THE MARKET REACTION TO INTERIM DIVIDENDS DURING EX-DIVIDEND DATES: GREEK EVIDENCE

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Abstract

The present study analyzes the ex-dividend day stock price and trading volume behaviour of firms listed on the Athens Stock Exchange (ASE) that distributed interim dividends from 1993 to 2006. Interim dividends are rare distributions, which are the result of an excellent financial performance of the firm during the current fiscal year. The Greek capital market is considered to be an ideal laboratory for testing the ex-dividend phenomenon due to the obligatory distribution of a minimum regular dividend amount, the absence of any taxes on dividends and capital gains and the trivial impact of tick size and bid-ask spread on stock prices. To test the ex-dividend day phenomenon, we employed the standard event study methodology. The findings are line with those found in other developed markets. Specifically, stock prices drop less than the amount of the interim dividend on the ex-dividend day, resulting in abnormal returns and abnormal trading volume on this day. The estimated ex-day abnormal return exceeds 5% and the ex-day abnormal trading volume is far above the normal volume. Cross-sectional regression analysis reveals that the coefficients of the dividend yield, systematic risk and transaction costs explain the stock price behaviour on ex-days. The overall findings are in line with the short-term trading hypothesis.

Keywords: Interim Dividends, Ex-dividend day, Short-term trading, Athens Stock Exchange.
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1. INTRODUCTION

Corporate dividend policy has been the subject of intensive theoretical modeling and empirical examination by financial economists and academics for the last 60 years. Dividends can be distributed through four ways: cash, property, scrip (promissory note to pay cash), or stock dividends. Additionally, dividends can be distributed as regular, interim, extra and specially designated. A number of researchers have provided insights, theoretical as well as empirical, into the dividend puzzle, an issue first raised by Black (1976). However, the issue as to why firms pay dividends is yet unresolved despite several academic attempts to offer a plausible explanation.

An issue that has attracted much attention among academics and practitioners alike is the reaction of stock prices on ex-dividend day. Specifically, in a perfect Walrasian market with no taxes or transaction costs, stock prices on the ex-dividend date would decline by exactly the dividend amount that is paid on each share. In other words, the stock price change between the cum-dividend day[2] (one day just before the ex-dividend day) and the ex-dividend day should be equal to the distributed dividend. However, this is not the case in reality, where significant deviations of stock price changes on ex-days are observed from the dividend amount. In particular, a strand of studies have revealed that stock prices drop less than the amount of the dividend on ex-days, a phenomenon which is named the ex-dividend day phenomenon.

Campbell and Beranek (1955), the first who observed the ex-dividend day phenomenon based on US data, evidenced that the average stock price drop-off was 90 percent of the amount of the dividend. Since then, numerous studies and various models have been developed in order to explain this unexpected drop in stock prices on the ex-dividend day. More specifically, Elton and Gruber (1970) attributed this drop to the tax factor and particularly, to the differential tax treatment of income from dividends relative to income from capital gains. On the other hand, Kalay (1982) attributed this finding to the tax change in code, or to the presence of transaction costs, while Frank and Jagannathan (1998) and Bali and Hite (1998) reported the existence of microstructure impediments in the market such as the tick size effect and the bid-ask spread that hinder the stock prices to adjust to dividend amount.

Whereas the above explanations have been developed to explain the smaller drop of stock prices on ex-dates under the institutional arrangements of developed capital markets, and especially those of the USA, the market and the institutional environment of other countries

[2] Cum-dividend day is the last day that a share trades with right to get the declared dividend.

may not justify these explanations. The distribution of dividends in Greece, in particular, presents certain interesting differences in comparison to similar distributions in other capital markets like those in the USA, Canada, the UK and other European countries. First, unlike the distribution of a regular dividend that, under specific circumstances, is compulsory in terms that results from legislative decrees, the distribution of interim dividends in Greece are always initiated by firms. Interim dividends are declared by very few firms[3] listed on the Athens Stock Exchange (ASE) that face highly increased profits during the first nine months (three quarters) of the fiscal year compared to the corresponding last period's profits. In the case of interim dividend distributions, the amount, the number of firms and the ex-dividend day cannot be estimated precisely, as in the case of regular dividends. This implies that the new information release through interim dividends is in most cases surprising. Second, unlike the USA, the UK, Canada or other European countries, but similar to Hong Kong, in Greece there is neither tax on dividends nor on capital gains. Finally, tick size is 7 to 8 times less than that of the other markets and the bid-ask spread for all stocks has been recently in effect in the Athens Stock Exchange.

The objective of this study is to investigate the ex-dividend day stock price and trading volume behaviour of interim dividends, using data from a market where neither tax on dividends, nor on capital gains is imposed, nor do microstructure impediments observed in other markets exist. The Greek capital market is considered a unique laboratory to test both the stock price and trading volume reaction on ex-dates due to the absence of severe microstructure impediments that deprive stock prices of falling by the full amount of the dividend. Both the ex-dividend day stock price and trading volume behaviour of interim dividends are expected to shed light on whether the so-called ex-dividend stock price anomaly exists in the Greek capital market. Furthermore, the present study aims to contribute to the literature by testing whether one of the hypotheses that have being put forward to explain the ex-dividend stock price anomaly is valid in the Greek capital market.

The remainder of the present paper is organized as follows: Section 2 reviews the pertinent literature regarding the ex-dividend day phenomenon. Section 3 describes the institutional environment that applies to interim dividends in Greece. Section 4 discusses the data and presents the methodology employed. Section 5 discusses the empirical findings and, finally, section 6 provides concluding remarks and provides directions for future research.

[3] Approximately a dozen of firms distribute an interim dividend each year.

2. LITERATURE REVIEW

One of the earliest published studies on the ex-dividend stock price anomaly is that of Campbell and Beranek (1955) who reversed the general view that stock prices drop by the full dividend amount on ex-days. Using data from the NYSE stocks, they observed that the ex-dividend price drop was 90% of the dividend amount.

Durand and May (1960) conducted another seminal work examining the ex-dividend behaviour of American Telephone and Telegraph stock (AT&T) for a time series of 43 consecutive dividends for the period from the first quarter of 1948 to the first quarter of 1959. The ex-dividend price drop-off ($\Delta P/D$) was measured from the closing price on the cum-dividend day to the closing price on the ex-dividend day. They found that the average $\Delta P/D$ on the 43 ex-dividend dates was \$2.16, or about 4 percent less than the \$2.25 dividend. This result led the authors to conclude that a taxpaying individual should be better to sell AT&T cum-dividend and wait to buy ex-dividend.

Since then, numerous studies and various models have been developed in order to explain this unexpected drop in stock prices on the ex-dividend day. Several studies attributed this drop in stock prices to the tax factor (Elton and Gruber, 1970) and particularly, to the differential tax treatment of income from dividends relative to capital gains. Other studies attributed this finding to the tax change in code, or to the microstructure factors such as the presence of transaction costs (Kalay, 1982), tick size effects (Bali and Hite 1998) and bid-ask spreads (Frank and Jagannathan, 1998).

Elton and Gruber (1970) were the first researchers that offered a reasonable explanation for the ex-dividend stock price anomaly using data over the period 1966-1967. They attempted to explain the equilibrium price behaviour of securities on the ex-dividend day by using the marginal tax rates prevailing on that date. They developed a model known as "the long-term trading hypothesis" or "the tax-effect hypothesis". Using this model, Elton and Gruber (1970) stated that an investor who decides to sell a share around its ex-dividend date faces a timing decision of whether to sell on cum or ex-dividend day. If he decides to sell on the cum dividend day (one day before stock goes ex-dividend), he will receive the cum-dividend price (P_c) and he will pay tax at the capital gains rate (t_g) on the excess of the cum dividend price over to the price at which the share was bought (P_o). On the other hand, if he decides to sell ex-dividend, he receives a dividend and the ex-dividend price (P_e) but he will now pay tax on the dividend at the dividend tax rate (t_d) and he will pay tax on the excess of the ex-dividend price (P_e) over to the price at which the share was bought at the capital gains tax rate (t_g). Therefore, the unfavorable treatment of dividends relative to capital gains will affect the decision of an

investor to sell on the ex-dividend day. For an investor to be indifferent to timing, the following equation can be established:

$$P_c - (P_c - P_o) * t_g = P_e - (P_e - P_o) * t_d + D * (1 - t_d) \quad (1)$$

where,

P_c = price per share cum dividend,

P_o = price at which the share was bought,

P_e = price per share ex-dividend,

t_g = tax rate on capital gains,

t_d = tax rate on dividend income and D is the dividend per share.

Rearranging equation (1) we get:

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

Elton and Gruber (1970) argued that the statistic[4] $(P_c - P_e)$/ D (or ΔP/D) must then reflect the marginal tax rates of the marginal stockholders and one should be able to infer these tax rates by observing the above ratio.

Kalay (1982) used a sample of 2,540 cash dividends paid for the period from April 1st, 1966 to March 31st, 1967 for firms traded on the NYSE. Unlike Elton and Gruber (1970) who used closing prices to compute cum and ex-dividend stock prices, Kalay (1982) used closing prices on cum-days and opening prices on ex-days. Furthermore, the stock prices on ex-dividend days were adjusted by market movements, using the market model. He concluded that the marginal tax rates of stockholders could not be inferred, in general, from the ex-dividend price drop ratio if the ratio was outside the no-profit opportunities bounds.

Lakonishok and Vermaelen (1986) investigated both the trading volume and the stock prices behaviour around ex-dividend days. They used data for trading volume and stock prices for all cash dividends (taxable distributions) as well as stock splits and stock dividends (non-taxable distributions) for the period 1970-1981 from both the NYSE and AMEX. Their results

[4] This statistic is known as ex-dividend price drop ratio, drop-off ratio, premium, price change to dividend drop ratio ΔP/D and etc.

showed that, for taxable distributions, trading volume increased significantly before and after ex-dividend days. This increase was more pronounced for high yield, actively traded stocks and during the period following the introduction of negotiable brokerage commissions. Moreover, stocks experienced abnormal price increases before ex-days and abnormal price decreases afterwards. The abnormal price increases were positively related to the dividend yield and transaction costs. On the other hand, the abnormal trading volume was positively (negatively) related with the dividend yield (transaction costs). These results were consistent with the hypothesis that short-term traders have impact on ex-day price behaviour, at least for taxable distributions. For non-taxable distributions, the authors found significantly positive abnormal returns in days –5 through +2 with a cumulative abnormal return (CAR) equal to 2.38%, but negative abnormal volume the other days.

Grammatikos (1989) in his study had two objectives. The first one was to examine the implications of the 1984 Tax Reform Act[5] (1984 TRA) for the short term trading activities of incorporated traders, and the second was to re-examine the ex-dividend day price behaviour in the context of the risk exposure resulting from dividend related trading. He used regular cash dividend distributions by NYSE and AMEX traded stocks over the period 1975-1985. In addition, in order to examine the importance of risk exposure for dividend stripping strategies, he used a sample of 3,096 optionable and 16,311 non-optionable cash dividends before the 1984 tax reform and 562 optionable and 1,470 non-optionable dividends after the tax reform. The results showed that the ex-dividend price drop ratio (abnormal return) declined (increased) as a result of the 1984 TRA, and this decline (increase) affected only the high-dividend stocks. A major objective of the new tax code was to increase the riskiness of short-term trading activities of incorporated traders. Consistent with the short-term trading hypothesis, the evidence indicated that the tax reform had inhibited such activities for stocks that were primary candidates for short-term trading. In addition, the 1984 TRA appeared to have inhibited short-term trading activities by increasing the risk exposure of incorporated traders. Stocks for which existing listed options permitted the reduction of risk through hedged dividend-stripping strategies were affected much less by the introduction of the new law of 1984 than their non-optionable counterparts.

[5] One purpose of the 1984 Tax Reform Act was to increase the risk and/or reduce the profitability of dividend–related trading by incorporated investors. Thus, according to the new tax code, the minimum holding period for the 85% exclusion was extended from 16 to 46 days.

Michaely (1991) also analysed the behaviour of stock prices around ex-dividend days after the implementation of the 1986 Tax Reform Act[6]. The sample of his study included data for all firms listed on the NYSE that paid dividends during the period 1986-1989. The results showed that the average ex-dividend price drop ratio was similar before and after the tax change and indistinguishable from one. Comparisons of the average ex-dividend price drop ratio within yield deciles also showed a similar pattern in 1986 and in 1987. This means that the change in the relative tax rates between dividends and capital gains, for long-term investors, had no effect on the ex-dividend stock price behaviour. On the other hand, the results indicated that the activity of short-term traders and corporate traders dominated the price determination on the ex-day.

Dubofsky (1992) offered an explanation for the ex-dividend price drop phenomenon, that was based on market microstructure practices, which was entirely different from the tax-effect hypothesis and the short-term trading hypothesis. More specifically, he argued that the abnormal returns found in NYSE and AMEX were the result of NYSE Rule 118 and AMEX Rule 132, which dictated how open limit orders to buy and sell stock were handled on ex-days. On both exchanges, open limit orders to buy stock must be reduced by the cash dividend amount on ex-cash dividend days. If the resulting price was not a multiple of an eighth of a dollar, then an ex-cash dividend limit buy order price was reduced to the next lower eighth. Limit orders to sell were not changed by the ex-cash dividend event. In addition, patterns in ex-day abnormal returns were shown to arise because trading was done at discrete price intervals (normally \$1/8 for stocks selling above one dollar per share), while cash and stock dividends paid per share are usually not multiples of eighths. Therefore, abnormal returns would be positive when the dividend exceeded \$0.0625 per share. The return for a dividend just below or equal to a multiple of an eighth would exceed the return for a dividend just above the same 1/8 multiple.

Lasfer (1995) analysed the behaviour of share prices around the ex-dividend dates before and after the introduction of the 1988 Income and Corporation Taxes Act (ICTA) in the UK. This is equivalent to the 1986 Tax Reform Act (1986 TRA) in the USA and eliminates the preferential tax treatment of long-term capital gains. The period of analysis was from April 6, 1985 to April 5, 1994. The results showed that in the pre-1988 period (before the introduction of the 1988 ICTA) when the differential taxation of dividends and capital gains was high, ex-

[6] The 1986 Tax Reform Act (1986 TRA) reduced the differential taxes between dividend income and capital gains income for long-term investors. Also, 1986 TRA did not change the incentives of short-term traders and had a small impact on corporate traders' incentives to trade around the ex-day.

day returns were positive and significant. In contrast, in the post-1988 period, ex-day returns were negative and insignificant. Furthermore, he showed that the ex-day returns in the UK were consistent with the tax-effect hypothesis as well as the impact of settlement effect[7], and inconsistent with the short-term trading hypothesis. However the findings suggested that short-term traders did not capture dividends in the UK either because the institutional legislation was effective or because the UK market was efficient. Finally, he found that the 1988 ICTA had no effect on the ex-day prices of the lowest dividend yield quintile where the ex-day stock prices declined by the full amount of the dividend both in the pre-and post-1988 period, in contrast to the highest dividend yield quintile.

Bali and Hite's (1998) sample consisted of both cash dividends and non-taxable distributions, such as stock dividends and stock splits, and covered the period from July 2, 1962 to December 31, 1994. The data referred to the NYSE and AMEX firms. They offered an explanation of the ex-dividend day stock price behaviour that relied on different arguments that so far had been provided. They investigated the effects of discreteness in trading prices on observed ex–dividend day stock price changes and demonstrated why prices declined by less than dividends and why this was attributed to the tax-induced dividend clienteles. This hypothesis is known as the price discreteness hypothesis.

Frank and Jagannathan (1998) examined the ex-dividend day stock price behaviour in the market of Hong Kong (HKSE), where neither dividends nor capital gains were taxed and unlike in the NYSE there were no market makers until 1993. They found that for the period from 1980 to 1993 the stock prices dropped, on average, by less than the dividend on the ex-dividend day with an ex-dividend day abnormal return of 1.3%. They argued that in order to avoid dealing with the dividend, investors tend to sell stock before the ex-day and delay purchasing stock on or after the ex-day. Therefore, transactions on the last cum-day would be closer to the bid price and transactions on the ex-dividend day tend to take place at the ask price causing positive abnormal returns which are unrelated to the tax regime. They argued that the true relationship between the price drop and the dividend should be one to one, but the bid-ask bounce clouds this relationship.

Naranjo et al. (2000) examined the intertemporal behaviour of ex-dividend day stock returns for high-yield stocks that were subject to corporate dividend capture. Particularly, they

[7] Unlike in the U.S., in the UK all ex-dividend dates occur on the first dealing day (which is the first Monday after the end of the account) of the account of the London Stock Exchange (LSE). The implication 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 Monday's returns are expected to be positive with the magnitude of two or three weeks of interest. This phenomenon was called the "settlement effect".

re-examined and extended the results of Eades et al.[8] (1994) from July 7, 1962 to December 31, 1994, using monthly data. Naranjo et al. (2000) found that ex-day abnormal returns for high-yield stocks were, on average, positive prior to the 1975 change in brokerage commissions and uniformly negative in the years after the introduction of negotiated commission rates. They also found that that ex-day returns were more negative (positive) when transaction costs and risk associated with dividend capturing were smaller (greater). In conclusion, the authors asserted that dividend capturing played a key role in determining ex-day returns.

Asimakopoulos and Hodgkinson (2001) examined stock price behaviour on ex-dividend days using data from the UK for the period from April 6th, 1988 to April 5th, 1998, after the introduction of the 1988 Income and Corporation Taxes Act[9] (ICTA). More specifically, the authors extended the model developed by Frank and Jagannanthan (1998), examining not only the influence of market microstructure, but also the impact of settlement costs and tick sizes on the ex-dividend price drop ratio ($\Delta P/D$). Asimakopoulos and Hodgkinson (2001) argued that market microstructure could, to some extend, explain why the share price drop might differ from the dividend on the ex-dividend day, but settlement costs appeared to have little impact. However, when they divided their sample according to the dividend size, even taking into account the impact of microstructure effect, the $\Delta P/D$ for the large dividend sub-sample was not significantly different from the amount of dividend paid.

Graham et al. (2003) examined ex-dividend price drop ratios, ex-day returns, and trading volume in the last part of the 1/8th pricing era (January 1, 1996 to May 6, 1997) to those in the 1/16th pricing era (June 24, 1997 to August 26, 2000) and the decimal pricing era (January 29, 2001 to December 31, 2001). The data referred to NYSE firms paying quarterly cash dividends. The results did not support the tick size or the bid-ask explanations[10] for the deviation of the ex-dividend price drop ratio from one and, consequently, the existence of ex-day abnormal returns proposed by other studies. In contrast, the results were more consistent with the tax-effect hypothesis that the ex-day abnormal returns were caused by the preferential tax treatment of capital gains and dividends. To confirm that, the authors reported that the ex-

[8] Eades et al. (1994) examined ex-dividend behaviour for a sample of NYSE firms for the period from July 7, 1962 to October 11, 1989.

[9] According to ICTA, statutory tax rates on capital gains and income were the same. Hence, subsequent to the implementation of ICTA, any ex-dividend price drop below the amount of dividend was less likely to be ascribed to the differential taxation explanation (tax-effect hypothesis). In addition, short-term trading hypothesis was also unlikely to be relevant in the UK because of institutional regulations (see Lasfer, 1995, pp. 877-881).

[10] Both the tick size and the bid-ask spread hypotheses predicted that the reduction of price discreteness after the decimalization should lead to the move of the ex-dividend price drop ratio close to one and the elimination of the ex-day abnormal returns.

dividend price drop ratio increased (and the abnormal returns fell) when the capital gains tax was reduced in May 1997. Finally, the short-term trading and the bid-ask spreads hypotheses argued that abnormal trading volume is positively related to the magnitude of the dividend and negatively related to the level of transaction costs and risk. However, the results did not support these predictions. The cumulative abnormal volume in decimal pricing era was not statistically different than in the $1/16^{th}$ pricing era as of the ex-day, nor over the entire eleven-day window.

Jakob and Ma (2004) used NYSE data from the $\$1/8^{th}$, $\$1/16^{th}$ and decimal tick regimes to conduct direct empirical test of the impact of both price discreteness and NYSE Rule 118[11] on the ex-divided day price behaviour. They reported that as discreteness was eliminated the ex-dividend price drop anomaly actually increased. In addition, regardless of the tick size, bid prices fell more than offer prices whether one measures the drop from cum-day open to ex-day open or from cum-day close to ex-day open. These findings were consistent with Dubofsky (1992), but in contrast to those found by Bali and Hite (1998). In a subsequent study, Jakob and Ma (2006) examined the ex-day price drop behaviour of stocks listed on the Toronto Stock Exchange (TSE). In contrast to the NYSE, the TSE did not automatically adjust limit orders on the ex-dividend date.

Kadapakkam and Martinez (2005) examined the ex-dividend share price behaviour of 64 Mexican firms for the period from 1993 to 2003. During the examined period, Mexico followed a dividend imputation system in which corporate and individual income taxes were integrated to avoid double taxation. Under the dividend imputation system, individuals could claim a tax credit for dividends, if they included dividends in their income. Capital gains on stock market transactions were tax free. Under such a tax-free institutional environment, the tax-based explanation of Elton and Gruber (1970) would predict negative or at most zero abnormal returns on the ex-dividend day. However, ex-date abnormal returns were significantly positive. Kadapakkam and Martinez (2005) argued that this finding was clear-cut evidence against the tax-based explanation leaving the issue open.

The study of Milonas et al. (2006) analysed the ex-dividend day price behaviour in an environment where the microstructure effects are neutralized. In the Chinese stock market cash

[11] Dubofksy (1992) was the first who investigated the impact of NYSE Rule 118 and AMEX Rule 112 on the ex-dividend day price anomaly. NYSE 112 and AMEX 132 dictated that, on ex-cash dividend days, open limit orders to buy stocks are reduced by the cash dividend amount. With discrete prices, if the resulting price is not a tick multiple, it is further lowered to the next tick. Prices in limit sell orders are not adjusted. For example, if the tick size is \$0.125 (\$1/8) and a dividend is \$0.15, then the price of limit buy orders will be adjusted down by \$0.25 and limit sell orders will not be adjusted (Jakob and Ma, 2004).

dividends could be either taxable or non-taxable, depending on their magnitude relative to the one-year estimated interest income on the face value of the corresponding stocks. This study neutralized the consequence of other potential factors and focuses on the tax effect on stock price behaviour on the ex-dividend day. The sample covered the period from January 1996 to December 1998 and it was separated into a taxable sample with 297 dividends and a non-taxable sample with 56 dividends. The findings from the non-taxable stocks showed that the price on the ex-dividend day dropped by an amount that equaled the dividend paid. Regarding the taxable sample, stock prices of small dividend yield stocks dropped proportionally to the dividend paid. For the large dividend yield stocks, the price adjustment depended on the effective tax rate on dividend income. The overall implication of this study was that the stock price behaviour on the ex-dividend day was consistent with the tax effect hypothesis.

Castillo and Jakob (2006) examined the ex-dividend day behaviour of stocks on the Bolsa de Santiago, the main stock exchange of Chile for the period from 1989 to 2004. In Chile the general tax environment for individual investors is consistent with a preference for capital gains. Capital gains are not taxed, while dividends are. Therefore, according to the tax-effect hypothesis individuals in Chile should prefer capital gains to dividends. Finally, on the Santiago Stock Exchange there is a tick size. Orders can be submitted on a continuous scale. According to the tick size effect hypothesis of Bali and Hite (1998), the $\Delta P/D$ ratio in Chile should equal to one. Castillo and Jakob (2006) found an average $\Delta P/D$ ratio of 0.815. Furthermore, in contrast to dividend clientele hypothesis, the authors found no significant relation between dividend yield and $\Delta P/D$ ratio. The evidence suggested that arbitrageur transaction costs might be the friction that restricted ex-day price adjustment in Chile.

Hu et al. (2007) analysed the tax-induced stock price behaviour on ex-dividend days for American Depositary Receipts (ADRs) since they offer a unique setting where all ADR investors are subject to identical foreign tax rate for a given cash distribution. The authors employed a sample of 6,461 cash dividend distributions of 528 firms from 42 different countries for the period from 1988 to 2004. The countries from which the equity securities that underlie ADRs were issued applied different foreign tax rates on ADR dividends. Hence, the authors tried to separate the ex-day abnormal returns based on foreign tax rate and investigated the relationship between abnormal returns and the foreign tax rate. The results showed significant abnormal returns exactly on ADR ex-dividend days. Moreover, the results from the regression analysis displayed a positive relationship between abnormal returns and foreign tax rates, dividend yield and transaction costs. These findings implied that tax was not the only factor that explained the stock price behaviour on ex-dates.

Recently, Yahyaee et al. (2007) examined the ex-dividend price day behaviour in a unique data set from Oman. Stock prices had been decimalized, dividends were distributed annually and there were neither taxes on dividends nor on capital gains. Like previous studies, they found that the stock prices dropped by less than the dividend amount resulting in a significant positive ex-day return. The authors also examined the abnormal trading volume around the ex-day and found no evidence of short-term trading. Similar to Frank and Jagannathan (1998), Yahyaee et al. (2007) found evidence that the bid-ask bounce is the primary factor behind the ex-dividend day behaviour.

3. THE GREEK INSTITUTIONAL ENVIRONMENT

3.1 General Information about the ASE

The Athens Stock Exchange (ASE) is an electronically traded market where the first electronic system (O.A.S.I.S) was introduced in 1992 and was advanced in 1999. There is one continuous market for the large and medium-sized companies and a call auction market for a small number of firms that are thinly traded. Trading hours begin at 10:30 and close at 17:00. The ASE was founded in 1876 and started to operate four years later in 1880. The first securities traded were Government bonds and the shares of the National Bank of Greece. Until the mid of 1990's very few domestic investors put their money on Greek listed firms and the foreign investment interest was weak.

Severe attempts have being made to squeeze stock price manipulations and provide greater transparency. In this line, Law 3016/2002 introduced the concept of corporate governance for first time in the Greek capital market in order to boost the domestic investment interest. Moreover, the prerequisites for making IPOs became stricter, resulting in a dramatic decrease of new firms listing their shares in the ASE.

The ASE is small compared to other European stock exchanges in terms of market capitalization, number of firms listed and turnover volume. By the end of 2006, more than 330 firms were listed in the ASE. The market's total capitalization has increased rapidly since 1995 due to new seasoned issues of shares. The greatest increase occurred in 1999 when the total value of listed companies reached 184,000 million Euros, an increase of 195% over that of 1998 (Owusu-Ansah and Leventis, 2006). The ASE witnessed tremendous growth since 1995 and reached historical levels in the mid of 1999. The influx of international funds during that period was remarkable contributing to the rise of the GIASE in record levels. Since then, there was a dramatic fall in prices for all stocks that lasted until the end of March of 2003. Within less than two years, the majority of stocks lost more than 70% of their market capitalization

and thousands of small individual investors saw their savings vanish. From the beginning of April 2003 there was a gradual uptrend in the GIASE that remains up to the writing of this study. This uptrend is mainly attributed to the remarkable influx of international funds which found the firms of the ASE as a great investment opportunity. At the end of 2006, more than half of market capitalization of the major ASE Indices was in the hands of foreign institutional investors.

3.2 Dividends and Taxation

Following standard corporate practice, in Greece, cash dividend distributions are proposed by the board of directors and the details of the distribution must be published in the daily newspapers. The proposed dividend is subject to the final approval at the annual general meeting (AGM) where the exact ex-dividend day is declared. However, the amount distributed to shareholders is not within a company's absolute freedom. The legislation defines the minimum amount of profits that must be distributed, which a company almost always has to retain. According to the Corporate Law 2190/1920, a company listed on the ASE should distribute its profits in the following order:

a) At least 5% of the net profits are withheld for the formation of regular reserves. This obligation ceases to exist when the amount of the stock in formation reaches the 1/3 of the stock capital (Corporate Law 2190/1920, article 44).
b) The amount that must be distributed in the form of cash dividends amount has to be equal either to 6% of the stock capital (Corporate Law 2190/1920, article 45) or to 35% of the net profits minus the amount kept for the formation of regular reserves, whichever of the two amounts is larger (Law 879/1979, article 1).

In case that the dividend which corresponds to the 6% of the stock capital is smaller than the one that corresponds to the 35% of the net profits, then the company can distribute the smaller amount only by the decision of the 95% of shareholders' votes at the relevant general meeting. Dividends may not be distributed only when there is a decision of 80% of shareholder's votes at the annual general meeting (AGM). The rest of the profits are distributed in accordance to the aim of the corporate memorandum (i.e. remuneration of the board of directors, additional wages for employees, distribution of additional dividends, formation of emergency stock, etc.).

Based on the legislative environment just described, one can conclude that the distribution of a regular dividend is quite predictable in Greece in the sense that the minimum distributed amount can be precisely predicted as determined by the corporate law. Furthermore,

the traditional corporate practice of Greek listed firms is to convene the shareholders annual general meeting (AGM) within June of the following fiscal year[12], where the shareholders' approval of the final financial statements of the last financial year and other significant corporate events, such as the distribution of regular cash dividends take place. At the same date, the board of directors declares the ex-dividend day which is usually the next weekday.

Unlike regular dividends, in Greece, interim dividends are not obligatorily distributed. No law determines the distribution of a minimum or regular interim dividend. The distribution of an interim dividend is at the company's discretion. Moreover, unlike regular dividends which are declared and paid within the following fiscal year, interim dividends are declared and paid during the current fiscal year. Common practice of the companies listed on the ASE is to distribute an interim dividend after the release of highly increased profits for the first three quarters of the current fiscal year. Therefore, the declaration of an interim dividend takes place between October and December of the current fiscal year. The amount of the interim dividend should not exceed 50% of the final dividend.

The Greek tax system does not impose any personal taxes on final or interim dividends. Corporate dividends are determined after corporate taxes have been deducted from profits before taxes (Law 2065/1992). Therefore, the shareholders are not subject to any taxes on received dividends, that is, dividends are not double-taxed as in the USA. Similarly, no taxes are imposed on capital gains. The only tax is a flat tax of 0.3% imposed on every stock sale proceeds (Law 2579/1998, article 9). Short-selling in the ASE is permitted. Trades are cleared in three days after the day of transaction. Market making is applied to a number of stocks.

Furthermore, commission costs in the ASE have been deregulated in 1996. Since then, fees imposed by brokerages are set freely, but not above a maximum of 1% set by the Association of Securities Firms. Tick sizes are very small and are scaled as follows:

Stock prices in Euros	0.01<stock price<3.00	3.01<stock price<60.00	stock price>60.01
Tick size in Euros	0.01	0.05	0.1

Comparing these multiple ticks with those prevailing in the pre-decimal pricing era in the US market, we observe that the tick size in Greece is almost 7 to 8 times smaller than that in the USA[13].

[12] 95% of the Greek listed firms have fiscal year that begins on 1st January and ends on 31st December of the same year.

[13] In the USA in the pre-decimalization pricing era, the tick size was initially \$0.125 (1/8) and then was reduced to \$0.0625 (1/16).

Finally, until 1st April 2001 the Greek firms were required to reduce artificially their ex-dividend stock price by the dividend amount. Enacting the rule 59 of 30th March 2001, the Hellenic Capital Market Committee (HCCC) decided that after 2nd April 2001 Greek firms are not required to reduce their ex-dividend stock price by the dividend amount.

In sum, the above described institutional environment in Greece contains many idiosyncrasies that are not observable in other developed markets that make the investigation of the ex-dividend day price anomaly very interesting.

4. DATA AND METHODOLOGY

4.1 Research Sample

Daily adjusted closing and opening prices as well as adjusted trading volume for the firms listed in the Athens Stock Exchange (ASE) are used to study the stock price and trading volume behaviour around ex-days. Both closing and opening prices and trading volume data were obtained from the Dissemination Information Department of the ASE. The ex-dividend dates were extracted from the website of the ASE[14] and were cross-checked by daily press releases. Our entire sample period is from January 1, 1993 to December 31, 2006. During the examined period 64 interim dividends have been distributed to shareholders.

To avoid the contamination of our results from the occurrence of other corporate events, a concern first raised by Miller and Scholes (1982), firms were excluded if they had any specific corporate event such as earnings announcements, dividend announcements, stock splits, share repurchases, stock dividends and right issues, within a 20-day event period around the ex-dividend day (-10, +10).

Furthermore, to be included in the final sample, we required companies to satisfy the following criteria: (a) price data were available for the period commencing 220 days prior and ending 20 days subsequent to the ex-dividend day; (b) trading volume data were available for a window of 120 days prior and 120 days subsequent to the ex-dividend day; and (c) to avoid the problem of thin trading[15] (stocks that trade infrequently), we excluded firms that had no transactions for more than 100 days in the estimation period. The above criteria resulted in a sample of 58 observations.

Table 1 presents the annual distribution of interim dividends declared by the firms traded on the ASE. Almost half of interim dividend distributions occur in the last three years

[14] www.ase.gr

[15] It is well known problem that this non-synchronous trading results in biased estimates of the market model parameters (Brown and Warner, 1985).

(2004, 2005 and 2006). The years 2004 and 2006 contain the largest number of interim dividend distributions being equal to 10.

[Insert Table1 about here]

4.2 Measures of the Ex-dividend Stock Price Behaviour

According to Elton and Gruber (1970), a stockholder selling his shares before the stock goes ex-dividend has not the right to receive the dividend. On the other hand, if he chooses to sell his shares on the ex-dividend day, then he has the right to receive the dividend, but he might expect to sell the stock in a lower price. In other words, the total wealth of a shareholder who decides to sell his shares on the ex-dividend day consists of the share price on the ex-dividend day plus the amount of the dividend received.

In a market without transactions costs and taxes the difference between the price on the cum-dividend day (P_c) and the price on the ex-dividend day (P_e) should be equal to the dividend (D):

$$P_c - P_e = D \tag{3}$$

Dividing both sides by D, we get the classical ex-dividend drop ratio which is called raw price ratio (RPR):

$$RPR = \frac{P_c - P_e}{D} = \frac{D}{D} = 1 \tag{4}$$

The raw price ratio (RPR) measures the price change from the cum-dividend day to the ex-dividend day in terms of the dividend paid. RPR can be calculated by three different ways[16]. First, we can calculate the RPR using closing prices both on cum and ex-dividend days (RPR_{c-c}). Second, the ratio can be calculated by using closing prices on cum-dividend days and opening prices[17] on ex-dividend days (RPR_{c-o}) and third, using closing prices both on cum and ex-dividend days, however, adjusting the latter for the stock market movements. Kalay (1982), Michaely (1991) and Naranjo et al. (2000) recognized that the closing price on the ex-dividend day is affected by the stock's normal daily return and attempted to adjust for this drift.

[16] See Milonas and Travlos (2001) and Milonas et al. (2006).

[17] We use opening prices on ex-days in order to control for overnight market movements between the cum-dividend day and the ex-dividend day.

Following prior research, we address this problem by adjusting the ex-day closing price for the daily market return (R_m) as it is proxied by the Athens Stock Exchange (ASE) composite stock index. This ratio is called the market-adjusted price ratio (MAPR) and is calculated as follows:

$$MARP = \frac{P_c - [P_e /(1+R_m)]}{D} \tag{5}$$

The theoretical value of RPR and MAPR equals one. In other words, we test the following null hypotheses:

H_{1a}: The mean of $RPR_{c\text{-}c}$ =1.

H_{1b}: The mean of $RPR_{c\text{-}o}$ =1.

H_{1c}: The mean of MARP =1.

Several authors like Eades et al. (1984), Barclay (1987), Michaely (1991), Boyd and Jagganathan (1994) and Bell and Jenkinson (2002) asserted that the traditional ratio ΔP/D (or RPR) suffers from heteroskedasticity and independence. Heteroskedasticity arises because the ΔP/D ratio is scaled by the dividend amount resulting in an excessive weight to changes in observations where dividends are low. For that reason, we also compute the price change from the cum-dividend day to the ex-dividend day as scaled by the cum-dividend day (or ΔP/P). Following Milonas et al. (2006), we define this as the raw price drop ratio (RPDR):

$$RPDR = \frac{P_c - P_e}{P_c} \tag{6}$$

Similar to RPR, RPDR can be calculated by three different ways. First, we calculate RPDR using closing prices both on cum and ex-dividend days ($RPDR_{c\text{-}c}$). Second, by using closing prices on cum-dividend days and opening prices on ex-dividend days ($RPDR_{c\text{-}o}$) and third, using closing prices both on cum and ex-dividend days, however, adjusting the latter for the stock market movements. We adjust the ex-day closing price for the daily market return (R_m) as it is proxied by the Athens Stock Exchange (ASE) composite stock index. This ratio is called the market-adjusted price drop ratio (MAPDR) and is calculated as follows:

$$MAPDR = \frac{P_c - [P_e /(1+R_m)]}{P_c} \tag{7}$$

All raw price drop ratios have a theoretical value equal to the dividend yield (DY) which is computed as the interim dividend per share divided by the stock price on the last cum-dividend day (P_c).

$$DY = \frac{D}{P_c} \tag{8}$$

Finally, the abnormal raw return (ARR) on ex-dividend days is calculated as follows:

$$ARR = \frac{P_e + D - P_c}{P_c} \tag{9}$$

In summary, we test the following null hypotheses:

H_{1d}: The mean of $RPDR_{c\text{-}c}$ =DY.

H_{1e}: The mean of $RPDR_{c\text{-}o}$ =DY.

H_{1f}: The mean of MAPDR =DY.

H_{1g}: The mean of abnormal raw returns (ARR) =0.

To examine the market reaction on and around ex-dividend days, we employ the standard event study methodology described by Dodd and Warner (1983) and Brown and Warner (1985). First, we estimate the stock price reaction for an event window of 40 days around the ex-dividend day (day 0), that is, from day -20 to day +20. Following Brown and Warner (1985), we estimate the market reaction by calculating the abnormal returns (AR) using the market model, the market-adjusted return model and the raw returns model[18]. The market model parameters are estimated using 200 observations (estimation period), commencing 220 days prior to the event day, that is, from day -220 and ending on day -21. The market return is proxied by the Athens Stock Exchange (ASE) composite stock index.

Abnormal returns are calculated as the difference between actual returns and normal or expected returns as follows.

[18] The majority of US and international studies on ex-dividend day phenomenon use one of the following models in order to calculate abnormal returns: the market model, the market-adjusted return model, the mean-adjusted return model and the raw returns model. However, the mean-adjusted return model suffers from heteroskedasticity and for that reason we decided not to employ it.

$$AR_{it} = R_{it} - E(R_{it}) \tag{10}$$

where,

AR_{it} = abnormal return of firm i on day t, where t= -20….+20

R_{it} = actual return of firm i on day t, where t= -20….+20

$E(R_{it})$ = expected return of firm i on day t, where t= -20….+20

Employing the market model, the expected return is calculated as:

$$R_{it} = \alpha + \beta * R_{mt} + e_{it} \tag{11}$$

where,

i = 1……..,N,

t = 1……..,N,

R_{it} = the actual return and of firm i on day t,

R_{mt} = market return as approximated by the ASE composite index on day t,

$\beta = \dfrac{Cov(R_{it}, R_{mt})}{Var(R_{mt})}$ = systematic or undiversifiable risk,

$a = E(R_{it}) - \beta * E(R_{mt})$ and

e_{it} = error term of firm i on day t with a mean equal to zero and a constant variance.

According to market-adjusted returns model, abnormal returns on and around ex-days are calculated as:

$$AR_{it} = R_{it} - R_{mt} \tag{12}$$

where,

AR_{it} = abnormal return of firm i on day t, where t= -20….+20

R_{it} = actual return and of firm i on day t,

R_{mt} = market return as approximated by the ASE composite index on day t.

The market-adjusted returns model assumes that $\alpha = 0$ and $\beta = 1$ for each stock.

Finally, the raw returns model does not take into account market movements and, therefore, abnormal returns are equal to observed returns for each stock.

$$AR_{it} = R_{it} \tag{13}$$

For all the aforementioned models, returns are calculated by employing natural logarithm as follows:

$$R_{it} = \ln(P_{it}) - \ln(P_{it-1}) \tag{14}$$

where,

P_{it} = stock price of firm i on day t,

P_{it-1} = stock price of firm i on day t-1 and

R_{it} = logarithmic returns of the stock price of firm i on day t.

The average abnormal returns for a 40 day-event window (-20, +20) is calculated as follows:

$$\overline{AR_t} = \frac{\sum_{t=1}^{N} AR_{it}}{N} \tag{15}$$

where,

$\overline{AR_t}$ = average (mean) abnormal returns on day t, where t= -20, -19,…,+20,

AR_{it} = abnormal returns of firm i on day t, where t= -20, -19,…,+20 and

N = number of firms included in the sample.

Finally, we compute cumulative abnormal returns for various event windows around the ex-dividend date as follows:

$$CAR_{(t1,t2)} = \sum_{t=t_1}^{t_2} AR_t \qquad (16)$$

We anticipate a mean abnormal return on ex-days and a cumulative abnormal return pre- and post-ex-dividend period equal to zero. That is, the null hypotheses are:

H_{1h}: The mean of abnormal returns on ex-days (ARs) =0.

H_{1i}: The cumulative abnormal returns pre-and post-ex-dividend period (CARs) =0.

4.3 Measures of the Ex-dividend Trading Volume Behaviour

Lakonishok and Vermaelen (1986) asserted that the investigation of the stock price reaction alone cannot distinguish which one of the long-term and short-term trading hypotheses fully explains the abnormal stock price behaviour on ex-days. They suggested that the investigation of trading volume would add new evidence regarding the group of investors that influence stock price behaviour on ex-days. According to Lakonishok and Vermaelen (1986), if short-term traders have a major impact on ex-days stock prices, one should observe a net increase in trading volume around ex-days. Following their methodology, we estimate abnormal trading volume (AV) using the mean-adjusted model[19] using 100 observations prior to the event day, that is, from day -120 to day -21 and 100 observations after the event day, that is, from day +21 to day +121. The abnormal trading volume is estimated as the Euro value of shares traded[20], that is, the product of the shares traded and the stock price.

Abnormal volume is calculated as the difference between actual volume and normal or expected volume as follows:

$$AV_{it} = V_{it} - E(V_{it}) \qquad (17)$$

where,

AV_{it} = abnormal volume of firm i on day t, where t= -20, -19,…,+20,

V_{it} = actual volume and of firm i on day t, where t= -20, -19,…,+20, and

$E(V_{it})$ = expected or normal volume of firm i on day t.

[19] Kato and Loewenstein (1995), Wu and Hsu (1996), Athanassakos (1996) and Koski and Scruggs (1998) also estimated the abnormal trading volume employing the mean-adjusted model.

[20] Michaely and Vila (1996), Kadapakkam (2000) and Zhen Li (2002) computed the mean volume as the mean daily turnover (shares traded relative to shares outstanding). Then, they define the abnormal volume as the difference between the daily turnover and the mean daily turnover.

The expected or normal volume of firm i on day t is calculated as:

$$E(V_{it}) = \frac{\sum_{t_1}^{t_2} V_{it}}{200} \tag{18}$$

where,

V_{it} = mean normal volume of firm i on day t,

$t_2 - t_1$ = estimation period, from day -120 to day -21 and from day +21 to day +120.

Finally, we compute cumulative abnormal returns for various event windows around the ex-dividend date as follows:

$$\overline{AV_t} = \frac{\sum_{t=1}^{N} AV_{it}}{N} \tag{19}$$

where,

$\overline{AV_t}$ = average (mean) abnormal volume on day t, where t= -20, -19,…,+20,

AV_{it} = abnormal volume of firm i on day t, where t= -20, -19,…,+20, and

N = number of firms included in the sample.

Similar to abnormal returns, we anticipate a mean abnormal volume on ex-days and a cumulative abnormal volume pre- and post-ex-dividend period equal to zero. That is, the null hypotheses are:

H_{1j}: The mean of abnormal volume on ex-days (AV) =0.

H_{1k}: The cumulative abnormal volume pre and post-ex-dividend period (CAV) =0.

4.4 Regression Analysis

Following Kato and Loewenstein (1995), Michaely and Vila (1996), Wu and Hsu (1996), Naranjo et al. (2000), Lasfer and Zenonos (2003), Dhalival and Zhen Li (2006) and Yahyaee et al. (2007), we regress abnormal returns on ex-days (AR_0) against a number of independent variables such as systematic risk (BETA), dividend yield (DY), transaction costs (TC), size (SIZE), average (normal) volume (NVOL) and ex-day abnormal volume (AV)

We employ the ordinary least squares (OLS) method to analyze the impact of the various independent variables on the ex-day abnormal returns. Our cross-sectional regression model[21] is the following:

$$AR_{0,i} = a_0 + a_1 * BETA_i + a_2 * DY_i + a_3 * TC_i + a_4 * SIZE_i + a_5 * AV_i + a_6 * NVOL_i + e_i \quad (20)$$

According to Michaely and Vila (1995 and 1996) the ex-day abnormal volume should be negatively correlated with risk. They argue that both the systematic risk and idiosyncratic (unsystematic) risk will dampen trading activities around ex-dividend days. In our study, we control for the systematic risk and we expect it to have a negative effect on the ex-day abnormal returns. The variable BETA is estimated 200 days before the event window (-220, -21) employing the market model.

According to Lakonishok and Vermaelen (1986), if the short-term trading hypothesis is valid, the ex-day abnormal returns are positively related to transaction costs and dividend yield. As in Karpoff and Walkling (1988), Naranjo et al. (2000), Dhalival and Zhen Li (2006) and Yahyaee et al. (2007), we use the inverse of the stock price as a measure of transaction costs ($1/P_c$). The dividend yield variable (DY) is estimated as the ratio of interim dividend for the year over the price at cum-dividend date (D/P_c).

According to Lasfer and Zenonos (2003), if the firm size effect is valid, that is, smaller firms experience larger abnormal returns than bigger firms, we anticipate an inverse relation between the variable SIZE and the ex-day abnormal returns. We estimate the firm size as the log of market value of equity (number of outstanding shares times the cum-dividend day) at the cum-dividend date price [$Ln(P_c)$].

If dividend capture occurs, we expect abnormal returns to be positively related to liquidity (see Lakonishok and Vermaelen, 1986; Karpoff and Walkling, 1990). Similar to Kato and Loewenstein (1995), we use a measure of average volume (NVOL) as a proxy for liquidity during our estimation period. Therefore, we expect a positive sign for the variable NVOL. Average volume is measured by the mean-adjusted model during the estimation period (-120, -21 και +21, +121).

The explanation behind the inclusion of the variable of the ex-day abnormal volume (AV) is the presence of dividend capture by some groups of investors. If short-term trading

[21] Regression analysis is performed by using Eviews 5.1 software programme.

occurs around ex-dividend days, then a positive relation between abnormal returns and abnormal volume is expected.

Finally, following Boyd and Jagganathan (1994), Farinha and Soro (2006) and Daunfeldt et al. (2006), we test whether microstructure effects exert any impact on the size of the ex-dividend price adjustment. To test this, the authors regressed the Raw Price Drop Ratio (RPDR) against on a constant term and the dividend yield as follows:

$$RPDR_i = a_0 + a_1 * \left(\frac{D}{P_c} \right)_i + e_i \tag{21}$$

According to Boyd and Jagganathan (1994), Farinha and Soro (2006) and Daunfeldt et al. (2006), a negative and statistically significant constant term is an evidence of the presence of microstructure effects on the ex-dividend day. We measure the Raw Price Drop Ratio (RPDR) by three different ways. First, we calculate RPDR using closing prices both on cum and ex-dividend days ($RPDR_{c\text{-}c}$). Second, by using closing prices on cum-dividend days and opening prices on ex-dividend days ($RPDR_{c\text{-}o}$) and third, using closing prices both on cum and ex-dividend days, however, adjusting the latter for the stock market movements. We adjust the ex-day closing price for the daily market return (R_m) as it is proxied by the Athens Stock Exchange (ASE) composite stock index.

As it can be seen in Table 2 all raw price ratios have a value less than one and all raw price drop ratios have a value less than the dividend yield. In the next section we test whether these ratios are statistically significant different from their theoretical values.

[Insert Table 2 about here]

5. EMPIRICAL RESULTS

5.1. Stock Price Reaction

The theoretical value of the mean and median raw price ratios is equal to unity and the theoretical value of the mean and median raw price drop ratios is equal to the dividend yield. Furthermore, the theoretical value of raw returns (RR) on the ex-dividend day is equal to zero. The results of the empirical model (Table 3) reveal that the raw price ratio is lower than unity in all three cases. Specifically, the raw price ratio using closing prices on both cum- and ex-days ($RPR_{c\text{-}c}$) is equal to 0.625 and statistically significant at the 5% level, the raw price ratio using closing prices on cum-days and opening prices on ex-days ($RPR_{c\text{-}o}$) is equal to 0.677 and

statistically significant at the 10% level, while the market-adjusted price ratio (MAPR) is equal to 0.693, but statistically insignificant at any conventional level.

On the other hand, all the raw price drop ratios are lower and statistically different from the dividend yield (8.1%) at the 1% level. In particular, the raw price drop ratio using closing prices on both cum and ex-days ($RPDR_{c\text{-}c}$) is equal to 0.017, the raw price drop ratio using closing prices on cum-days and opening prices on ex-days ($RPDR_{c\text{-}o}$) is equal to 0.019 and the market-adjusted price drop ratio (MAPDR) is equal to 0.064. The raw return on the ex-dividend day is equal to 6.4%, statistically significant at the 5% significance level.

Looking at median values, we observe that both RPR and RPDR ratios have lower values than their theoretical ones. Moreover, all the observed values are statistically significant at 1% level as calculated by the Wilcoxon sign rank test. Finally, the median raw return is equal to 10%, statistically significant at the 1% level.

These results are in line with those of Elton and Gruber (1970), Kalay (1982), Lakonishok and Vermaelen (1986) amongst others who found that the stock prices drop less than the amount of the dividend on ex-days, resulting in significant abnormal returns. Therefore, stocks prices seem to drop less than the interim dividend amount on ex-dates despite the neutralized Greek tax system and the absence of microstructure impediments observed in other markets such as tick size and bid-ask spread.

[Insert Table 3 about here]

The results from the stock price behaviour of 58 firms that distributed interim dividends in the examined period are presented in Table 4 and Figure 1. The event window is 40 days around the ex-dividend day (day 0) and the abnormal returns are calculated by the market model (column 2), the market-adjusted return model (column 4) and the raw returns model (column 6). Similar to other studies, there are statistically significant abnormal returns on ex-dividend days equal to 5.530% estimated by the market model, 5.280% estimated by the market-adjusted returns model and 5.502% by the raw returns model. These results imply that an investor who buys shares on the cum-dividend day and sells on ex-dividend day can gain remarkable returns[22].

[Insert Table 4 about here]

[22] These returns are gross returns. To estimate the net returns, one should deduct the flat tax of 0.3% on every stock sale proceeds and the commissions.

Due to the absence of taxes on dividends and capital gains in Greece, the tax-effect hypothesis of Elton and Gruber (1970) could not find empirical support *a priori* in our sample. However, we assess the impact of short-term trading hypothesis of Kalay (1982) on ex-day returns by analysing the behaviour of share prices around the ex-dividend dates. If short-term traders capture dividends then ex-day returns should not be confined solely to the ex-dividend dates; they should be positive in the pre-event dates and negative after ex-dividend dates to reflect the buying (selling) behaviour in the pre- (post-) event periods (Lasfer and Zenonos, 2003).

The cumulative abnormal returns (CARs) over the period [-20 to +20] of the research sample (Table 5) showed that there is no pattern regarding share prices before and after the ex-dividend date. Over the period [-20, -1], [-10, -1] and [-5, -1] the CARs are negative but not statistically significant as calculated by the market model. On the other hand, over the periods [+1, +20], [+1, +10] and [+1, +5] the CARs are negative and statistically insignificant as measured by the market model. The most interesting result, however, comes from the period [-1, 0] where the CARs are 5.234% and statistically significant at the 1% level. These results indicate that, in Greece, dividend capture is predominant and the ex-day returns reflect the short-term trading. They suggest that investors buy shares in the pre-event period, mainly on the cum-day and sell their shares after the ex-dividend day in order to capture the dividend. These investors are likely to be corporate and individual investors who face no taxes on dividends and capital gains.

[Insert Table 5 about here]

5.2 Trading Volume Reaction

The results of the empirical model, for the trading volume behaviour around the event widow [-20, +20] (Table 6 and Figure 2), showed that there is a net increase in trading volume around ex-days, similar to those of Lakonishok and Vermaelen (1986). On the cum-dividend day, the abnormal trading volume (AV) is equal to 1,492,679.78 Euros, statistically significant at the 10% significance level and equal to 45.53% of the normal trading volume of the estimation period [-120, -21 and +21, +120]. On the ex-dividend day, the abnormal trading volume (AV) is equal to 322,585.78 Euros, statistically insignificant and equal to 9.84% of the normal trading volume of the estimation period. These results corroborate those of stock prices which suggest that investors buy shares on cum-dates and sell on ex-dates or later.

[Insert Table 6 about here]

In all pre- and post-event periods the cumulative abnormal volume (CAV) is positive and statistically significant (Table 7). More specifically, for the pre-event periods [-20, -1], [-1-, -1], [-5, -1] and [-1, 0], CAV is 10,480,415.13 Euros, 7,782,415.36 Euros, 7,782,415.36 Euros, and 1,815,265.56 Euros, respectively. For the post-event periods [+1, +20], [+1, +10], [+1, +5] and [0, +1], CAV is 6,672,376.11 Euros, 716,626.25 Euros, 1,173,273.61 Euros, and 998,518.63 Euros, respectively. These results are consistent with those of Lakonishok and Vermaelen (1986) and Kato and Loewenstein (1995), lending support for the short-term trading hypothesis.

[Insert Table 7 about here]

5.3 Regression Analysis Results

Nine different regression models were employed (Table 8) in order to examine the impact of independent variables on the ex-dividend abnormal return (dependent variable), since some independent variables (DY, TC and SIZE) are highly correlated. All models are tested for unit root (non-stationarity), heteroskedasticity and serial correlation and were found not to suffer from these problems.

In model (1) we observe that the variable BETA has the expected (negative) sign (-0.015), however, without being statistically significant. DY has positive sign (0.93) and is statistically significant at the 1% level. Both AV and NVOL are found to have insignificant impact on the dependent variable. In model (2), we replace DY with TC and we find that BETA has now positive sign (0.036) without being statistically significant at any conventional level. However, the coefficient of variable TC has the expected positive sign (0.171) and is statistically significant at the 1% level. This finding is consistent with the predictions of short-term trading hypothesis. The coefficients of AV and NVOL remain insignificant. In model (3), the variable TC is replaced by the variable SIZE. BETA is positive (0.187) and statistically significant at the 5% level, while SIZE has the expected negative sign (-0.06) being statistically significant at the 1% level. In Models (4) to (9), each independent variable is regressed against ex-dividend abnormal returns separately. In model (4), BETA has positive (0.047) but insignificant coefficient. In model (5), DY has the expected positive sign (0.924), statistically significant at the 1% level. In model (6), TC has the expected positive sign (0.171), statistically significant at the 1% level. In model (7), SIZE has the expected negative sign (-0.05), statistically significant at the 1% level. Finally, in models (8) and (9), both AV and NVOL have insignificant and negative sign implying no explanation power.

Overall, our results are in line with those found by Lakonishok and Vermaelene (1986), Kato and Lowenstein (1995), Naranjo et al. (2000) confirming the predictions of short-term trading hypothesis of Kalay (1982).

[Insert Table 8 about here]

Finally, we test whether the price discreetness hypothesis of Bali and Hite (1998) and the bid-ask spread hypothesis of Frank and Jagannathan (1998) can explain the ex-dividend day anomaly by regressing the Raw Price Drop Ratio against a constant term and the dividend yield. According to Boyd and Jagannathan (1994), Farinha and Soro (2006) and Daunfeldt et al. (2006) the finding of a negative and statistically significant intercept is a clear evidence for the existence of microstructure effects on ex-days. The results showed (Table 9) that the intercept has a positive sign which is inconsistent with the predictions of the microstructure-based hypotheses of Bali and Hite (1998) and Frank and Jagannathan (1998) on the ex-dividend price adjustment.

[Insert Table 9 about here]

6. CONCLUSIONS

6.1 Concluding Remarks

In the present paper we analyzed the ex-dividend day stock price and trading volume behaviour of firms listed on the Athens Stock Exchange (ASE) that distribute interim dividends. Greek firms distribute interim dividends after an excellent corporate performance in the first three quarters of the current fiscal year. Greek market distinguishes from other markets because no tax is imposed on dividends and capital gains. Therefore, in Greece, the stock returns on the ex-dividend day should not reflect any tax effects. Moreover, the Greek capital market is free of microstructure impediments found in other markets ruling out the presence of tick size effect and bid-ask spread hypotheses.

We find that ex-day returns are positive and statistically significant in our sample, suggesting that ex-day prices decrease by less than the amount of the interim dividend paid. Specifically, on the ex-dividend day there is an abnormal of approximately 5.5%, statistically significant at the 1% level. Moreover, consistent with the predictions of the short-term trading hypothesis, we observe a buying pressure in the pre-ex-dividend period and a selling pressure in the post-ex-dividend period.

The results from the trading volume reaction on the ex-dividend day corroborate those from the stock market reaction. Consistent with the suggestions of the short-term trading

hypothesis as developed by Kalay (1982) and Lakonishok and Vermaelen (1986), we find significant increase of trading volume around the ex-dividend day. More specifically, on the cum-dividend day, the abnormal trading volume (AV) is equal to 1,492,679.78 Euros, statistically significant at the 10% significance level and equal to 45.53% of the normal trading volume. On the ex-dividend day, the abnormal trading volume (AV) is equal to 322,585.78 Euros, statistically insignificant and equal to 9.84% of the normal trading volume. Therefore, we can conclude that the buying and selling pressure mainly occurs on the cum- and ex-dividend days.

Cross-sectional regression analysis provides further support for the short-term trading hypothesis. In particular, the coefficients of the dividend yield, systematic risk and transactions costs have the expected signs appear and seem to explain the stock price behaviour on ex-days. In addition, the microstructure-based hypotheses of Bali and Hite (1998) and Frank and Jagannathan (1998) do not seem to explain the ex-dividend stock price anomaly.

Overall, the results suggest that an investor can gain excess returns on the ex-days by buying shares one day or more days earlier than the ex-dividend day and selling his portfolio on the ex-dividend day or later. These excess returns are more evident when an investor decides to put his money on firms that declare interim dividends.

6.2. Future Research

We believe that our analysis contributes to the controversial debate on the market behaviour on the ex-dividend dates by offering empirical support from a market with unique and interesting institutional environment. However, future research should be directed to the investigation of short-term and long-term performance of those Greek firms announcing an interim dividend. Additionally, both the treading volume and stock price reaction on the ex-interim dividend day could be measured and compared by employing a control sample of firms that do not announce interim dividends. Finally, an interesting feature that was not covered in the present study due to small number of firms included in the sample is the presence or not of dividend clienteles as suggested by Modigliani and Miller (1961).

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Table 1. Sample distribution of interim dividends in the ASE

Year	N	Fraction (%)
1993	2	3.4
1994	2	3.4
1995	0	0.0
1996	0	0.0
1997	3	5.2
1998	1	1.7
1999	3	5.2
2000	2	3.4
2001	3	5.2
2002	7	12.1
2003	6	10.3
2004	10	17.24
2005	9	15.52
2006	10	17.24
Total	58	100

Note: Distribution of the sample of interim dividends by the fiscal year of the announcement. N is the number of observations.

Table 2. Descriptive statistics

	Mean	Median	St. Deviation	Minimum	Maximum	1st Quartile	3rd Quartile
Dividend	0.300	0.215	0.301	0.010	2.000	0.150	0.325
Div. Yield	0.081	0.024	0.209	0.010	1.188	0.016	0.030
Pcum	11.18	10.05	7.790	0.160	28.22	3.450	16.33
Pex	11.03	9.940	7.760	0.160	28.10	4.520	16.02
RPR- close to close	0.625	0.608	1.371	-1.227	9.667	0.049	1.000
RPR-close to open	0.677	0.633	1.407	-1.667	9.000	0.000	0.961
MARP	0.693	0.661	1.415	-1.610	9.991	0.159	1.035
RPDR- close to close	0.017	0.013	0.025	-0.050	0.114	0.002	0.029
RPDR- close to open	0.019	0.014	0.031	-0.050	0.143	0.000	0.024
MAPDR	0.019	0.017	0.026	-0.066	0.117	0.007	0.025
Raw ex-div Return	0.064	0.010	0.207	-0.102	1.188	0.000	0.022

Notes: Dividend (D) is the amount of the dividend per share in Euros. Dividend yield is measured as the ratio of D over the price on the last cum-dividend day (P_{cum}). P_{ex} is the price on the ex-dividend day. RPR_{c-c} denotes the raw price ratio using closing prices on both cum and ex-days. RPR_{c-o} denotes the raw price ratio using closing prices on cum- days and opening prices on ex-days. MAPR denotes the market-adjusted price ratio. $RPDR_{c-c}$ denotes the raw price drop ratio using closing prices on both cum and ex-days. $RPDR_{c-o}$ denotes the raw price ratio using closing prices on cum- days and opening prices on ex-days. MAPDR denotes the market-adjusted price drop ratio. Raw returns are the abnormal returns on ex-days.

Table 3. Ex-dividend day price behaviour for the firms listed on the ASE that distribute interim dividends for the Period 1993-2006

RATIOS	THEORETICAL VALUES	MEAN	t-Statistic	P-Value	THEORETICAL VALUES	MEDIAN	P-Value
RPR c-c	1.000	0.625**	2.08	0.042	1.000	0.608***	0.000
RPR c-o	1.000	0.677*	1.69	0.097	1.000	0.633***	0.000
MARP	1.000	0.693	1.65	0.104	1.000	0.661***	0.000
RPD c-c	0.081	0.017***	-19.44	0.000	0.024	0.013***	0.003
RPD c-o	0.081	0.019***	-14.48	0.000	0.024	0.014***	0.003
MAPD	0.081	0.019**	-17.75	0.000	0.024	0.017***	0.003
RR	0.000	0.064**	2.34	0.023	0.000	0.010***	0.000
DY		0.081				0.024	

Notes: Dividend yield is measured as the ratio of D over the price on the last cum-dividend day (P_{cum}). P_{ex} is the price on the ex-dividend day. RPR_{c-c} denotes the raw price ratio using closing prices on both cum and ex-days. RPR_{c-o} denotes the raw price ratio using closing prices on cum- days and opening prices on ex-days. MAPR denotes the market-adjusted price ratio. $RPDR_{c-c}$ denotes the raw price drop ratio using closing prices on both cum and ex-days. $RPDR_{c-o}$ denotes the raw price ratio using closing prices on cum- days and opening prices on ex-days. MAPDR denotes the market-adjusted price drop ratio. Raw returns (RR) are the abnormal returns on ex-days.*** Statistically significant at the 0.01 level, ** Statistically significant at the 0.05 level, * Statistically significant at the 0.1 level. P-values for the median values are calculated by the Wilcoxon Signed Rank Test.

Table 4. Mean abnormal returns (AR) on ex-dividend days for the firms listed on the ASE that distribute interim dividends for the period 1993-2006

N=58	MARKET MODEL		MARKET-ADJUSTED		RAW RETURNS	
	AR %	t-Statistic	AR %	t-Statistic	AR %	t-Statistic
-20	-3.428***	-12.07	-3.447	-1.10	-3.014	-0.96
-19	-0.310	-1.09	-0.159	-0.71	-0.164	-0.70
-18	0.308	1.08	0.342	1.25	0.134	0.43
-17	0.033	0.11	0.210	0.69	0.094	0.27
-16	0.418	1.47	0.448*	1.71	0.595*	1.85
-15	0.311	1.09	0.259	1.05	0.591*	1.87
-14	-0.059	-0.21	-0.031	-0.15	-0.011	-0.04
-13	-0.325	-1.14	-0.293	-1.55	-0.115	-0.42
-12	0.457	1.61	0.352	0.98	0.503	1.17
-11	0.099	0.35	0.310	0.95	0.274	0.99
-10	0.527*	1.86	0.582	1.65	0.289	0.75
-9	0.609**	2.14	0.617***	2.53	0.394	1.31
-8	-0.207	-0.73	-0.277	-1.02	-0.068	-0.18
-7	0.364	1.28	0.339	1.07	0.450	1.42
-6	-0.045	-0.16	-0.139	-0.67	-0.241	-0.86
-5	0.324	1.14	0.276	0.99	0.343	1.11
-4	0.230	0.81	0.306	1.11	0.346	1.11
-3	-0.051	-0.18	-0.015	-0.05	0.136	0.39
-2	-0.251	-0.88	-0.006	-0.02	-0.100	-0.28
-1	-0.297	-1.04	-0.373	-1.38	-0.339	-1.10
0	5.530***	19.47	5.280**	1.99	5.502**	2.06
1	0.369	1.30	0.215	0.99	0.332	1.30
2	-0.220	-0.77	-0.007	-0.03	0.156	0.61
3	-0.153	-0.54	0.076	0.23	0.357	1.09
4	-0.104	-0.37	-0.009	-0.04	0.241	0.83
5	0.037	0.13	-0.245	-0.79	-0.202	-0.74
6	-0.118	-0.42	-0.216	-0.86	-0.025	-0.12
7	-0.286	-1.01	-0.254	-0.99	-0.023	-0.08
8	-0.010	-0.03	0.093	0.33	0.659**	2.32
9	-0.101	-0.36	0.011	0.05	0.171	0.71
10	0.204	0.72	0.146	0.73	0.241	1.09
11	0.122	0.43	0.119	0.47	0.193	0.68
12	-0.032	-0.11	0.131	0.53	0.249	0.97
13	-0.079	-0.28	0.172	0.82	0.044	0.16
14	-0.041	-0.14	-0.213	-0.77	0.169	0.54
15	-0.167	-0.59	-0.384	-1.41	-0.002	-0.01
16	-0.343	-1.21	-0.415	-1.50	-0.218	-0.67
17	-0.002	-0.01	-0.105	-0.38	0.351	1.11
18	-0.302	-1.06	-0.293	-1.12	-0.495	-1.39
19	-0.099	-0.35	-0.075	-0.23	-0.249	-0.82
20	-0.453	-1.59	-0.354	-1.35	-0.148	-0.50

Note: *** Statistically significant at the 0.01 level, ** statistically significant at the 0.05 level, * statistically significant at the 0.1 level.

Table 5. Cumulative abnormal returns (CAR) on ex-dividend days for the firms listed on the ASE that distribute interim dividends for the period 1993-2006.

	MARKET MODEL		MARKET-ADJUSTED		RAW RETURNS	
Event Periods	CAR %	t-Statistic	CAR %	t-Statistic	CAR %	t-Statistic
CAR (-20+20)	2.461	1.35	2.973	0.45	7.403	1.13
CAR (-20 -1)	-1.292	-1.02	-0.700	-0.15	0.098	0.02
CAR (+1 +20)	-1.777	-1.40	-1.608	-0,35	1.802	0.40
CAR (-10 +10)	6.352***	4.88	6.400	1.36	8.621*	1.85
CAR (-10 -1)	1.203	1.34	1.310	0.40	1.211	0.38
CAR (+1 +10)	-0.381	-0.42	-0.191	-0.06	1.908	0.59
CAR (-5 +5)	5.414***	5.75	5.499	1.61	6.772**	2.00
CAR (-5 -1)	-0.045	-0.07	0.189	0.08	0.385	0.17
CAR (+1 +5)	-0.071	-0.11	0.030	0.01	0.885	0.39
CAR (-1 +1)	5.603***	11.39	5.122***	2.87	5.495***	3.11
CAR (-1 0)	5.234***	13.03	4.907***	3.37	5.163***	3.58

Note: *** Statistically significant at the 0.01 level, ** statistically significant at the 0.05 level, * statistically significant at the 0.1 level.

Table 6. Mean abnormal volume (AV) in Euros on ex-dividend days for the firms listed on the ASE that distribute interim dividends for the period 1993-2006.

N=58	MEAN-ADJUSTED MODEL		
Day	AV in Euros	t-Statistic	AV %
-20	-144,253.64	-0.25	-4.40
-19	124,391.20	0.23	3.79
-18	349,410.61	1.16	10.66
-17	79,138.41	0.10	2.41
-16	1,293,907.27*	1.75	39.47
-15	881,979.97	1.38	26.90
-14	434,063.88	0.64	13.24
-13	-304481.74	-0.48	-9.29
-12	180,155.08	0.38	5.50
-11	-196,311.28	-0.37	-5.99
-10	87,565.50	0.20	2.67
-9	338,803,04	0.98	10.33
-8	-239,123,62	-0.49	-7.29
-7	-192,190.44	-0.29	-5.86
-6	1649950.87	0.92	50.33
-5	1,498,552,61	1.35	45.71
-4	1,912,303.74*	1.73	58.33
-3	451,216.65	0.80	13.76
-2	782,657.24	1.26	23.87
-1	1,492,679.78*	1.76	45.53
0	322,585.78	0.55	9.84
1	675,932.85	1.39	20.62
2	-176,157.90	-0.61	-5.37
3	678,040.76	1.09	20.68
4	22,273.78	0.06	0.68
5	-26,815.87	-0.06	-0.82
6	360,436.44	0.59	10.99
7	-468,466.30	-0.98	-14.29
8	-307,636.46	-0.71	-9.38
9	-542,507.95	-1.21	-16.55
10	501,526.90	0.55	15.30
11	-238,781.42	-0.61	-7.28
12	607,996.56	0.60	18.55
13	428,467.03	0.45	13.07
14	1,175,370.09	0.90	35.85
15	-110,345.06	-0.13	-3.37
16	1,427,948.22	1.19	43.56
17	238,027,53	0.31	7.26
18	1,012,801.54	0.84	30.89
19	355,660.29	0.58	10.85
20	1,058,605.08	1.24	32.29

Note: *** Statistically significant at the 0.01 level, ** statistically significant at the 0.05 level, * statistically significant at the 0.1 level.

Table 7. Cumulative abnormal volume (CAV) in Euros on ex-dividend days for the firms listed on the ASE that distribute interim dividends for the period 1993-2006.

	MEAN-ADJUSTED MODEL	
Event Period	CAV in Euros	t-Statistic
CAV (-20+20)	17,475,377.02***	4.34
CAV (-20 -1)	10,480,415.13***	3.73
CAV (+1 +20)	6,672,376.11**	2.37
CAV (-10 +10)	8,821,627.39***	3.06
CAV (-10 -1)	7,782,415.36***	3.91
CAV (+1 +10)	716,626.25	0.36
CAV (-5 +5)	7,633,269.42***	3.66
CAV (-5 -1)	6,137,410.02***	4.36
CAV (+1 +5)	1,173,273.61	0.83
CAV (-3 -1)	2,726,553.67**	2.50
CAV (-1 +1)	2,491,198.41**	2.29
CAV (-1 0)	1,815,265.56**	2.04
CAV (0 +1)	998,518.63	1.12

Note: *** Statistically significant at the 0.01 level, ** statistically significant at the 0.05 level, * statistically significant at the 0.1 level.

Table 8. Regression analysis of abnormal returns on ex-dates

	MODEL (1)	MODEL (2)	MODEL (3)	MODEL (4)	MODEL (5)	MODEL (6)	MODEL (7)	MODEL (8)	MODEL (9)
INTERCEPT	-0.009	-0.45	1.162***	0.020	-0.019**	-0.018	1.039***	0.056**	0.075**
	(-0.39)	(-1.44)	(6.61)	(0.26)	(-2.31)	(-1.60)	(6.46)	(2.08)	(2.42)
BETA	-0.015	0.036	0.187**	0.047					
	(-0.45)	(-0.83)	(2.34)	(0.47)					
DY	0.93***				0.924***				
	(23.54)				(24.74)				
TC		0.171***				0.171***			
		(-17.21)				(18.00)			
SIZE			-0.06***				-0.05***		
			(-7.02)				(-6.17)		
AV	-8.26E-10	-3.69E-10	2.31E-09					-1.56E-09	
	(-0.46)	(-0.16)	(0.52)					(-0.26)	
NVOL	3.67E-10	3.60E-10	6.84E-09						-6.04E-09
	(0.21)	(0.16)	(1.51)						(-1.22)
R^2	91.68%	85.55%	50.61%	0.39%	91.61%	85.27%	40.45%	0.12%	2.57%
R^2-adj	91.05%	84.46%	46.89%	-1.38%	91.46%	85.00%	39.39%	-1.67%	0.83%

Notes: The dependent variable is the mean abnormal return on ex-dividend day (AR_0). The independent variables are BETA which denotes the systematic risk estimated 200 days before the event window (-220, -21), DY which denotes the dividend yield estimated as the ratio of dividend per share over the price on the cum-dividend day (D/P_{cum}), TC which denotes the transactions cost estimated as the reverse of price at cum-dividend date ($1/P_{cum}$), SIZE which denotes the size as measured by the log of market value of equity (the number of outstanding shares times the cum-dividend price) at cum-dividend date price [Ln (P_{cum})], NVOL which denotes the normal volume as measured by the mean-adjusted model in the estimation period (-120, -21 και +21, +121), and AV which denotes the abnormal volume on ex-dividend day. T-values are in parentheses. *** Statistically significant at the 0.01 level, ** statistically significant at the 0.05 level,* statistically significant at the 0.1 level.

Table 9. Regression analysis for the existence of microstructure effects on ex-dates

	Intercept	D/P_c	R^2
RPDR c-c	0.016***	0.015	
	(4.46)	(0.96)	0.016
RPDR c-o	0.011***	0.123***	
	(2.97)	(5.32)	0.352
MADRP	0.017***	0.021	
	(4.68)	(1.28)	0.029

Notes: $RPDR_{c-o}$ denotes the raw price ratio using closing prices on cum- days and opening prices on ex-days. MAPDR denotes the market-adjusted price drop ratio. D/P_c is the dividend yield estimated as the ratio of dividend per share over the price on the cum-dividend day. T-statistic values are in parentheses. *** Statistically significant at the 0.01 level, ** Statistically significant at the 0.05 level. * Statistically significant at the 0.1 level.

FIGURE 1
ABNORMAL RETURNS (ARs) ON AND AROUND EX-DIVIDEND DAYS FOR GREEK LISTED FIRMS DISTRIBUTING INTERM DIVIDENDS FOR THE PERIOD 1993-2006

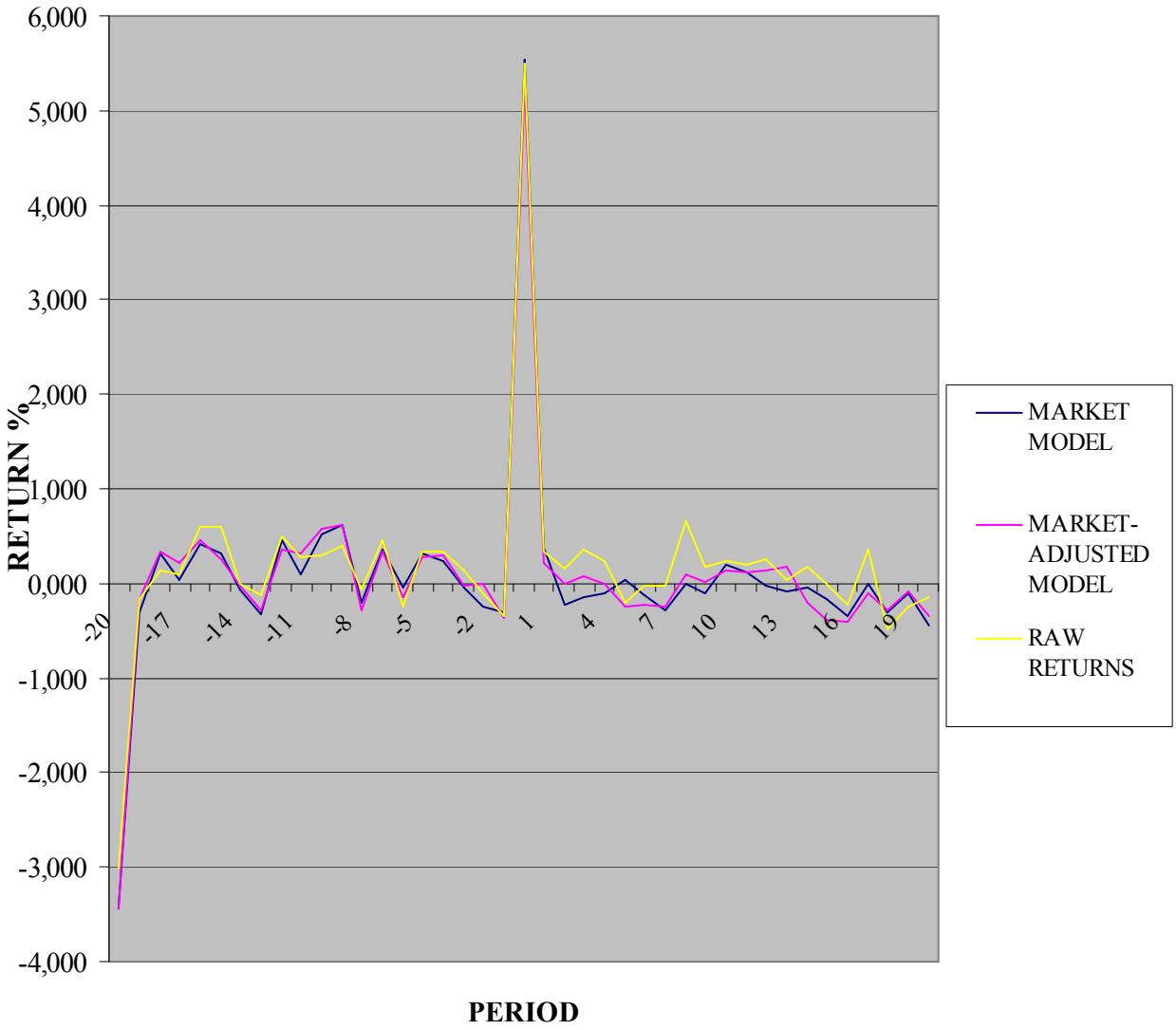

FIGURE 2
ABNORMAL VOLUME ON AND AROUND EX-DIVIDEND DATES FOR THE GREEK LISTED FIRMS DISTRIBUTING INTERIM DIVIDENDS FOR THE PERIOD 1993-2006