactions can be voided by the U.K. tax authority. On the other hand, a tax exempt investor who buys a share before its ex-dividend date and sells it just after, will become liable to tax. This investor, despite its tax exempt status, will not be able to claim all the tax credit, $ds/(1-s)$, on dividend received, d , but only $n/30$ of that tax, where s is the rate of tax credit and n is the number of days for which the share is held. Security dealers or corporate investors who trade in a security around its ex day and hold the share for less than a month will not be able to deduct the full capital loss from their taxable income. A fraction of this loss, varying inversely with the holding period, is disallowed for tax purposes.¹¹ This legislation implies that dividend is captured free of tax only if shares are held for one month.

Although the opportunities for trading around the ex days to capture dividends are likely to be reduced by this legislation, there is no reason to suspect that the prohibition is perfectly operational. When investors consider the tax advantages offered by the imputation system, then dividend capture becomes highly profitable. For example, corporate investors are likely to have a strong incentive to capture dividends because they can use the implied tax credit to either frank their own dividend distributions or to offset against their previous losses, and any capital losses may be set off against chargeable gains of that or any later accounting period.¹² Similarly, tax exempt investors, investment trusts who can switch investments tax free, and security dealers are expected to capture dividends to maximize their after-tax returns. Lasfer (1993) shows that dividend capture gains depend on the tax position of

⁹ To exploit the 70 percent dividend income deductions in the United States, firms have to hold their shares for a minimum of 46 days. See Karpoff and Walkling (1990), footnote 1, for details.

¹⁰ This system is part of the anti-bond washing legislation as stated first in Sections 471 to 475 of the 1970 Anti-Avoidance Act. Subsequently, this legislation is included in Section 731 of the Income and Corporation Taxes Acts, last amended in 1988.

¹¹ In practice, market makers can trade around ex dates without paying tax because they can net off their long and short positions and dividends received are set against those paid.

¹² Any surplus tax credit is carried forward into the next accounting periods or, if the corporate investor has unrelieved trading losses, the surplus is offset against such losses and an immediate refund of the relevant tax credit is obtained. See the 1992 Taxation of Chargeable Gains Act, s. 8(1) for taxation of capital losses.

short-term traders, the holding period, and the dividend yield. These potential benefits on dividend capture warrant a test of the short-term trading hypothesis in the United Kingdom.

II. Data and Methodology

Data on dividend distributions, ex-dividend dates, share prices, and market index to cover our sample period April 6, 1985 to April 5, 1994 are drawn from MicroView, a financial database microsystem and Datastream, an on-line database. We first obtain all the cash distributions in the form of either interim or final dividends. To avoid potential confounding effects of other announcements, a concern first raised by Miller and Scholes (1982), firms are excluded if they have any specific announcement such as earnings, stock splits, or rights issues within a period of 5 days on either side of their own ex day. Firms with missing observations are also excluded. Our final sample contains a total of 10,123 observations with 2,891 (28.6 percent) events occurring in the pre-1988 period and the remaining 7,232 (71.4 percent) cover the post-1988 period.

Event study methodology (Brown and Warner (1985)) is used to test the above hypotheses where the event is the ex-dividend date. We use the market model to compute the abnormal returns over the event window $(-10, +10)$ relative to the ex day. To obtain the market model coefficients, security returns are regressed against the *Financial Times All Shares Index* using $(-200, -41)$ trading days relative to the ex day and the Dimson (1979) specification to control for thin trading. A minimum of 40 nonmissing observations are required for the market model. To test for the sensitivity of our results to the event study methodology, we compute the drop-off ratio, the raw returns, and the mean-adjusted returns using the $(-200, -41)$ days estimating period.

While the prices are adjusted for any changes in capital, the reported dividends per share are not adjusted. We checked each company in the sample for any change in capital and adjusted the dividend per share accordingly. We use this adjusted dividend per share to compute the ex-day abnormal returns and the dividend yields.¹³

To test for the potential effects of short-term trading, we relate our computed ex-day returns to the corresponding bid-ask spreads and trading volume. We use both these measures as a proxy for transactions costs. Ideally, a test of the possible shift in short-term trading between the two sample periods would be more appropriate. Unfortunately, consistent data on these measures is available only in the post-1988 period.

Datastream provides the posted rather than the effective bid and ask prices. Pattersen and Fialkowski (1994) argue that, on the NYSE, when trades

¹³ Dividend yield is computed as the amount of dividend per share paid (either interim or final) over the corresponding cum-dividend price.

are executed inside the posted bid-ask spread, the posted spread is not an accurate measure of transactions costs faced by investors. However, in the LSE, posted spreads are likely to be closer to the effective spreads because, unlike the NYSE, large trades are not negotiated upstairs but brought directly to the market makers and filled immediately. Moreover, market makers have to display firm bid and ask prices for no less than the *minimum marketable quantity*¹⁴ and, unlike, for example, in the Nasdaq where market makers may “back away” from trading at posted prices, they are obliged to buy and sell up to that quantity at their quoted prices. Furthermore, unlike the retail-oriented Nasdaq market, over 60 percent of the trading on the LSE is done by institutions that demand immediacy. De Jong, Nijman, and Roell (1994) argue that, while the quoted spread may overestimate the realized cost of trading, the realized spread is not a good indicator of the cost of immediacy. Empirical evidence shows, however, that even in the United Kingdom transactions are commonly made on the LSE within the spread and that dealers offer systematic discounts from posted prices on medium to large trades (e.g., Schwartz (1991) and Reiss and Werner (1994)). Thus, if trading activity increases around the ex-day, the posted bid and ask prices are not likely to reflect the effective transaction costs.

To overcome this problem, we first look at the behavior of the bid-ask spread around the ex-days and find no significant changes in the pre-, post-, and ex-dividend dates’ levels. We, thus, compute the bid-ask spread on the ex-day, BAS_{ex} , rather than the average over a specified period, as in, e.g., Karpoff and Walkling (1990), as follows:

$$BAS_{ex} = \frac{ASK_{ex} - BID_{ex}}{(ASK_{ex} + BID_{ex})/2} \quad (4)$$

where ASK_{ex} and BID_{ex} are the ex-day ask and bid prices. Second, we test the sensitivity of this measure of transaction costs by relating the abnormal returns to the mean trading volume over the estimating period (+11, +60) relative to the ex-day.¹⁵ Trading volume is shown to be negatively related to transactions costs (Loeb (1983)) and this proxy was widely used in past research (e.g., Lakonishok and Vermaelen (1986) and Fedenia and Grammatikos (1991)). We expect short-term traders to capture dividends of high-

¹⁴ The minimum marketable quantity, referred to as the normal market size, is a dealing size set by the exchange’s council at about the median transaction size.

¹⁵ Datastream International has started reporting data on trading volume only in 1986. This data does not, however, cover the totality of our sample. As a result, the number of observations decreased to less than 3,800. We use (+11, +60) as the estimation period mainly to minimize the missing cases and to avoid the impact of earnings announcements that occur, on average, two weeks before the ex-days. Results based on the preevent period (−70, −20) did not change significantly the statistical significance of our results.

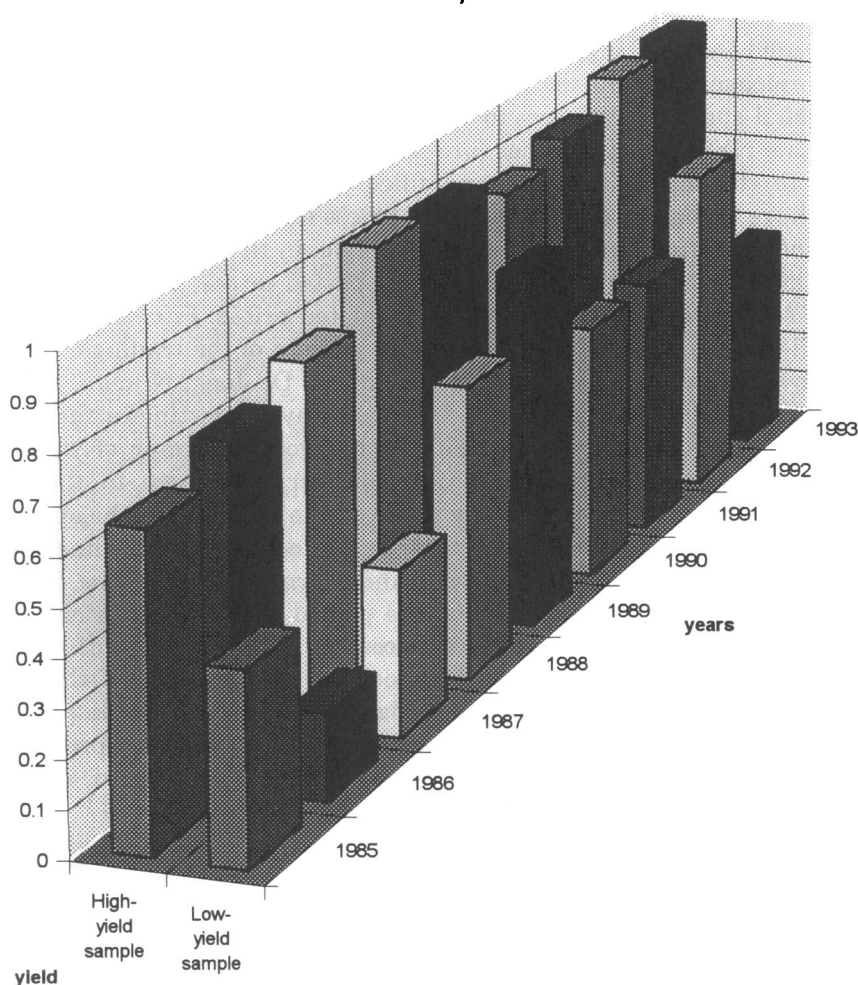


Figure 1. Average drop-off ratio of high- and low-yield samples (1985 to 1993).

yield-low-bid-ask spread and/or high-yield-high-trading volume shares. If short-term traders capture dividends of these shares, then their abnormal returns should be positive (negative) before (after) the ex days.

III. Empirical Results

A. *Ex-Day Abnormal Returns in the Pre- and Post-1988 ICTA*

Figure 1 charts the drop-off ratios of high- and low-yield samples for each of the fiscal years April 6, 1985 to April 5, 1994. As in Eades, Hess, and Kim (1994) the high-yield sample consists of the highest dividend-yield quintile, and the low-yield sample contains the three lowest dividend-yield quintiles, excluding the fourth yield quintile, to draw a clear distinction between the

samples. In line with Eades, Hess, and Kim (1994), ex-day drop off ratios vary over time. However, despite their fluctuations, the pre-1988 drop-off ratios are clearly lower than those of the post-1988. The decrease in the drop-off ratio of the low-yield sample in 1986 is likely to result from the cut in the rate of the tax credit from 30 percent in 1985 to 29 percent in 1986. However, the difference in mean drop-off ratios between these two dates is not statistically significant at any conventional confidence level. In contrast, the rise in the drop-off ratio in the post-1988 fiscal years is statistically significant compared to any of the fiscal years 1985 to 1987. Therefore, consistent with the tax hypothesis, the 1988 ICTA has resulted in a significant rise in the drop-off ratio.

To analyze further the extent of the effect of the 1988 ICTA on ex-day prices, we report in Table I the distribution of ex-day abnormal returns sorted by dividend yield.¹⁶ Panel A of Table I reports the results based on the market model and shows that in both subperiods, ex-day returns are positive and significant. These results are consistent with previous studies (e.g., Eades, Hess, and Kim (1984) and Lakonishok and Vermaelen (1986)), and imply that, on average, ex-day share prices drop by less than the amount of dividend, thus rejecting the null by hypothesis of no ex-day tax premium. However, while in the 1985 to 1987 period ex-day abnormal returns amount to 0.46 percent, they dropped to less than 0.30 percent in the post-1988 period. The differences in means and in the medians as reflected in the two-sample *t*-statistic and in the Mann-Whitney *p*-value are statistically significant at the 0.01 level. Similarly, with the exception of the lowest dividend yield group, the hypothesis that the remaining dividend yield groups' mean and median abnormal returns between the two sample periods are equal cannot be accepted at any conventional confidence level. It is interesting to note that, in the post-1988 period, the mean ex-day return of 0.363 percent generated by the highest dividend yield group is not significantly different from zero, while, on the other hand, ex-day abnormal returns of the lowest dividend yield quintile, although significant, are not significantly different from those of the pre-1988 period.

Similar results are obtained using alternative event study methodologies, as reported in Panel B of Table I. For example, the drop-off ratios increased significantly between our two sample periods from 0.49 to 0.74. These results suggest that the 1988 ICTA, by equalizing the marginal tax rates on gross dividend income and capital gains, resulted in a significant decrease in the tax premium.

Although the above findings suggest that the 1988 ICTA had a significant effect on the price formation around the ex-dividend day, our results are not consistent with the hypothesis that ex-day returns reflect the long-term investor's tax differential between dividend and capital gains. If ex-day returns are driven solely by taxes, then ex-day premium in the post-1988

¹⁶ The dividend yield quintiles are: less than 0.75 percent, 0.75 to 1.25 percent, 1.25 to 1.75 percent, 1.75 to 2.5 percent, and more than 2.5 percent.

Table I
Distribution of Ex-Day Abnormal Returns by Sample Period and Dividend Yield

In Panel A, ex-day returns are computed using the market model with the coefficients calculated over the estimating period (–200, –41) relative to the ex-day. The same estimating period is used to compute the mean adjusted returns reported in Panel B. *N* is number of observations. For the drop-off ratio, *ALL_{DOR}*, in Panel B, the *t*-statistic tests for drop-off ratio equal to one, and Percent Positive is the proportion higher than one. *Z* is the two-sample *t*-test for the difference in mean abnormal returns over the two periods.

Dividend Yield Groups	April 6, 1985 to April 5, 1988					April 6, 1988 to April 5, 1994					Mann-Whitney <i>p</i> -Values <i>Z</i>	
	Panel A: Percentage of Ex-Day Returns Based on the Market Model					Panel B: Drop-off Ratios and Percentage of Ex-Day Returns Using Alternative Methodologies						
	<i>N</i>	Mean	<i>t</i>	Median	Percent Positive	<i>N</i>	Mean	<i>t</i>	Median	Percent Positive		
ALL	2891	0.462***	11.67	0.285	58.1	7232	0.298***	5.43	0.159	55.8	0.0003	2.43
Lowest	657	0.166***	2.13	0.052	51.5	1232	0.143***	2.85	0.054	52.8	0.9318	0.25
2	677	0.412***	5.78	0.238	59.1	1594	0.251***	7.57	0.166	57.1	0.0383	2.05
3	525	0.370***	5.29	0.272	58.3	1575	0.292***	6.91	0.171	56.4	0.0807	1.96
4	532	0.649***	8.11	0.535	63.0	1529	0.419***	9.81	0.252	59.2	0.0164	2.53
Highest	500	0.834***	5.95	0.425	60.0	1302	0.363	1.27	0.097	52.4	0.0012	1.97
Panel B: Drop-off Ratios and Percentage of Ex-Day Returns Using Alternative Methodologies												
ALL _{DOR}	2891	0.487***	−6.62	0.500	68.7	7232	0.738***	−10.4	0.833	77.6	0.0000	−3.08
ALL _{RAW} %	2891	0.655***	14.52	0.532	66.9	7232	0.454***	16.28	0.260	59.6	0.0000	3.79
ALL _{MAR} %	2891	0.673***	21.17	0.456	65.2	7232	0.564***	12.47	0.335	62.7	0.0077	1.98

* Significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

period should be negative, and the drop-off ratio higher than unity, to reflect the tax credit associated with the cash dividend received. In contrast, Panel A of Table I shows that, with the exception of the highest dividend yield group, all the remaining abnormal returns are positive and significant and the drop-off ratios significantly lower than unity. Therefore, taxation is not the only factor that is affecting ex-day returns.

B. Impact of the Settlement Effect on Ex-Day Returns

A closer analysis of our sample revealed that all the ex-dividend dates occur on the first dealing day of the account of the LSE. Unlike the U.S. markets, the LSE operated during our sample period under the fixed *settlement dates* system where the trading year is divided into *account settlement periods* of two or three weeks.¹⁷ All transactions taking place within an account are due for settlement on *settlement day*, known also as *account day*, which is the second Monday after the end of an account.

The implication of this system is that share prices on the first dealing date trade at a premium to reflect the financing advantage brought by a new account period. *Other things being equal*, these Mondays returns are expected to be positive with the magnitude of two or three weeks of interest. Empirically, a number of studies have reported evidence of positive abnormal returns on first day of the account in the United Kingdom and in France (e.g., Theobald and Price (1984), Condoyanni, O'Hanlon, and Ward (1987), and Crouhy and Galai (1992)). Theobald and Price (1984), for example, have also pointed out that returns on the ex-dividend days that are the first Monday of the LSE account may be affected by settlement effects.

To account for the settlement effect, ex-day returns and drop-off ratios are adjusted by discounting, over the period of the account, ex-day prices using the one-month certificate of deposit interest rate applicable on the ex dates.¹⁸ Table II reports the distribution of the adjusted ex-day returns and drop-off ratios sorted by dividend yield. In the pre-1988 period, the adjusted abnormal returns of 0.16 percent are still significant ($t = 3.91$). In contrast, the post-1988 period adjusted ex-day returns of 0.04 percent are not significant ($t = 0.70$). The differences in means and medians between the two sample periods are significant. Consistent with the tax hypothesis, the results suggest that, before 1988 when the differential taxation of dividends and capital gains was high, the adjusted ex-day returns decreased by significantly less

¹⁷ The three-week period occurs at holiday times such as Christmas and Easter. In July 1994 the LSE axed the account period system and introduced the first stage of the rolling settlement system where any share transactions are settled 10 days later. On June 26, 1995 the LSE is expected to start the 5-day rolling settlement system.

¹⁸ I have also simulated the results using interest rates on 3-month and 1-year certificates of deposit and other short-term interest rates without any significant change in the reported results.

Table II
Distribution of Adjusted Ex-Day Abnormal Returns by Sample Period and Dividend Yield

In Panel A, Ex-day returns are computed using the market model with the coefficients calculated over the estimating period (–200, –41) relative to the ex-day and then adjusted for the length of the accounting period using a one-month certificate of deposit interest rate. For the drop-off ratio in Panel B, the *t*-statistic tests for drop-off ratio equal to one and Percent Positive is the proportion certificate higher than one. *N* is number of observations. *Z* is the two-sample *t*-test for the difference in means abnormal returns and drop-off ratios over the two periods.

Dividend Yield Groups	April 6, 1985 to April 5, 1988					April 6, 1988 to April 5, 1994					Mann-Whitney <i>p</i> -Values	
	<i>N</i>	Mean	<i>t</i>	Median	Percent Positive	<i>N</i>	Mean	<i>t</i>	Median	Percent Positive		
	Panel A: Percentage of Ex-Day Returns Based on the Market Model											
ALL	2891	0.155***	3.91	−0.022	49.3	7232	0.038	0.70	−0.109	46.2	0.0416	1.92
Lowest	657	−0.138*	−1.77	−0.247	44.1	1232	−0.115***	−2.28	−0.162	42.9	0.4505	−0.25
2	677	0.109	1.53	−0.032	48.7	1594	−0.008	−0.24	−0.110	45.7	0.0908	1.99
3	525	0.065	0.92	−0.056	48.2	1575	0.034	0.81	−0.104	47.5	0.8931	0.37
4	532	0.336***	4.18	0.208	54.7	1529	0.157	1.66	−0.011	49.6	0.0927	1.97
Highest	500	0.523***	3.74	0.132	52.4	1302	0.104	0.36	−0.181	44.7	0.0072	1.91
Panel B: Ex-Day Adjusted Drop-Off Ratio												
ALL	2891	0.775***	−4.86	0.776	88	7232	0.97	−1.12	0.99	92	0.000	−3.73
Lowest	657	0.919	−0.50	0.747	93	1232	1.23**	1.88	1.04	100	0.034	−1.53
2	677	0.697***	−3.19	0.627	90	1594	0.94	−1.60	0.99	86	0.000	−2.36
3	525	0.809***	−2.88	0.818	82	1575	0.92	−1.59	1.02	90	0.002	−1.42
4	532	0.631***	−7.17	0.737	82	1529	0.88**	−1.88	0.97	91	0.000	−4.43
Highest	500	0.808***	−4.81	0.872	90	1302	0.94	−1.04	0.99	96	0.000	−2.24

* Significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

than the amount of the dividend. In contrast, when the tax differential was eliminated by the 1988 ICTA, ex-day returns appear to have decreased by the full amount of the dividend.

The significance in ex-day abnormal returns in the pre-1988 period is driven by the two highest dividend yield groups. Ex-day prices of the first three dividend yield groups decrease by the full amount of the dividend. In particular, for the lowest dividend yield group, the adjusted ex-day returns in both subperiods are negative and significant, suggesting that ex-day share prices decrease by more than the amount of the cash dividend. The t -statistic of the difference in the pre- and post-1988 means abnormal returns of -0.25 is not statistically significant at any conventional confidence level. For the subsequent two yield groups ex-day returns are not significant, and the middle yield group is not significantly different from its post-1988 level. In contrast, the last two groups are positive and significant and substantially different from their post-1988 levels.

Panel B of Table II provides the distribution of the adjusted drop-off ratios. In the pre-1988 period, ex-day prices drop by about 78 percent of the amount of the dividend. This drop-off ratio is significantly lower than unity ($t = -4.86$). In contrast, in the post-1988 period, the mean drop-off ratio has risen to 97 percent and is not significantly different from one ($t = -1.12$). The t -statistic for the difference in the two sample periods drop-off ratios is significant ($t = -3.73$). In line with the above results, the significant drop appears to be driven by the highest dividend yield group. In the pre-1988 period, the ex-day drop-off ratio of the highest dividend yield group of 0.81 is significantly different from one ($t = -4.81$), while that of the lowest dividend yield group of 0.92 is not significantly different from one. In the post-1988 period, the highest dividend yield group's drop-off ratio of 0.94 is not significant ($t = -1.04$), while that of the lowest dividend yield group is 1.23, significantly higher than one ($t = 1.88$).

The tax hypothesis predicts also that ex-day abnormal returns should be positively related to dividend yield with a decline in its coefficient in the post-1988 period. To test further this hypothesis, we construct a dummy variable, *DUM-Yield*, equal to dividend yield for post-1988 period and zero otherwise. A regression of ex-day abnormal returns against dividend yield and *DUM-Yield* gives the following results (t -statistics in parentheses):

$$AR_{exj} = -0.005 + 0.684 Yield_j - 0.116 DUM-Yield_j \quad \overline{R}^2 = 7.1\% \quad F = 388$$

$$(-17.8) \quad (25.33) \quad (-5.70) \quad (5)$$

where AR_{exj} is the adjusted ex-day abnormal returns on security j , *Yield* is the corresponding dividend yield and *DUM-Yield* is the dividend yield times the post-1988 dummy variable. Consistent with the tax hypothesis, the post-1988 dividend yield dummy is negative and significant ($t = -5.70$). Further analysis of this relationship shows, however, that the results are driven by the highest dividend yield group. The corresponding regressions using the lowest (*L*) and highest (*H*) dividend yield quintiles produce the

following results (*t*-statistics in parentheses):

$$\begin{aligned}
 AR_{exL} &= -0.004 + 0.563 \text{ Yield}_L - 0.086 \text{ DUM-Yield}_L & \overline{R^2} &= 0.2\% & F &= 2.43 \\
 &(-2.79) & (2.17) & & (-0.57) \\
 AR_{exH} &= -0.020 + 0.83 \text{ Yield}_H - 0.149 \text{ DUM-Yield}_H & \overline{R^2} &= 27.3\% \\
 &(-19.43) & (25.59) & & (-4.69) \\
 F &= 386.7 & & & (6)
 \end{aligned}$$

As shown above, the 1988 ICTA appears to have had no effect on ex-day prices of the lowest dividend yield quintile. In contrast, for the highest dividend yield group, the significance of the post-1988 dividend yield dummy implies that, as a result of the 1988 ICTA, the relationship between ex-day returns and yield has shifted significantly over the two periods.¹⁹

To the extent that the magnitude of the computed dividend yield reflects long-term investors' expected yield, our results appear to suggest that the lowest dividend yield shares are likely to be held by tax-exempt institutions that were not affected by the 1988 tax reforms, and the negative ex-day returns reflect the tax credit associated with the cash dividend. In this case, in line with previous U.K. studies (e.g., Lasfer (1995) and Poterba and Summers (1984)) the reported results do not provide support for the dividend tax clientele hypothesis, which predicts that share prices of the high yield group, owned by low-tax bracket investors, should drop by the full amount of the dividend on the ex-day. However, relating these results to the dividend tax clientele may be misleading because the definition of dividend yield, i.e., dividend per share over price cum dividend, may classify firms into lower yield category either when the dividend distributed is low or when the price is temporarily high. Thus, although this definition of dividend yield is useful in testing short-term trading effects, it may be misleading for the tax interpretation because it does not measure the expected yield of long-term investors for which the annualized dividend yield is likely to be more relevant.²⁰

C. Tests of the Short-Term Trading Hypothesis

Short-term trading hypothesis predicts that the pre-ex-day returns should be positive and post-ex-day returns should be negative. Significant price increases before the ex-date will be consistent with the buying pressure of short-term traders while, in the post-ex-dividend date, a selling pressure by

¹⁹ Another particularity of the LSE trading system relates to the fact that, following the *new time* dealing system, investors can trade on the new account 2 trading days before the first day of the account. The implication of this system is that investors who trade on Thursday, for example, may do so to capture dividends or to realize capital gains. We simulated the previous analysis using the cumulative abnormal returns over the period $(-2, 0)$ relative to the ex-day, but find no significant change in our reported results.

²⁰ However, Christie (1990) identified a number of specific misclassification problems that apply to dividend omission and initiation when the annualized dividend yield is computed.

short-term traders to reduce their holding risk will result in a fall in prices. Table III reports the distribution of the cumulative abnormal returns (CAR) before and after the ex dates. In the pre-1988 period, the overall CAR in the 4 days before the ex-day of 0.07 percent are not significant ($t = 1.01$). Similarly, in the post-ex-day period, the CAR of 0 percent are not significant ($t = 0.01$). The analysis by yield shows, however, that the pre-ex-day period CAR of the highest dividend yield quintile is positive and significant. Although this result is consistent with possible short-term trading activity, the ex-day abnormal returns of 0.523 percent (Table II) are positive and significant, thus unlikely to be affected by this activity. Moreover, the CAR of 0.06 percent in the four days after the ex-day are not significant ($t = 0.40$), suggesting that these prices are not affected by the selling pressure of short-term traders.

In the post-1988 period, the positive and significant cumulative abnormal returns in the four days before the ex-day appear to be driven by the significance of the lowest dividend yield quintile. These results are not, however, consistent with the short-term trading hypothesis, which predicts that this activity will occur in the highest dividend yield group. Similarly, the positive and significant cumulative abnormal returns in the four days after the ex-day generated by the highest dividend yield quintile is inconsistent with the short-term trading hypothesis where negative returns are expected.

To analyze further this hypothesis, Table IV reports the distribution of the post-1988-period CAR sorted by dividend yield and then by bid-ask spread.²¹ If short-term traders capture dividends in the United Kingdom, we would expect positive and significant CAR occurring in the high-dividend-yield, low-bid-ask spread group. The cumulative abnormal returns of this group of 0.268 percent are significant at the 0.10 level and appear to be consistent with the short-term trading hypothesis. However, the t -statistic of the difference in means with the low-yield-low-bid-ask spread group is 0.07, not significant at any conventional confidence level. Similarly, the t -statistic on the difference in means with the high-yield-high-bid-ask spread group of 0.85 is not significant. In the post-ex-day period, none of CARs are negative and significant. The results, thus, do not provide evidence of dividend capture activity in the United Kingdom.

The above results are also simulated using the trading volume as a proxy for the transaction costs incurred by short-term traders. A regression of the four pre-ex-days CARs against the mean £ trading volume over the estimating period (+11, +60) relative to the ex-day, yields the following results (t -statistics in parentheses)

$$CAR_{-4,-1} = 0.003 + 0.0001 \text{ Mean Volume} \quad \overline{R^2} = 0.0\% \quad F = 1.43. \quad (2.88) \quad (1.20) \quad (7)$$

²¹ The bid-ask spread quintiles are: less than 1 percent, 1 to 1.5 percent, 1.5 to 2 percent, 2 to 3 percent, and more than 3 percent. The pre-1988 relevant data is not available.

Table III
Distribution of Percentage Pre- and Cum-Ex-Day Cumulative Abnormal Returns (CARs) by
Sample Period and Dividend Yield

Ex-day returns are computed using the market model with the coefficients calculated over the estimating period (–200, –41) relative to the ex day. t is the statistic for the significance from zero in the mean abnormal returns.

Dividend Yield Groups	April 6, 1985 to April 5, 1988				April 6, 1988 to April 5, 1994			
	CAR _{-4,-1}		CAR _{+1,+4}		CAR _{-4,-1}		CAR _{+1,+4}	
	Mean	Median	t		Mean	Median	Mean	t
ALL	0.07	–0.02	1.01	0.01	0.09***	0.12	0.11	1.35
Lowest	–0.09	–0.03	–0.62	–1.36	0.28***	0.21	–0.08	–0.83
2	0.05	–0.01	0.40	1.06	0.08	0.08	0.03	0.52
3	–0.18	–0.33	–1.01	0.85	0.01	0.01	0.10	1.60
4	0.20	0.07	1.39	–0.21	0.07	0.22	0.25	1.54
Highest	0.39***	0.15	2.24	0.40	0.01	0.12	0.23***	2.47

* Significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Table IV
Distribution of Post-1988 Period Cumulative Abnormal
Returns (CARs) in the Pre- and Post-Ex-Day Period by
Dividend Yield and Bid-Ask Spread

Ex-day returns are computed using the market model with the coefficients calculated over the estimating period (−200, −41) relative to the ex-day. The CARs are ranked by dividend yield (1 = low, 5 = high) and then by bid-ask spread (1 = low, 5 = high).

Yield Group	Bid-Ask Spread Group	$CAR_{-4,-1}$		$CAR_{+1,+4}$		N
		Mean (%)	t-Value	Mean (%)	t-Value	
1	1	0.289	1.17	0.037	−0.21	245
1	2	0.271	1.46	0.147	1.02	257
1	3	0.056	0.31	−0.407	−1.00	220
1	4	0.433***	2.76	0.171	1.11	250
1	5	0.338	1.46	−0.315*	−1.86	252
2	1	0.031	0.27	0.116	1.06	326
2	2	0.011	0.09	−0.004	−0.04	359
2	3	−0.143	−0.81	−0.158	−1.23	287
2	4	0.178	1.18	0.228	1.59	335
2	5	0.321*	1.68	−0.075	−0.57	287
3	1	0.021	0.16	−0.001	−0.06	315
3	2	−0.136	−0.95	0.181*	1.66	383
3	3	−0.225	−1.26	0.054	0.38	295
3	4	0.139	0.78	0.097	0.64	321
3	5	0.297	1.03	0.146	0.86	261
4	1	0.109	0.86	0.257**	2.19	291
4	2	−0.053	−0.29	0.139	1.11	313
4	3	−0.083	−0.26	0.272*	1.80	298
4	4	0.088	0.38	0.205	1.04	326
4	5	0.283	1.18	0.403**	2.16	301
5	1	0.268*	1.84	0.273**	1.97	278
5	2	0.250	0.93	0.092	0.58	252
5	3	−0.163	−0.59	0.349*	1.83	215
5	4	−0.291	−0.94	−0.283	−1.22	267
5	5	−0.020	−0.07	0.677***	2.59	298

* Significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level.

Although the coefficient of the mean volume is positive, as predicted by the short-term trading hypothesis, it is not significant. Thus, the pre-ex-day CARs of heavily traded shares, i.e., those expected to have low transaction costs, are not significantly higher than those of low traded shares. Therefore, unlike the U.S. markets where short-term traders affect ex-day prices (e.g., Lakonishok and Vermaelen (1986), Karpoff and Walkling (1990), and Michaely (1991)), our results do not provide support for the short-term trading hypothesis. Consistent with previous U.K. studies (e.g., Poterba and

Summers (1984) and Lasfer (1995)), our results imply that the legislation on short-term trading in the United Kingdom is still preventing short-term traders and/or that ex-day returns are not high enough to compensate short-term traders for the implied transactions costs.

D. Other Potential Effects on Ex-Day Returns

In this section we test whether ex-day returns are affected by other potential effects unrelated to taxation and short-term trading. We hypothesize that, since the first day of the account is not necessarily a Monday, the above results may be capturing the day of the week effect. Condoyanni, O'Hanlon, and Ward (1987) find that returns on Mondays are in general negative, while on Tuesdays and Wednesdays, returns are positive and significant. Although a large number of our ex-days are on Mondays, some of our observations are on Tuesdays and Wednesdays. If the day of the week affects our ex-day returns, then the Monday returns should be significantly lower than returns on the remaining days of the week.

The wide distribution of ex-dividend dates may also indicate that the reported results are affected by the month effect. Corhay, Hawawini, and Michel (1988) show that April is the only month of the year in which the systematic risk premium is positive in the United Kingdom. The relationship between returns and the systematic risk in other month is either negative or not significant. To test the hypothesis that ex-day returns are affected by the seasonality effect, we compute the corresponding month of each ex-dividend date in our sample and codify the month from 1 to 12 corresponding to January to December.

The extent to which ex-day returns are affected by the type of the distribution is also analyzed by splitting the distributions into either interim or final dividends. Unlike the U.S. environment where companies pay quarterly dividends, most U.K. companies distribute dividends twice a year. The interim dividend is usually lower than the final dividend. To test the hypothesis that short-term traders capture final rather than interim dividends, we construct a dummy variable equal to one if the distribution is an interim and zero otherwise.

We also hypothesize that the market discounts the dividend to payment. The average time lag between ex-day and the payment date is 40 days. If the market values dividends paid sooner more than the dividends paid later, we would expect ex-day returns to be affected by the number of days to payment date.

The following regression results are obtained (*t*-statistics are in parentheses)

$$AR_{ex} = -0.008 + 0.001MD + 0.0002M + 0.006DS - 0.004FI - 0.0001DP + 0.025I$$

$$(-2.34) \quad (0.22) \quad (1.41) \quad (3.99) \quad (-0.45) \quad (-0.06) \quad (1.28)$$

(8)

$$\overline{R^2} = 0.1\% \quad F = 3.49$$

where AR_{ex} represents the ex-day abnormal returns, MD is a dummy equal to 1 if the ex-day is a Monday, M is the month of the year, DS is the number of days in the LSE account, FI is a dummy variable equal to 1 if the distribution is an interim and zero for the final dividend, DP is the number of days to the receipt of cash dividend, and I is the interest rate on a one-month certificate of deposit applicable on the ex-day. The regression results provide evidence that ex-day returns are only affected by the number of days in the LSE account, and they cannot be explained by the day of the week, the month of the year, the number of days to the receipt of cash dividends, or the type of dividend. Although the coefficient of the interest rate is, as expected, positive, it is not significant. To the extent that interest rates explain macroeconomic volatility (e.g., Lauterbach (1989)), our results indicate that ex-day returns are not affected by macroeconomic conditions. In contrast to Eades, Hess, and Kim (1994), our results suggest that in the United Kingdom the price of dividend is not countercyclical.

IV. Conclusion

This article examines ex-day abnormal returns of a large sample of U.K.-listed companies and compares the distribution of ex-day abnormal returns in the pre- and post-1988 ICTA, which equalized the taxation of gross dividends and capital gains. We hypothesize that, if taxation is the only force that drives ex-day share prices, then, while the pre-1988 ex-day returns are expected to be positive and significant to reflect the tax differential between dividends and capital gains, the post-1988 returns should be insignificant and even negative to reflect the tax credit associated with the cash dividend.

Consistent with the tax hypothesis, we find that, after adjusting for the settlement effect, ex-day returns in the post-1988 period are not significant. In contrast, in the pre-1988 period, ex-day returns are positive and significant. We find, however, that the significant shift between these two tax periods is driven mainly by the highest dividend yield groups. For the lowest quintile, ex-day share prices drop by the full amount of the dividend in both periods.

The reported results show that, unlike the U.S. market, ex-day returns in the United Kingdom are not affected by short-term trading, although this activity is likely to be profitable because of the tax credit associated with the cash dividend. Our results suggest that short-term traders do not capture dividends in the United Kingdom either because the institutional legislation is effective or because the U.K. market is efficient, and that ex-day premium and the tax credit are not high enough to outweigh transaction costs.

While our conclusions on the tax impact on ex-day share prices are derived from the significant change in the abnormal returns that results from the reform in the income tax system in the United Kingdom, the magnitude of our computed ex-day returns may not reflect the tax differential between dividends and capital gains of the average shareholder in the LSE. In the United Kingdom the major shareholders are the tax exempt investors for

which ex-day returns are expected to be negative in both our subperiods. In contrast, our results appear to overstate the tax effect. The extent to which ex-day returns are also affected by the trading practices is a matter of further investigation.

REFERENCES

- Barclay, M. J., 1987, Dividends, taxes and common stock prices: The ex-dividend day behavior of common stock prices before the income tax, *Journal of Financial Economics* 19, 31–43.
- Booth, L. D., and D. J. Johnston, 1984, The ex-dividend day behavior of Canadian stock prices: Tax changes and clientele effects, *Journal of Finance* 39, 457–476.
- Brown, K. C., and S. L. Lummer, 1986, A reexamination of the covered call option for corporate cash management, *Financial Management* 15, 13–17.
- Brown, S., and J. Warner, 1985, Using daily stock return: The case of event studies, *Journal of Financial Economics* 14, 3–32.
- Christie, W. G., 1990, Dividend yield and expected returns: The zero dividend puzzle, *Journal of Financial Economics* 28, 95–125.
- Condoyanni, L., J. O'Hanlon, and C. W. R. Ward, 1987, Day of the week effects on stock returns: International evidence, *Journal of Business Finance and Accounting*, 14, 159–174.
- Corhay, A., G. Hawawini, and P. Michel, 1988, The pricing of equity on the London Stock Exchange: Seasonality and size premium, in E. Dimson, Ed.: *Stock Market Anomalies* (Cambridge University Press, Cambridge, U.K.).
- Crouhy, M., and D. Galai, 1992, The settlement day effect in the French Bourse, *Journal of Financial Services Research*, 32, 417–435.
- De Jong, F., T. Nijman, and A. Roell, 1994, A comparison of the cost of trading French shares on the Paris Bourse and on SEAQ International, Working paper, London School of Economics, London.
- Dimson, E., 1979, Risk measurement when shares are subject to infrequent trading, *Journal of Financial Economics* 7, 197–226.
- Eades, K. M., P. J. Hess, and E. H. Kim, 1984, On interpreting security returns during the ex-dividend period, *Journal of Financial Economics* 13, 3–34.
- , 1994, Time-series variation in dividend pricing, *Journal of Finance* 49, 1617–1638.
- Elton, E., and M. Gruber, 1970, Marginal stockholder tax rates and the clientele effect, *Review of Economic and Statistics* 52, 68–74.
- , and J. Rentzler, 1984, The ex-dividend day behavior of stock prices: A reexamination of the clientele effect: A comment, *Journal of Finance* 39, 551–556.
- Fedenia, M., and T. Grammatikos, 1991, Portfolio rebalancing and the effective taxation of dividends and capital gains following the Tax Reform Act of 1986, *Journal of Banking and Finance* 15, 501–520.
- Grammatikos, T., 1989, Dividend stripping, risk exposure and the effect of the 1984 Tax Reform Act on ex-dividend day behavior, *Journal of Business* 62, 157–173.
- Hamada, R. S., and M. S. Scholes, 1985, Taxes and corporate Financial Management, in E. I. Altman and M. G. Subrahmanyam, Eds.: *Recent Advances in Corporate Finance* (Irwin, Homewood, Ill.).
- Heath, D. C., and R. A. Jarrow, 1988, Ex-dividend stock price behavior and arbitrage opportunities, *Journal of Business* 61, 95–108.
- Kalay, A., 1982, The ex-dividend day behavior of stock prices: A re-examination of the clientele effect, *Journal of Finance* 37, 1059–1070.
- Kaplanis, C. P., 1986, Options, taxes, and ex-dividend day behavior, *The Journal of Finance* 41, 411–424.
- Karpoff, J., and R. Walkling, 1988, Short-term trading around ex-dividend days: Additional evidence, *Journal of Financial Economics* 21, 291–298.
- , 1990, Dividend capture in NASDAQ stocks, *Journal of Financial Economics* 28, 39–65.

- Keim, D. B., 1988, Stock market regularities: A synthesis of the evidence and explanations, in E. Dimson, Ed.: *Stock Market Anomalies* (Cambridge University Press, Cambridge).
- Lakonishok, J., and T. Vermaelen, 1983, Tax reforms and ex-dividend day behaviour, *Journal of Finance* 38, 1157–1179.
- , 1986, Tax induced trading around ex-dividend days, *Journal of Financial Economics* 16, 287–319.
- Lasfer, M. A., 1995, Taxes and dividends: The U.K. evidence, *Journal of Banking and Finance*, Forthcoming.
- Lasfer, M. A., 1993, *Dividend capture in the UK*, Working paper, City University Business School.
- Lauterbach, B., 1989, Consumption volatility, production volatility, spot rate volatility and the return on treasury bills and bonds, *Journal of Financial Economics* 24, 155–180.
- Loeb, T., 1983, Trading costs: The critical link between investment information and results, *Financial Analyst Journal* 39, 39–44.
- Michaely, R., 1991, Ex-dividend day stock price behavior: The case of the 1986 Tax Reform Act, *Journal of Finance* 46, 845–859.
- Miller, M. H., and M. S. Scholes, 1978, Dividend and Taxes, *Journal of Financial Economics* 6, 333–364.
- , 1982, Dividends and taxes: Some empirical evidence, *Journal of Political Economy* 90, 1118–1141.
- Petersen, M. A., and D. Fialkowski, 1994, Posted versus effective spreads: Good prices or bad quotes, *Journal of Financial Economics*, 35, 269–292.
- Poterba, J. M., and L. H. Summers, 1984, New evidence that taxes affect the valuation of dividends, *Journal of Finance* 39, 1397–1415.
- Reiss, P. C., and I. M. Werner, 1994, *Transaction Costs in Dealer Markets: Evidence from the London Stock Exchange*, Working paper No. 4727, National Bureau of Economic Research.
- Robinson, B., 1989, Reforming the taxation of capital gains, gifts and inheritances, *Fiscal Studies* 10, 33–40.
- Schwartz, R. A., 1991, *Reshaping the equity markets: A guide for the 1990s* (Harper Business, New York).
- Stiglitz, J. E., 1983, Some aspects of the taxation of capital gains, *Journal of Public Economics* 21, 257–294.
- Theobald, M., and V. Price, 1984, Seasonality estimation in thin markets, *Journal of Finance*, 39, 377–392.