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The Ex-Dividend Day Anomaly in the Spanish Stock Market

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Abstract

The purpose of this paper was to investigate the behavior of stock returns and trading volumes around ex-dividend dates in the Spanish stock market, using event study methodology. Clear consensus is evident in the literature about the fact that stock prices fall by less than the dividend paid on ex-dividend days. This behavior indicates a preference for capital gains over dividends, generally explained in terms of tax advantages. Contrary to the existing consensus, the results of this study did not reflect significant abnormal returns on ex-dividend days. The finding is consistent with the fact that nowadays Spain taxes dividends and capital gains at the same rate. In addition, abnormally high trading volumes are apparent around ex-dividend dates, especially for high-yield stocks.

Keywords: Ex-dividend days, abnormal returns, abnormal volumes, event studies

JEL Classification codes: G10, G35

In the academic field of corporate finance, few topics, if any, have received more attention than dividend policy. Financial economists have struggled for many years to understand the factors that determine a firm's dividend policy. Despite the wealth of research in the field, dividend policy is still a puzzling topic.

Lintner (1956) pioneered an empirical investigation into the determinants of dividend policy by interviewing a set of firms' managers and concluded that firms establish long-term benchmarks for the dividend distribution rate. Because managers are usually reluctant to reduce dividend payments, when benefits increase, dividends increase at a lower rate, in an attempt to converge at the target payout. One year before, Campbell and Beranek (1955) investigated the effects of dividend payments on stock prices with a small sample of companies on the New York Stock Exchange. Campbell and Beranek reported that prices dropped 90% of the dividend paid on ex-dividend dates but did not offer any explanation.

Nevertheless, Miller and Modigliani's (1961) paper, which established the irrelevance of dividend policy, formed a crucial moment in the theoretical modeling of dividend policy. Miller and Modigliani proposed a one-period model with perfect capital markets, with no frictions, such as transaction costs and taxes, under certainty conditions. Assuming that dividend policy would not affect the firm's investment program or its capital structure, higher dividends would require the issue of new stock without affecting the value of the firm. Thus, a dollar paid in dividends should cause a dollar drop in the price of the stock.

However, when considering taxes, Elton and Gruber (1970) supported a tax-effect hypothesis. Because dividends are usually taxed at a higher rate than capital gains, the drop of the stock price should be lower than the dividend paid to make investors indifferent to the choice between selling the stock cum-dividend or holding the stock, obtaining the dividend, and selling the stock ex-dividend. Therefore, the higher the difference between dividends and capital gains tax rates, the lower the drop of the price. In fact, Elton and Gruber argued that one could infer stockholders' marginal tax rates from the ex-dividend day stock-price behavior. Elton and Gruber investigated stock-price adjustment on ex-dividend dates between April 1966 and March 1967 and observed that stock prices dropped on average 77.7% of the dividend paid. By sorting the sample into deciles according to the firm's dividend yield, Elton and Gruber found that firms with higher yields showed higher adjustment in prices on ex-dividend dates, interpreted as proof of a tax-clientele situation. Because investors in shares with high-dividend yield should have relatively low marginal tax rates, the dividend value after taxes should not be far off the dividend paid. In contrast, investors with high marginal tax rates would likely invest in shares with low-dividend yields.

In later years, many researchers conducted studies in different stock markets (with different tax regimes for dividends and capital gains) following Elton and Gruber's methodology, and most supported the tax-effect hypothesis. Graham, Michaely, and Roberts (2003); Poterba and Summers (1984); and Robin (1991) conducted studies in the United States; Athanassakos (1996) carried out research in Canada; Hayashi and Jagannathan (1990) investigated the topic in Japan; and Poterba and Summers (1985) studied the phenomenon in the United Kingdom. A straightforward way to test the tax-effect hypothesis is to investigate stock-price behavior around ex-dividend days in countries or periods where neither dividends nor capital gains were taxed. Along these lines, Frank and Jagannathan (1998) and Yahyaee, Pham, and Walter (2007) observed the ex-dividend day anomaly in Hong Kong and Oman, respectively, thus questioning the tax-clientele hypothesis.

Although the tax-clientele hypothesis constitutes the most widely accepted reasoning for the ex-dividend price behavior, financial economists have explored other possible explanations, alone or, in most cases, interacting with taxes. Kalay (1982) contributed one of the most important clarifications, arguing that one could not infer stockholders' marginal tax rates from the ex-dividend day stock-price behavior and offering an alternative explanation for the fact that stock prices did not fully adjust for the dividend paid. Kalay, without disregarding the importance of taxes, proposed an alternative explanation known as the short-term trading hypothesis. Without transaction costs, investors with the same tax rate on dividends and capital gains can buy the stock cum-dividend and sell it ex-dividend if the ex-dividend stock-price drop is less than the dividend payment. If the received dividend and the tax savings from the capital loss exceed transaction costs, such a strategy will be profitable. Accordingly, without transaction costs, the price drop should equal the dividend paid. The short-term trading hypothesis is also consistent with the two main results observed in the Elton and Gruber (1970) study: (a) the stock price drops less than the dividend payment, and (b) a positive correlation exists between price drops and dividend yields.

Focusing on volumes instead of on returns, Lakonishok and Vermaelen (1986) reported higher trading volumes before and after ex-dividend days. They also observed higher volume increases for those stocks with higher yields. Furthermore, stocks reflected abnormal price increases before ex-dividend days and abnormal price decreases afterwards. While abnormal price increases positively depended on dividend yield, abnormal trading volumes negatively depended on dividend yield.

Other researchers, focusing on microstructure arguments, suggested that factors other than taxes or transaction costs cause prices to drop less than the amount of dividend paid on ex-dividend days. For example, Bali and Hite (1998) stated that price discreteness, rather than taxes or transaction costs, is responsible for the anomaly. In their model, because they limited variation in stock prices to multiples of a tick, the ex-day price drop would be the dividend paid rounded to the next smaller tick, thus, lower than the amount of the dividend. This explanation formed the price-discreteness hypothesis.

Frank and Jagannathan (1998) also focused on microstructure arguments and pointed out that because the collection and reinvestment of dividends are annoying for small investors, they would not buy shares before ex-dividend days but rather afterwards. Because this is not the case for market makers, most transactions will occur at the ask price before the ex-dividend date and at the bid price afterwards. Accordingly, the bid-ask bounce would cause the observed drop in stock prices by less than the dividend paid. Frank and Jagannathan investigated the Hong Kong Stock Market, in which neither dividends nor capital gains are taxed, observing that stock prices adjust approximately half of the dividend paid on ex-dividend days.

Jakob and Ma (2004) investigated both the price-discreteness hypothesis and the bid-ask bounce, concluding that eliminating price discreteness caused ex-dividend prices to drop even less, contrary to the price-discreteness hypothesis. Their results, however, supported the bid-ask bounce as an explanation for the ex-dividend price anomaly. Along the same lines, Yahyaee et al. (2007) investigated the issue in the Oman stock market, where taxes on dividends or capital gains did not exist and stock prices had been decimalized. Yahyaee et al. found that prices dropped by less than the dividend paid, indicating the bid-ask bounce as the most suitable explanation of the anomaly.

More than 30 years after their first investigation, Elton, Gruber, and Blake (2002) reexamined the ex-dividend anomaly. This time, they used a sample including municipal bond funds (tax-advantaged dividends), for which the ex-dividend price drop should be greater than the dividend if taxes mattered, and a set of securities (taxable bonds and domestic common stock funds), for which the drop should be generally less than the dividend. The results supported the tax-effect hypothesis and were inconsistent with market microstructure arguments.

Three decades ago, Black (1976) stated, "The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together" (p. 5). Later, Allen and Michaely (1995) concluded that much more empirical and theoretical research on the subject was required before a consensus was likely. Elton et al. (2002) noted that since the publication of their article on taxes and ex-dividend behavior in 1970, over 100 relevant articles had appeared in leading financial economics journals. Nowadays, the number of articles is much higher. Nevertheless, the dividend picture is still a puzzle. In a review paper on dividend policy, Bhattacharyya (2007) emphasized, "Despite decades of study, we have yet to completely understand the factors that influence dividend policy and the manner in which these factors interact" (p. 4). Similarly, the classical Brealey, Myers, and Allen (2006) textbook illustrates the dividend issue as one of the ten most important unsolved problems in finance and indicates the necessity of more empirical research.

This paper forms a contribution to the existing literature on the ex-dividend day anomaly in three ways. First, the focus was on the Spanish stock market. Previous investigation of the issue in this market related to the period 1980-1992. Because financial markets microstructure is one of the most accepted explanations of the ex-dividend day anomaly, empirical papers on the issue in markets other than the United States should be especially welcomed. The taxes and the characteristics of the Spanish Stock Exchange have changed dramatically over the last 25 years, making updating the dataset necessary. The investigation was particularly interesting because after the last tax reform, dividends and capital gains are now taxed at the same rate, while during the 1980-1992 period, capital gains had a better tax treatment compared with dividends.

Second, the method employed in this paper is different to the one proposed first by Elton and Gruber (1970) and later used in most empirical papers. Instead, the basis of this study was Brown and Warner's (1980) methodology for event studies. The usefulness of event studies, according to Kothari and Warner (2005), arises from the fact that the magnitude of abnormal performance provides a measure of the (unanticipated) impact of this type of event, in this case dividend payments, on stock returns. Third, the paper involved investigating not only price movements but also trading volumes around ex-dividend days. The joint consideration of returns and volumes provides better possibilities to explain the results.

The next section reflects a discussion of the methodology proposed to investigate the ex-dividend day anomaly in the Spanish stock market. A presentation of the dataset and a summary of the Spanish tax system for dividends and capital gains follow. The penultimate section illustrates analysis of the results in the context of previous investigations, and the final section indicates the main conclusions of the study.

Methodology

Elton and Gruber (1970) were the first to propose a plausible explanation for the observed anomalous behavior of stock prices around ex-dividend days. Since the proposal, many authors have followed their approach to investigate the issue in other stock markets and/or periods. Equation 1 expresses their methodology:

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

where P_c is the cum-dividend price, P_e the ex-dividend price, and P_0 the opening price of the last day before the ex-dividend day. Finally, t_g and t_d are the marginal tax rates for capital gains and dividends, respectively. Under Equation 1, two strategies (sell the stock cum-dividend or obtain the dividend and sell the stock ex-dividend) will provide the same net return. One can express Equation 1 as follows:

$$\frac{(P_c - P_e)}{D} = \frac{(1 - t_d)}{(1 - t_g)} \tag{2}$$

From Equation 2, one can conclude that the price drop should reflect the marginal tax rates of the marginal investors. In addition, one could infer marginal tax rates by observing stock-price drops in terms of dividends.

Most researchers investigating ex-dividend price behavior have applied the Elton and Gruber (1970) framework, with some of them, for example, Kalay (1982), incorporating other factors such as transaction costs. Other researchers (Kato & Loewenstein, 1995; Naranjo, Nimalendran, & Ryngaert, 2000; Yahyaee et al., 2007) proposed a regression framework, through which one regresses abnormal returns against a number of factors, including dividend yield, abnormal trading volume, and transaction costs. However, this paper reflects the classical Brown and Warner (1980) methodology for event studies, with the payment of a cash dividend being the studied event. According to previous research, one would expect ex-dividend price behavior to depend on the stock dividend yield (e.g., Elton & Gruber, 1970). Thus, this study included two sets of stocks, with high- and low-dividend yield. Abnormal returns reflected the difference between actual and normal returns, while normal returns were expected returns without conditioning on the occurrence of the event.

Thus, abnormal return for stock *i* on day *t* was expressed as follows:

$$AR_{it} = R_{it} - E(R_{it}|x_t) \tag{3}$$

where AR_{it} is the abnormal return of stock *i* on day *t*; R_{it} is its actual return calculated as $\ln\left(\frac{P_t + D_t}{P_{t-1}}\right)$, where P_t and D_t are the closing price and the dividend paid on day *t* respectively; $E(R_{it}|x_t)$ is its expected return for day *t*. Finally, X_t is the conditioning information set for the expected return on day *t*.

Two predominant models exist to compute expected or normal returns: the constant mean return model and the market model. While the former assumes normal return as the mean return over a given period, the latter shows the normal return as given by a linear relationship between the stock return and the market return. In this paper, $E(R_{it}|x_t)$ has been estimated through three different models: the constant mean model (Model 1), the market model (Model 3), and a variation of the constant mean model that involves calculating average returns taking into account the day of the week (Model 2). The last model was included because some researchers, such as García (2007), have proved the effect of the day of the week in the Spanish Stock Exchange.

For Model 1, normal daily return for each event window was computed through the average daily return of the estimation period: [-90, -20]. A similar approach was evident for Model 2, but five average returns were calculated, one for each weekday. Then, the abnormal return for day *t* was computed through the difference between its actual return and the average return that corresponds to that day. For example, if day *t* is Monday, one would use the Monday average return and so on. Regarding Model 3, daily market returns were computed through the Indice General de la Bolsa de Madrid (IGBM), or the General Index of the Madrid Stock Exchange, and normal returns were estimated through ordinary least squares. Use of the three models encouraged results that were more robust. The selected event period (i.e., the period during which the effect of dividend payments on returns was investigated) started on Day -10 and ended on Day +20, around the ex-dividend date (Day 0). Normal returns were estimated using the same estimation period [-90, -20].

The procedure involved estimating daily average abnormal returns for each firm and then calculating the average abnormal return on day *t* for each sample ($\overline{AR_t}$) as follows:

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{4}$$

The cumulative average abnormal return ($\overline{CAR_t}$) was obtained by adding the average daily abnormal return for different intervals through the event window [-10, +20].

$$\overline{CAR} = \sum_{t=a}^{b} \overline{AR}_t \tag{5}$$

The first null hypothesis was that the average abnormal return would be zero on the ex-dividend day for the two samples of stocks.

Lakonishok and Vermaelen (1986) suggested that the examination of stock-trading volumes around ex-dividend dates could provide important information about the causes of the ex-dividend day anomaly. They argued that if short-term traders play a major role in ex-dividend price behavior, a net increase in trading volumes should be apparent around ex-dividend days. Therefore, this paper involved investigating stock-trading volumes around ex-dividend days with a similar framework to the one used to investigate abnormal returns. The abnormal trading volume (AV) of a given stock was estimated as the difference between its actual and normal trading volumes, all in euro values. In accordance with Athanassakos (1996), Koski and Scruggs (1998), and Lakonishok and Vermaelen (1986), among others, the next step included estimating normal trading volumes through the mean-adjusted model. In addition, to be consistent with the current approach to estimate normal stock returns, estimation of normal trading volumes through a day of the week mean-adjusted model was necessary. Thus, the definition of abnormal trading volume, for stock i on day t (AV_{it}) is as follows:

$$AV_{it} = \frac{V_{it}}{(\sum_{t=-20}^{-50} V_{jt} + \sum_{t=30}^{60} V_{jt}) \frac{1}{62}} \tag{6}$$

where V_{it} is the traded volume in euros of stock i on day t. As with returns, the procedure involved computing abnormal daily volumes for each firm i and then calculating the average abnormal volume on day t ($\overline{AV_t}$) for the two samples as follows:

$$\overline{AV}_t = \frac{1}{N} \sum_{i=1}^{N} AV_{it} \tag{7}$$

The second null hypothesis was that the average abnormal trading volume would be zero on the ex-dividend day.

Brown and Warner's (1980) methodology was useful in testing the two hypotheses. As usual, the standard deviation of each sample return was used to assess the significance of the event-window average abnormal return, through the z statistic. In addition, given the small size of the stock samples, the Corrado (1989) non-parametric rank test was necessary.

Data and Sample Selection

The purpose of the paper was to investigate the behavior of stock prices around ex-dividend dates considering the stock dividend yield. Accordingly, a selection of two sets of stocks was necessary: (a) high-dividend yield stocks and (b) low-dividend yield stocks. To minimize potential problems associated with the homogeneity of the samples, all selected stocks belonged to the Spanish IBEX-35 index. The set of high-yield stocks included those stocks belonging to the IBEX Top Dividend index, with a dividend yield higher than 4% in each year between 2006 and 2008. The set of low-yield stocks included those paying dividend stocks that did not belong to the IBEX Top Dividend index, with a dividend yield below 2% in each year between 2006 and 2008. Elimination of those companies that pay dividends more than twice a year occurred to avoid the overlapping of estimation periods and window events. As a result, the group of high-yield stocks consisted of ACS, Endesa, Enagás, FCC, Mapfre, Repsol, Telefónica, and Telecinco, while the low-yield group included Abengoa, Cintra, Gamesa, Gas Natural, and Red Eléctrica Española. During the research period, 41 dividend payments were evident: 11 for the low-yield group and 30 for the high-yield sample.

The research related to the period between June 2006 and June 2008. Some researchers have used periods of similar length, among them Elton and Gruber (1970). A relatively short period of investigation is important for two main methodological reasons. The first concerns the event study approach. Kothari and Warner (2005) noted that horizon length has a big impact on event study test properties:

> *First, short-horizon event study methods are generally well-specified, but long-horizon methods are sometimes very poorly specified .... Second, short-horizon methods are quite powerful if (but only if) the abnormal performance is concentrated in the event window. In contrast to the short-horizon tests, long-horizon event studies (even when they are well-specified) generally have low power to detect abnormal performance.* (p. 17)

The second reason specifically involves the tax-clientele hypothesis. Because differential taxation between dividends and capital gains constitutes the most widely accepted explanation of the ex-dividend day anomaly, the period of investigation should exhibit certain stability in the taxation of dividends and capital gains.

Spanish Taxation on Dividends and Capital Gains

The last reform of the Spanish tax system for dividends and capital gains was conducted through Law 36/2006 of November 28 (Ley 35/2006, de 28 de noviembre). One of the purposes of the reform was to minimize the effect of taxes on investment decisions. Thus, investment returns after taxes should respect the pretaxes scheme. Under the new tax system, dividends and capital gains are taxed at a fixed rate of 18%. Before the reform, capital gains generated in more than one year were taxed at a fixed rate of 15%, while capital gains generated in one year or less were taxed at the investor marginal tax rate. In contrast, dividends were taxed at the investor's marginal tax rate although there was a deduction for double taxation consisting of 40% of the received dividend multiplied by 1.4. After the reform, this deduction was replaced by a lineal exemption of the first 1500 euros of dividends. Thus, high-income taxpayers enjoy comparatively lower double-taxation benefits.

Although the achievement of perfect neutrality through the reform is arguable, one must admit that the Spanish tax system is more neutral now than before the reform. Therefore, the tax advantage of capital gains over dividends is now very limited. With capital gains, the investor decides when the income will be taxed because capital gains are taxed when the asset is sold, unlike the case of dividends. However, corporations enjoy deductions for double taxation of dividends generally established in 50% of the dividends received but which can reach 100% under certain conditions. In the latter situation, double taxation of dividends is eliminated.

Results

Tables 1 and 2 illustrate average abnormal returns and cumulative average abnormal returns for low- and high-dividend yield stocks, respectively. Both types of returns were computed through the three estimation methods previously discussed. Results obtained through the three models are highly consistent for the low-yield sample but not for the high-yield sample. As expected, the market model (Model 3) provides results that are more precise because the variance of the average abnormal return is lower compared with the other two models. This is not surprising because the stocks in the sample, all included in IBEX 35, are expected to show an important market component, whose variability is undertaken and therefore eliminated by the market model. The result is in line with Cable and Holland's (1999) finding that the market model performs better than do other models proposed in the literature. Accordingly, the following discussion will reflect a focus on the results obtained with the market model.

Table 1
Average Abnormal Returns for Low-Yield Stocks

	Model 1		Model 2		Model 3			
t	$\overline{AR_t}$	Z_t	$\overline{AR_t}$	Z_t	$\overline{AR_t}$	Z_t	Corrado	$\overline{CAR_t}$
-10	0.43	0.66	0.62	1.02	0.18	0.34	0.24	0.18
-9	0.64	0.99	0.70	1.14	0.75	1.43	1.43	0.93
-8	-0.12	-0.18	-0.31	-0.51	-0.49	-0.92	-0.65	0.45
-7	0.19	0.29	0.28	0.46	0.35	0.66	1.00	0.79
-6	-1.13	-1.74	-1.20	-1.97*	-0.95	-1.81	-0.99	-0.16
-5	-0.34	-0.53	-0.15	-0.25	-0.54	-1.02	0.08	-0.69
-4	0.01	0.02	0.03	0.04	0.22	0.42	0.29	-0.47
-3	0.72	1.11	0.53	0.87	0.15	0.28	-0.02	-0.32
-2	-0.86	-1.33	-0.85	-1.40	-1.29	-2.45*	-2.91**	-1.61
-1	1.68	2.59*	1.52	2.50*	1.58	3.00**	2.94**	-0.04
0	-0.14	-0.21	-0.01	-0.01	-0.21	-0.40	-0.42	-0.25
1	-0.25	-0.39	-0.30	-0.49	0.28	0.53	0.78	0.03
2	-0.43	-0.67	-0.56	-0.92	-0.65	-1.24	-0.52	-0.62
3	-0.24	-0.37	-0.17	-0.29	-0.14	-0.27	-0.89	-0.76
4	0.29	0.44	0.24	0.40	0.26	0.50	-0.25	-0.50
5	-0.09	-0.14	0.04	0.07	0.53	1.00	-0.05	0.03
6	-0.30	-0.46	-0.34	-0.56	-0.07	-0.13	0.07	-0.04
7	0.30	0.47	0.18	0.29	0.66	1.26	1.81	0.62
8	-0.04	-0.07	0.02	0.04	0.03	0.06	0.27	0.65
9	-1.03	-1.58	-1.07	-1.76	0.07	0.13	0.66	0.72
10	-0.38	-0.59	-0.25	-0.41	-0.29	-0.55	-1.01	0.43
11	0.13	0.20	0.08	0.14	-0.34	-0.64	-0.38	0.09
12	1.16	1.78	1.03	1.69	0.50	0.95	0.54	0.59
13	-0.97	-1.49	-0.90	-1.48	-0.18	-0.35	0.03	0.41
14	0.74	1.15	0.70	1.15	0.07	0.13	0.40	0.48
15	0.23	0.36	0.36	0.60	0.22	0.42	0.38	0.70
16	0.37	0.56	0.32	0.53	-0.22	-0.42	-1.13	0.48
17	0.86	1.32	0.69	1.14	0.49	0.93	1.06	0.97
18	0.32	0.50	0.41	0.68	-0.07	-0.13	0.19	0.90
19	0.65	0.99	0.56	0.92	0.65	1.24	0.81	1.55
20	-0.11	-0.16	0.06	0.09	0.32	0.61	0.10	1.87

Note. * Significant at a 0.05 level. ** Significant at a 0.01 level.

Table 1 shows nonsignificant abnormal returns for low-dividend yield stocks on the ex-dividend day ($t = 0$). Therefore, the null hypothesis indicating that the mean abnormal return on the ex-dividend day was zero cannot be rejected for the low-dividend yield sample in any of the three models. This result is somewhat surprising because it contradicts most of the empirical evidence worldwide showing that stock prices fall less than the dividend paid. In this paper, ex-dividend days are no different from ordinary days in terms of abnormal returns. In addition, although nonsignificant, the ex-dividend day abnormal return is negative, while previous research indicates it should be positive. Interestingly, a positive and significant abnormal return is also evident on the day prior to the ex-dividend date ($t = –1$). As before, the same result is observed independently of the model used to estimate abnormal returns. Low-dividend yield stocks do not show any significant abnormal return after ex-dividend days.

Table 2
Average Abnormal Returns for High-Yield Stocks

	Model 1		Model 2		Model 3			
t	$\overline{AR_t}$	Z_t	$\overline{AR_t}$	Z_t	$\overline{AR_t}$	Z_t	Corrado	$\overline{CAR_t}$
-10	-0.02	-0.08	-0.14	-0.48	0.06	0.34	0.95	0.06
-9	-0.52	-1.72	-0.53	-1.79	-0.43	-2.25*	-2.43**	-0.36
-8	0.03	0.11	0.20	0.66	0.11	0.57	0.48	-0.25
-7	-0.14	-0.48	-0.18	-0.59	-0.05	-0.27	0.24	-0.30
-6	-0.57	-1.89	-0.59	-1.98*	-0.48	-2.53**	-1.16	-0.78
-5	-0.08	-0.26	0.00	0.01	0.07	0.36	0.21	-0.71
-4	0.22	0.74	0.17	0.58	0.22	1.17	1.18	-0.49
-3	-0.24	-0.80	-0.22	-0.74	0.03	0.14	0.30	-0.47
-2	0.49	1.64	0.48	1.60	0.36	1.90	1.36	-0.11
-1	0.43	1.44	0.40	1.34	0.39	2.07*	1.56	0.28
0	-0.57	-1.91	-0.67	-2.25*	-0.24	-1.29	-0.62	0.04
1	-0.11	-0.35	-0.19	-0.62	0.01	0.07	0.69	0.05
2	-0.15	-0.51	-0.02	-0.07	0.17	0.89	1.55	0.22
3	-0.51	-1.68	-0.43	-1.45	-0.21	-1.12	-0.37	0.01
4	-0.79	-2.62**	-0.80	-2.69**	0.10	0.54	-0.14	0.11
5	-0.31	-1.02	-0.30	-1.00	-0.12	-0.63	0.34	0.00
6	-0.68	-2.27*	-0.63	-2.13*	-0.10	-0.54	-1.19	-0.11
7	0.28	0.92	0.42	1.42	-0.13	-0.70	-0.11	-0.24
8	-0.20	-0.68	-0.19	-0.62	0.12	0.64	-0.17	-0.12
9	-0.39	-1.29	-0.45	-1.51	-0.05	-0.28	-0.76	-0.17
10	0.10	0.33	0.07	0.22	-0.09	-0.47	-0.87	-0.26
11	0.24	0.81	0.22	0.73	0.12	0.61	0.73	-0.15
12	0.22	0.73	0.30	1.02	0.05	0.24	-0.01	-0.10
13	-0.14	-0.46	-0.15	-0.51	-0.29	-1.52	-1.46	-0.39
14	-0.37	-1.23	-0.22	-0.72	-0.15	-0.78	-0.05	-0.54
15	-0.71	-2.37*	-0.77	-2.58**	-0.24	-1.28	-0.23	-0.78
16	0.12	0.40	0.12	0.40	-0.19	-1.01	-1.42	-0.97
17	0.22	0.72	0.07	0.23	0.14	0.72	0.67	-0.83
18	-0.50	-1.65	-0.37	-1.25	-0.27	-1.42	-1.14	-1.10
19	0.30	0.98	0.24	0.80	0.45	2.36*	2.17**	-0.66
20	0.09	0.31	-0.01	-0.04	-0.14	-0.73	-1.03	-0.79

Note. * Significant at a 0.05 level. ** Significant at a 0.01 level.

As apparent in Table 2, high-dividend yield stocks show negative average abnormal returns on the ex-dividend day, statistically significant at a 0.05 level for Model 2, while nonsignificant for Models 1 and 3. However, in accordance with the market model, one cannot reject the null hypothesis that indicates that the mean abnormal return on ex-dividend days is zero. As for the low-yield sample, positive and significant abnormal returns on day t –1 are evident.

Given the relatively low number of events, especially for the low-yield sample, conducting Corrado's nonparametric rank test for detecting significant abnormal returns was necessary. The test was performed for the abnormal returns obtained with the market model. The results of the test support nonsignificant abnormal returns on ex-dividend dates, both for the low- and high-yield samples, and the observed positive and significant abnormal return for day t –1 for the low-yield sample.

Jointly considered, Tables 1 and 2 show negative although nonsignificant average returns on ex-dividend dates for the two samples but positive and statistically significant returns on the day before ex-dividend dates. These results do not illustrate a markedly different return behavior according to the stock yield. Figure 1 shows average abnormal returns, as reported from Model 3, for low- and high-yield stocks. High-yield stocks demonstrate higher volatility in abnormal returns around ex-dividend dates compared with low-yield stocks. This fact may be due to the higher number of events for high- compared to low-yield stocks.

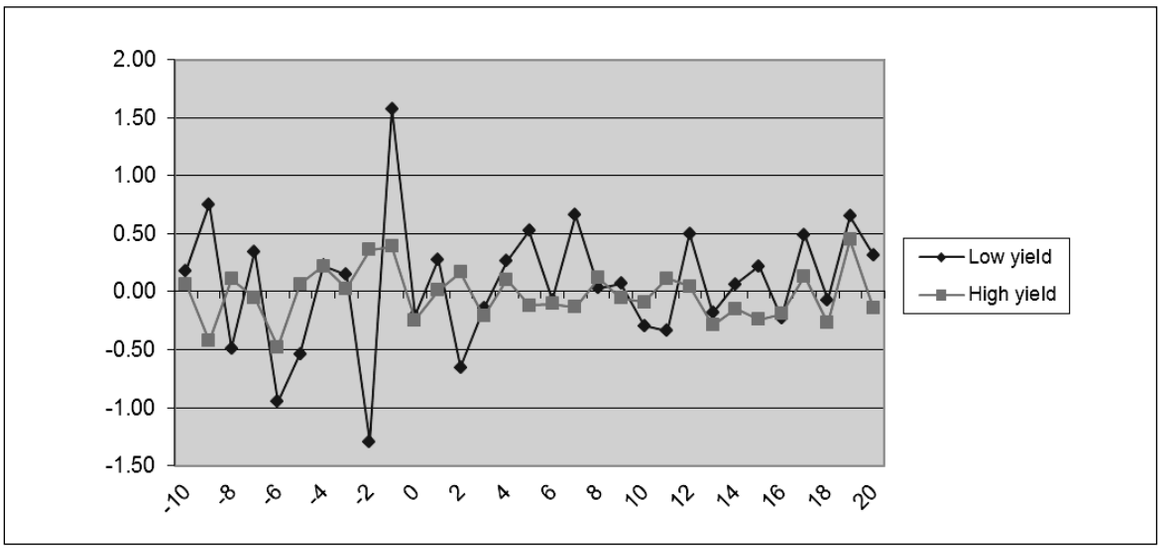

Figure 1. Average abnormal returns for high- and low-yield stocks.

A marked behavior in cumulative abnormal returns, either for low- or high-yield stocks, was not apparent. Nevertheless, no a priori hypothesis had been made about the behavior of this variable.

Only two comparable studies for the Spanish stock market exist: Espitia and Ruiz (1997) and Ruiz and Espitia (1996). Both studies involved investigating the same set of companies during the same period (1980-1992) but with different methodologies. In both papers, the authors observed that the ex-dividend price fall, on average, was significantly lower than the dividend amount. Thus, unlike the current findings, average returns on ex-dividend days were positive. The most suitable explanation for these contradictory findings could be the different periods under investigation. Capital gains, compared to dividends, have traditionally received better tax treatment under the Spanish tax system. For example, until 1996, capital gains generated over five years were tax-exempt, while tax deductions existed for those generated in shorter periods. Therefore, the period covered by Espitia and Ruiz (1997) and Ruiz and Espitia (1996) was characterized by a tax advantage of capital gains compared to dividends. The situation is quite different nowadays.

As previously explained, Elton and Gruber (1970), and many authors since, viewed the ex-dividend day stock return as an indicator of how market participants value lower taxed capital gains relative to higher taxed dividends. Because one dollar of dividend was less worthy than one dollar of capital gain, the ex-dividend price drop should have been lower than the dividend paid; thus, ex-dividend days should have shown positive returns. However, as Naranjo et al. (2000) observed, the implicit assumption in this interpretation is that there is one investor tax clientele that determines the ex-dividend day return. One can view the ex-dividend day return more clearly as being determined by the interaction of investors with different tax-induced valuations on dividends and capital gains. Because market participants show different tax profiles, Naranjo et al. (2000) proposed a tax-heterogeneity explanation for ex-dividend day returns, which is especially interesting for high-dividend yield stocks that should be particularly affected by tax-based trading.

Naranjo et al. (2000) reported negative returns on ex-dividend days for high-dividend yield stocks from 1975, after the introduction of negotiated commission rates. They explained this result in terms of the dividend-capturing behavior of corporations more heavily taxed on dividends than on capital gains. Under low transaction costs, such companies would buy high-yield stocks before ex-dividend days and sell them afterwards. The results of the present paper (abnormal returns for high-yield stocks are negative and statistically significant at a 0.05 level for Model 2 and almost at a 0.05 level for Model 1 but nonsignificant for low-yield stocks) support this interpretation, particularly when trading volumes are also considered.

The simultaneous investigation of returns and trading volumes strongly improves the likelihood of explaining the ex-dividend day anomaly. The behavior of trading volumes around ex-dividend days (see Tables 3 and 4) supports the tax-heterogeneity hypothesis because, as suggested by Naranjo et al. (2000), trading volumes should increase around ex-dividend dates. For high-yield stocks, Table 4 shows significant abnormal trading volumes on four days of the period with Model 1 and eight days with Model 2; in all cases, average

abnormal volumes are above 1, indicating abnormally high trading volumes. Nevertheless, for low-yield stocks, significant abnormal volumes are apparent only on three days with Model 1 and five days with Model 2. The fact that abnormal trading volumes around ex-dividend days are higher for high- than for low-yield stocks is consistent with high-dividend yield stocks being the most suitable candidates for dividend-capturing behavior. Figure 2 shows the abnormal trading volume from Model 2 for low- and high-yield stocks. While for high-yield stocks, abnormal volumes are above 1 for all days but two in the analyzed period, being particularly high the days before ex-dividend dates, for high-yield stocks, days with high trading volumes are usually followed by days with low volumes.

Table 3
Average Abnormal Volumes for Low-Yield Stocks

	Model 1			Model 2		
t	$\overline{AV_t}$	Z_t	Corrado	$\overline{AV_t}$	Z_t	Corrado
-10	2.05	6.44**	1.49	2.06	6.65**	1.11
-9	1.14	0.86	1.66	1.13	1.13	1.43
-8	1.04	0.27	0.12	1.12	0.78	0.44
-7	0.87	-0.80	-0.60	0.89	-0.71	-0.39
-6	1.73	4.47**	-1.66	1.64	3.99**	-1.70
-5	1.17	1.02	0.82	1.15	0.95	0.51
-4	0.96	-0.23	-0.12	0.92	-0.47	-0.23
-3	0.88	-0.76	-0.67	0.93	-0.44	-0.12
-2	1.05	0.29	0.80	1.06	0.37	0.71
-1	0.87	-0.82	-0.63	0.93	-0.46	-0.47
0	1.07	0.44	-0.49	1.03	0.16	-0.83
1	1.19	1.15	0.84	1.14	0.89	0.52
2	1.07	0.45	0.15	1.16	1.00	0.78
3	0.85	-0.91	-1.62	0.84	-0.98	-1.37
4	1.06	0.38	-0.15	1.09	0.55	-0.34
5	0.82	-1.12	-0.73	0.80	-1.28	-1.19
6	0.99	-0.03	0.39	0.96	-0.23	0.20
7	1.26	1.58	0.37	1.35	2.23*	0.84
8	0.83	-1.06	-0.87	0.83	-1.09	-0.82
9	0.85	-0.92	-0.60	0.88	-0.77	-0.56
10	1.18	1.13	0.45	1.15	0.92	0.32
11	1.08	0.47	0.98	1.05	0.30	0.82
12	1.26	1.58	1.03	1.36	2.25*	1.39
13	0.99	-0.04	-0.30	0.98	-0.10	-0.33
14	1.05	0.32	0.22	1.06	0.38	0.42
15	1.18	1.12	1.18	1.15	0.96	0.90
16	1.07	0.44	0.34	1.03	0.19	0.15
17	1.40	2.47*	1.36	1.49	3.11**	1.76
18	1.14	0.85	0.92	1.14	0.89	0.87
19	0.94	-0.39	0.15	0.95	-0.30	-0.05
20	1.15	0.94	1.74	1.13	0.81	1.51

Note. * Significant at a 0.05 level. ** Significant at a 0.01 level.

Table 4
Average Abnormal Volumes for High-Yield Stocks

	Model 1			Model 2		
t	$\overline{AV_t}$	Z_t	Corrado	$\overline{AV_t}$	Z_t	Corrado
-10	1.00	-0.03	0.08	1.03	0.42	0.29
-9	1.12	1.25	1.18	1.07	0.85	0.41
-8	0.96	-0.40	-0.26	0.99	-0.07	0.20
-7	1.09	0.94	1.50	1.14	1.76	2.06*
-6	1.40	4.28**	0.71	1.30	3.68**	0.49
-5	1.14	1.47	1.54	1.19	2.39*	1.77
-4	1.17	1.80	1.87	1.16	2.00*	1.31
-3	1.14	1.53	1.74	1.16	2.04*	2.15
-2	1.17	1.78	1.45	1.18	2.27*	1.74
-1	1.31	3.34**	2.60**	1.27	3.39**	2.31*
0	1.18	1.89	1.48	1.20	2.50*	1.40
1	1.08	0.91	1.09	1.09	1.10	1.16
2	1.02	0.20	-0.36	1.06	0.71	-0.12
3	1.07	0.79	1.09	1.07	0.87	0.72
4	1.10	1.06	0.06	1.08	1.03	0.03
5	1.34	3.67**	1.20	1.36	4.43**	1.03
6	1.07	0.73	-0.23	1.08	0.95	-0.09
7	1.07	0.79	0.77	1.11	1.41	0.85
8	1.06	0.66	0.33	1.06	0.80	0.55
9	1.19	2.08*	0.40	1.16	1.94	0.23
10	1.01	0.10	-0.39	1.03	0.35	-0.26
11	0.97	-0.31	-0.21	0.95	-0.60	-0.85
12	0.97	-0.35	-0.26	1.02	0.19	0.29
13	1.04	0.46	0.16	1.05	0.62	0.09
14	1.10	1.09	1.48	1.10	1.19	1.76
15	1.07	0.74	0.95	1.10	1.23	1.27
16	1.10	1.03	0.70	1.08	1.01	0.29
17	1.11	1.17	0.53	1.14	1.72	0.91
18	1.09	0.92	-0.07	1.09	1.14	-0.21
19	1.18	1.93	1.00	1.14	1.72	0.70
20	1.06	0.68	-0.64	1.09	1.07	-0.77

Note. * Significant at a 0.05 level. ** Significant at a 0.01 level.

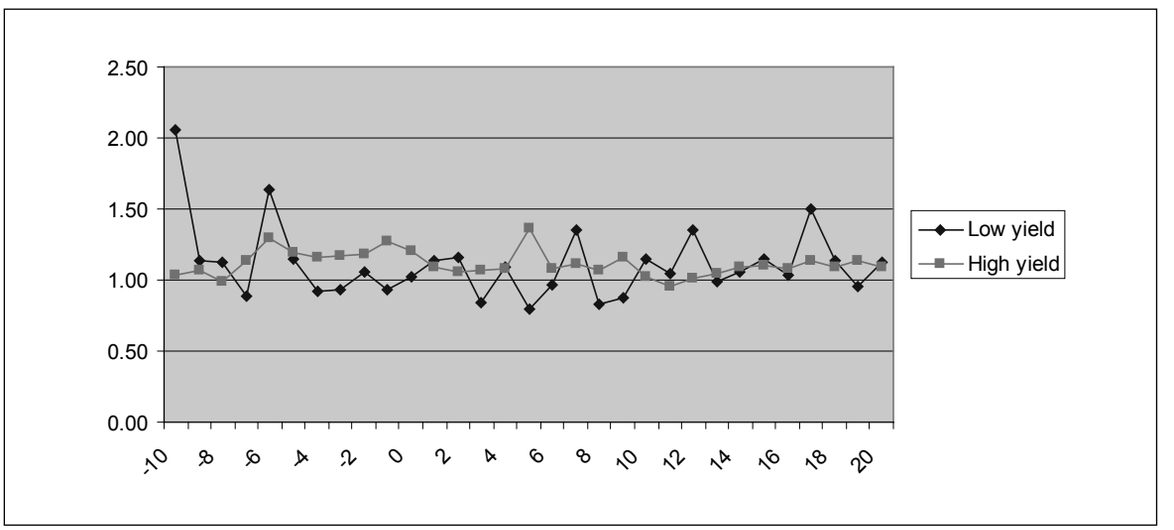

Figure 2. Average abnormal volumes for high- and low-yield stocks.

Lakonishok and Vermaelen (1986) proposed that while no abnormal trading volumes should be evident under the basic Elton and Gruber (1970) framework, similar positive and negative abnormal volumes should occur under Kalay's (1982) model. The reason is that investors with high marginal tax rates would prefer to sell before ex-dividend days, with the opposite being true for those investors with low tax rates. In the case of all the categories of traders exactly matching each other, one should observe no abnormal volume. The results evident in the present paper support the Lakonishok and Vermaelen (1986) model, predicting (a) that trading volume would increase abnormally before and after the ex-dividend day and (b) that because potential trading profits are relatively higher for high-yield stocks, the excess trading activity would be more pronounced for high-yield stocks.

Conclusions

The so-called dividend puzzle constitutes one of the most important lines of research in finance. However, despite many researchers having investigated the issue over decades, the solution to the puzzle is far from evident. The purpose of this paper was to investigate the ex-dividend day anomaly, characterized by significantly abnormal returns on this date. A further goal was to investigate the behavior of trading volumes around ex-dividend days to understand the causes of the ex-dividend day anomaly better. Empirical evidence gathered internationally reflects almost unanimous agreement on the existence of positive abnormal returns on ex-dividend days, indicating that one euro of capital gains is more valuable that one euro of dividends. Contrary to most of the existing evidence, the findings of this paper illustrate negative although nonsignificant abnormal returns on ex-dividend days and positive and significant abnormal returns on the day before dividend payments. These results were apparent for high- and low-dividend yield stocks. Higher trading volumes around ex-dividend dates, particularly for high-yield stocks, were also evident.

The current results are difficult to reconcile with the two most accepted explanations for the ex-dividend anomaly: the traditional tax-clientele hypothesis, as posed by Elton and Gruber (1970), and the short-selling hypothesis, both predicting that stock prices should drop less than the amount of dividend paid. On the contrary, our results indicate a dividend-capturing behavior by certain investors who would prefer dividends to capital gains, probably due to tax reasons. Deductions to avoid double taxation of dividends, especially important for corporate investors, might play a key role in encouraging such dividend-capturing behavior. Nevertheless, more research is required, including an examination of the order size around ex-dividend days, to determine the validity of this hypothesis as an explanation of the ex-dividend day anomaly.

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