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Dissertation: Ex-dividend day behavior in Romania

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Abstract: This dissertation examines the ex-dividend day stock price and trading volume behavior in Romania for the years 2000 to 2012. We follow the standard event study methodology regarding both the price and trading volume behavior to derive an explanation for the anomaly. We also use drop price and raw price ratios and multiple regression analysis. We find that the stock price does not drop by the dividend amount but it increases on the ex-dividend day implying even bigger profit opportunities to investors. By examining the abnormal returns and abnormal volume we find evidence of the short-term trading hypothesis which attributes investors interest to capture the dividends. The results from the regression analysis show that transaction costs relate to the abnormal returns around the ex-dividend day and therefore the short-term trading hypothesis offers an explanation for the stock price anomaly around the ex-dividend day in Romania.

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1. Introduction

Dividends behavior around ex dividend dates is a major topic in finance that has been troubling investors and traders and inspiring academics for more than 60 years. It is a controversial issue that has been the subject of numerous researches so far. According to Modigliani Miller theorem (1961) in a perfect capital market free off frictions such as transaction fees, taxes, asymmetric information, bankruptcy costs, agency costs, in an efficient market, the stock prices should drop by exactly the dividend amount. Yet the majority of the studies conducted in the United States, United Kingdom and other developing markets, have shown different outcomes than the one described above. More specifically it has been accounted that the stock prices most of the times drop by an amount less than the dividend, creating a serious deviation from the one for one theorem of Modigliani and Miller. First reported research recording this deviation, was from Campbell and Beranek in 1955, when the results from the study conducted on a small sample of NYSE stocks, showed a 90% drop on stock prices on average as compared to the dividend amount. From that point on many researches followed, reporting deviations and anomalies in stock prices around ex-dividend dates.

No matter the studies that have been conducted, a clear justification has yet to be found. Nevertheless, while the rationale for this anomaly remains contested, three main explanations have been proposed for this phenomenon. The first and oldest explanation lies in the preferential treatment of taxes in capital gains as compared to dividends taxation. The second justification proposed was relative to the transaction costs and the third and more recent explanation has to do with microstructure impediments, such as tick-size and bid-ask spreads, which are considered responsible for the price deviations.

In this study we examine the ex-dividend day price behavior of Romanian stocks, traded in the Bucharest Stock Exchange (BET). Our goal is to examine the ex-dividend day phenomenon in Romania, whether the short term-trading hypothesis and the clientele effect exist in this market. The unique structure and institutional environment of the Romanian market offers new insights in the ex-dividend day phenomenon. Idiosyncracies such as the absence of tax differential between dividends and capital gains makes this particular market a promising laboratory for research. Employing data from the Bucharest Stock Exchange we examine stock prices around the ex-dividend dates.

The current study contributes to the existing literature in two ways. First of all there is no prior empirical research using data from the Bucharest stock exchange, to explain ex-dividend day price anomaly phenomenon. To my knowledge this is the first attempt to describe stock prices and trading volume around ex-dividend days in Romania. Secondly

the methodology employed takes into consideration the peculiarities of the Romanian capital market, such as the absence of tax differentiation between dividends and capital gains, as described above and the nature of the microstructure impediments making the Romanian market a tax-neutralized, however interesting environment. In line with the predictions of the short-term trading hypothesis we examine the relationships between abnormal returns and dividend yield, transaction costs, abnormal volume, average volume and firm size by running multiple regressions in addition to event study on stock prices and trading volume.

Following in this paper in chapters 2, 3 and 4 there is the literature review, the Romanian institutional and legal environment and the methodology employed, respectively. Chapter 5 describes the data. Chapter 6 presents the results of this research. Finally chapter 7 offers the main conclusions and discusses their implications.

1. Literature Review

The tax-effect hypothesis

The first attempt to study the ex-dividend price anomaly was from Campbell and Beranek in 1955. In their paper, employing data from a small sample of NYSE stocks, they introduced the tax-driven clientele. They argued that the price of the stocks drop by approximately 90% of the dividend amount, refuting the one for one theory of Modigliani and Miller (1961) that suggested that stock prices should drop exactly by the dividend amount. Some years after the study of Campbell and Beranek, another attempt to study the phenomenon has been conducted by Durand and May (1960). The results of their studies using data from a specific listed firm in the USA (American Telephone and Telegraph stock) showed again that on average the stock prices drop 4% less than the dividend amount.

The first attempt to provide a plausible explanation for the ex-dividend day phenomenon was from Elton and Gruber (1970). In their influential paper they presented the tax-driven clientele effect. Their model suggested that investor's preference on capital gains or dividends, lies in the taxation of capital gains and dividends. According to their theory, taxation is important because investors are interested in after-tax stock returns, so the existence of taxation and their differential treatment between capital gains and dividends holds an important role for investors' decisions. Consequently Elton and Gruber argued that the price to drop ratio depends on the specific tax-clientele that receives the dividend and in accordance, equilibrium price-drop ratio occurs when the investor is indifferent between 1) selling the stock cum-dividend and 2) holding the stock, receiving the dividend and selling ex-dividend. Furthermore, they suggested that in order for the investor to be indifferent between the two aforementioned options, stock prices should drop by an amount less than the dividend. Their model became known as "the tax-effect hypothesis" or "the long-term trading hypothesis". According to their argument, if an investor chooses the first option and decides to sell on cum-dividend, he/she receives the cum-dividend price (P_c) and pays tax at the capital gain rate (t_g) in the excess of cum-dividend price, less the price that the stock was bought (P_o) If the investor chooses the second option that stands for holding the stock, receiving the dividend and selling on the ex-dividend day, then the relation is as follows: investor will receive the dividend and the ex-dividend price (P_e) but will have to pay tax on the dividend at the dividend tax rate (t_d) and also pay tax on the excess of the ex-dividend price (P_e) less the price that the stock was bought (P_o) at the capital gain tax rate (t_g) An algebraic presentation of this equation is as follows:

$$P_c - (P_c - P_o) * t_g = P_e - (P_e - P_o) * t_g + D * (1 - t_d) \quad (\text{Eq. 1})$$

Rearranging equation 1 we get:

$$\frac{Pc - Pe}{D} = \frac{1 - td}{1 - tg} \quad (\text{Eq. 2})$$

In their paper (Elton and Gruber 1970) they argued that the price drop to dividend ratio (DOR) in the ex-dividend day is determined by the net of marginal tax ratio between dividends and capital gains. As empirical support for their model they also reported a positive relation between the price drop ratio and the dividend yield in their data. Furthermore they found that investors in lower taxation scale prefer higher yielding stocks, while investors in higher taxation scale prefer lower yielding stocks.

Short-term trading hypothesis

Elton and Gruber's studies have triggered numerous other researchers. Popular extensions and alternatives to the tax-clientele hypothesis and the long term trading hypothesis, is the short term trading hypothesis proposed by Kalay in 1982. Kalay was the first researcher who suggested a different rationale than taxation, to explain the stock price behavior around ex-dividend days. His hypothesis argues that if capital gains and dividends have the same tax treatment, then it would be possible for an investor to find arbitrage opportunities by buying cum-dividend and selling ex-dividend given that the stock price will drop less than the dividend amount and the transaction costs get surpassed by the tax savings from capital loss. This argument can be expressed algebraically as follows:

$$(1 - to) * [D - (Pc - Pe) - a * P] > 0 \quad (\text{Eq. 3})$$

Where: $P = \frac{(Pc + Pe)}{2}$

a = expected transaction costs of a roundtrip trading

to = tax rate on ordinary income

An arbitrage opportunity could then be as follows. Given that the price of the stock will drop less than the dividend amount, the investor can sell short cum-dividend-day then buy the stock on the ex-dividend-day to close his/her position, in a price less than he short sold it. Next we can see this proposition algebraically:

$$(1 - to) * [(Pc - Pe - D) - a * P] > 0 \quad (\text{Eq. 4})$$

Arbitrage traders attempt to eliminate any difference from the stock price change and the dividend amount that is caused by the tax clienteles, leaving the transaction costs to be the only restriction that keeps the price drop from adjusting at the amount of the dividend. Consequently profit can be realized only if the arbitrage traders do not care about obliterating it. Kalay 1982 presented the above suggestion with the following formula:

$$1 - \frac{\alpha P}{D} \leq \frac{P_c - P_e}{D} \leq 1 + \frac{\alpha P}{D} \quad (Eq.5)$$

Equation 5 describes that the higher the stock's dividend yield the closer to the full amount of the dividend the drop will be to prevent arbitrage traders to profit from short-term trading. Furthermore, if $\alpha = 0$ the $\Delta P/D$ ratio would be 1 and if α is relatively high then the arbitrage traders would be discouraged from trading and the $\Delta P/D$ ratio would reflect the tax rate of the marginal long-term investor.

In accordance with Kalay's argument, Eades et al in 1984 showed evidence of drop in excess returns caused by a change in transaction costs in the US market from 1975 onwards. Other studies that confirmed Kalay's theorem was those of Lakonishok and Vermaelen in 1986, who provided evidence of a significant increase in transaction volume around the ex-dividend day that was more pronounced for high dividend yield stocks. On the other hand, Booth and Johnston in 1984 examined the short trading hypothesis more directly using Canadian data and rejected the hypothesis for Toronto Stock Exchange.

Microstructure impediments

Most recent literature suggests alternatives to the tax clientele and short-term traders, like Bali and Hite (1998) who proposed microstructure impediment as a third explanation to the ex-dividend day phenomenon. Their discreteness argument focuses on the multiple ticks of price changes compared to the dividends continuation. Due to the discreteness of price changes, prices are often not equal to the dividend amount. Bali and Hite (1998) argued that the market most of the times rounds the price drop down to the nearest tick and this is the reason that the price drops less than the dividend amount. For example, with a minimum bid-ask spread of 1/8 (€0.125) a dividend €0.20 would lead in €0.125 drop in price that leads to a price-drop ratio of 0.625 The decimalization in 2001 and the transition of the 1/8 to 1/16 tick in the US markets, offered a great opportunity to test Bali and Hite's argument. The reduction of the tick size, along with the decimalization were expected to lead to a price drop on the ex-dividend day close to one.

Dubofsky (1992) and later Jason and Ma (2004) looked into microstructure impediments, in a different perspective in order to explain the ex-day anomaly. They argued that an automated cum-dividend day to ex-dividend day limit order adjustment mechanism seems to control ex dividend day behavior based on data taken from US. Jason and Ma (2004), used data from NYSE to develop their research regarding this issue and their report was that no matter the tick size, bid prices fell more as compared to the ask prices, regardless if they measured the drop from cum-dividend day open to ex-dividend day open or from cum dividend day open to ex-dividend day close. Moreover their report suggested that while price discreteness was eliminated, the actual ex-dividend price drop anomaly increased. Dubofsky (1992) verified those findings. A year later Jason and Ma (2005) conducted another research, examining trading in the Toronto Stock Exchange (TSX) in which limit orders are not automatically adjusted from cum-dividend day to ex-dividend day. They reported much smaller price drop ratios in TSX and concluded that the lack of an order adjustment mechanism together with a fairly low trading volume leads to incomplete price adjustments on ex-dividend days.

Castillo and Jacob (2006) conducted a research examining the ex-dividend price anomaly in the Chilean markets for the period 1989-2004. During this period there was no taxation in capital gains and no taxation on dividends. Moreover microstructure impediments were neutralized. They found no empirical evidence of dividend clientele effect but they found a price drop to dividend ratio lower than one, which they attributed to the frictions that restricted ex-dividend price adjustment.

Evidence from non-US markets

Since the majority of the studies report a price drop to dividend ratio ($\Delta P/P$) less than one but suggesting different explanations, the anomaly of the ex-dividend price behavior and the abnormal trading volume remains a puzzle. More researchers examined the phenomenon trying to contribute in this issue. Yet it is often the case that non-US markets have specific characteristics that can be used to develop tests that would not be possible with data from the US markets.

Milonas and Travlos (2001) conducted a research in the Athens Stock Exchange (ASE) for the period 1994-1999. They found a price-drop to dividend ratio less than one. Moreover in Greece, Dasilas (2009) examined the ex-dividend price behavior of the Greek stock market for the period 2000-2004. During this period there were no taxes on dividends neither on capital gains. He reported a price drop to dividend ratio less than one, confirming previous studies. Moreover he found strong evidence of the short-term trading, suggesting that this is the explanation for the ex-dividend day stock price anomaly in the Athens Stock Exchange.

Yahyaee et al (2007) conducted another research examining the ex-dividend day price anomaly of the Omani market, an environment in which, there was no taxes on capital gains and on dividends, the stock prices were decimalized and dividends were distributed annually. In line with previous studies he found a price drop to dividend ratio lower than one. Moreover he found no evidence of the short term trading and suggested that the bid-ask spread was the primary factor for the anomaly.

Borges (2008) examined the ex-dividend price behavior in the Portuguese market for the period 1990-1998. Consistent with prior studies a price drop to dividend ratio less than one was found while the proposed explanation to this phenomenon was that the price behavior reflects a market that is not efficient, has low liquidity, price stickiness and arbitrage is taken. No empirical evidence of tax clientele effect was found.

Bell and Jenkinson (2000) and Michaely and Murgia (1995) found evidence of tax clientele effect in the UK and Italy. Romon (2000) rejected the existence of tax effects in France. Daunfeldt (2002) found that the tax inducted clientele hypothesis was not supported by the Swedish data. In Australia Brown and Clarke (1993) found mixed evidence of the tax clientele effect and weak evidence of the short-term trading. For New Zealand, Bartholdy and Brown (2004) reported that no single type of investor emerges as the marginal trader dominating all stocks. As for Canada, Bauer et al. (2006) rejected both tax and tick size effects on the ex-dividend day price behavior.

A controversial research was from Garcia (2011) that examined the ex-dividend day on the Spanish market after the tax reform of 2006, that established the same tax rate on both dividends and capital gains. Their findings suggested that the ex-dividend price anomaly does not occur in firms listed on the IBEX-35 and supported a tax-based explanation for the anomaly. Anantarak (2011) examined the ex-dividend day price anomaly employing data from the stock exchange of Thailand in a time window of 1975 to 2010. Their findings were that the ex-dividend price anomaly occurs in Thailand and offered as an explanation the short-term trading hypothesis.

Mohibul Islam, A. I. (2013) examined the ex-dividend day on stock prices of firms listed on the Dhaka Stock Exchange (DSE) for the period 2005-2011, a market where dividends income is taxed higher than the capital gains. They reported a price drop on stock prices significantly lower than the after tax dividend amount, due to the investor's valuation assumptions to determine the equilibrium stock prices. Olson, R. and Wallen T. (2013) conducted another research with data employed from Dhaka Stock Exchange for a sample period of January to December 2011 and found that investors don't benefit from dividends on ex-dividend day due to a substantial fall in stock prices both in pre ex-dividend and post ex-dividend period.

Haenser (2013) examined the ex-dividend day stock price and trading volume behavior after the tax reform on 2001 in the German market for the period 1994-2009. They reported that even after the tax reform, that reduced tax heterogeneity among investors, a high trading volume around ex-dividend day persists and they suggested as a plausible explanation the short-term trading hypothesis.

Hung-Ling Chen (2013) conducted a research for the ex-dividend day stock price behavior, on stocks listed on the Taiwan Stock Exchange between January 1992 and December 2006. They found that the ex-dividend price anomaly occurs in Taiwan and provided support for the dynamic dividend clientele hypothesis. They also reported that high tax-bracket investors tend to sell shares cum-dividend, and buy shares on the ex-dividend day, while low tax-bracket investors and corporate shareholders tend to trade in the opposite direction.

Furthermore, Lindop. S (2013) examined the ex-dividend price behavior in the U.K. market during the period 1991-2007 and found a link between shareholder level taxation of dividends and firms' cost of capital.

Summarizing the non-US market findings, while the stock price drop less than the dividend amount is common phenomenon there is still no clear explanation for it. Evidence of the existence of tax-clientele is mixed, while the discreteness hypothesis is weak. As Black (1976) acknowledged many years ago, the harder we look in the dividend picture, the more it looked like a puzzle. No matter the numerous researchers examining the anomaly that followed, Bhattacharyya (2007, p.4) stated: "*Despite decades of study, we have yet to completely understand the factors that influence dividend policy and the manner in which these factors interact*".

In our study we examine the ex-dividend stock price behavior in the Romanian market contributing the existing literature in two ways. First of all we provide evidence of the Bucharest Stock Exchange. In this point it is worth mentioning that this is the first attempt to explain this phenomenon in Romania. Moreover Romanian market is an environment that taxation is the same for dividends and capital gains, excluding *a priori* the tax-effect hypothesis.

The next table provides a timeline of the existing literature papers, their authors, the markets under examination and the outcomes of their studies.

Table 1 Prior studies regarding Ex-dividend price anomaly

	Study	Examined Period	Examined Market	Finding
1	Campbell and Beranek (1955)	1949-1950	USA	$\Delta P/D < 1$
2	Durand and May(1960)	1948-1959	USA	$\Delta P/D < 1$
3	Elton and Gruber(1970)	1966-1967	USA	Tax effect
4	Litzenberger and Ramaswamy(1979)	1936-1977	USA	Tax effect
5	Kalay (1982)	1966-1967	USA	Short-term trading
6	Poterba and Summers (1984)	1955-1981	UK	Tax effect
7	Booth and Johnson (1984)	1970-1980	Canada	Tax effect
9	Eades et al (1984)	1975-1984	USA	Short-term trading
8	Lakonishok and Vermaelen (1986)	1970-1981	Canada	Short-term trading
10	Barclay (1987)	1962-1985	USA	Tax effect
11	Grammatikos (1989)	1975-1985	USA	Short-term trading
12	Hietala(1990)	1974-1985	Finland	Tax effect
13	Michaely(1991)	1986-1989	USA	Short-term trading
14	Stickel(1991)	1972-1980	USA	Tax effect
15	Lamdin and Hiemstra (1993)	1982-1991	USA	Tax effect
16	Hearth and Ribley (1993)	1984-1988	USA	Short-term trading
17	Boyd and Jagannathan (1994)	1962-1987	USA	Short-term trading
18	Michaeli and Murgia (1995)	1981-1990	Italy	Tax effect
19	Lasfer(1995)	1985-1994	UK	Tax effect
20	Kato and Loewenstein(1995)	1981-1991	Japan	Tax effect
21	Bowers and Fehrs(1995)	1976-1987	USA	Short-term trading
22	Wu and Hsu(1996)	1984-1990	USA	Tax effect
23	Michaeli and Vila(1996)	1963-1991	USA	Tax effect

	Study	Examined Period	Examined Market	Finding
24	Siddiqi(1997)	1987-1988	USA	Short-term trading
25	Espita and Ruiz(1997)	1980-1992	Spain	Tax effect
26	Bali and Hite(1998)	1962-1994	USA	Tick size effect
27	Frank and Jagannathan(1998)	1980-1993	Hong Kong	Bid-ask spread effect
28	Bhardwaj and Brooks(1999)	1986-1989	USA	Tax effect
29	Naranjo et al.(2000)	1962-1994	USA	Short-term trading
30	Liljeblom et al.(2001)	1994-1996	Sweden	Tax effect
31	McDonald(2001)	1989-1998	Germany	Tax effect
32	Milonas and Travlos(2001)	1994-1999	Greece	$\Delta P/D < 1$
33	Bell and Jenkinson(2002)	1995-1999	UK, Italy, France	Tax effect
34	Lasfer and Zenonos(2003)	1988-2002	Germany	Tax effect
35	Graham et al.(2003)	1996-2001	USA	Tax effect
36	Jakob and Ma(2004)	1993-2001	USA	Limit order imbalance
37	Milonas et al.(2006)	1996-1998	China	Tax effect
38	Fariha and Soro(2006)	1993-2002	Portugal	Tax effect
39	Castillo and Jakob(2006)	1962-1994	Chile	Short-term trading
40	Jakob and Ma(2006)	1962-1994	USA	Limit order imbalance
41	Daunfeldt et al.(2006)	1991-1995	Sweden	Tax effect
42	Yahyaee(2007)	1997-2005	Oman	Bid-ask spread effect
43	Borges (2008)	1990-1998	Portugal	$\Delta P/D < 1$
44	Dasilas(2009)	2000-2004	Greece	Short-term trading
45	Garcia (2011)	2006	Spain	Tax effect
46	Anantarak (2011)	1975-2010	Thailand	Short-term trading
47	Mohibul Islam, A. I. (2013)	2005-2011	Pakistan	Short-term trading
48	Olson, R. and Wallen T. (2013)	2011	Pakistan	$\Delta P/D < 1$
49	Haenser (2013)	1994-2009	Germany	Short-term trading
50	Hung-Ling Chen (2013)	1992-2006	Taiwan	Tax effect
51	Lindop. S (2013)	1991-2007	U.K.	Tax effect

Source: Dasilas (2009)

3. The Romanian Institutional environment

3.1 Romanian Stock Exchange

The Romanian stock exchange “Bursa de Valori București” also known as “Bucharest Stock Exchange” is located in Bucharest, the capital of Romania. It holds a tradition of many years, since, it first started to operate in 1882, in the building of the Chamber of Commerce in Bucharest. One year after that "Law on exchanges, securities and commodities brokers" has passed and the stock exchange was under its regulation. By that time there were only 21 issues quoted and market activity continued to be relatively low until 1916 when Romania entered World War I and trading was suspended altogether. The stock exchange reopened after the war and it was followed by a great increase in investor's demand and trading activity. Nevertheless after a period of extended growth and due to the Great Depression of 1929 stock prices fell significantly reaching their lower historical level in 1932. Some years later the exchange started to recover, yet it was not long after that when the stock exchange, forced by a turning point in Romanian national history, seized its operations and remained closed for 50 years. (Bucharest Stock Exchange, 2013)The Bucharest stock exchange made its first try to reopen in 1992 but the recovery process wasn't easy, two years were needed before the adoption of Law no. 5 /1994 on transferable securities and stock exchanges, together with efforts to educate the general public in financial and trading concepts.

In 1995 the stock exchange was reopened in the building of the National Bank of Romania, and started to take its today form. Another important step was made in 1998 when all listed stocks got separated in two tiers and the exchange introduced daily trading while the National Bank of Romania became the settlement bank. Finally in December of 2008 “RASDAQ¹”, a former stock market in Romania, merged with the Bucharest Stock Exchange. The total capitalization of the Bucharest Stock Exchange as of September 2013 was around €26.6 billion euro, making it a medium Central and Eastern European (CEE) stock exchange. Bucharest Stock Exchange today has six indices:

1. BET, that was created first, reflects the advancement of the most liquid 10 stocks (except Investment Funds) and it is the most popular index of the exchange.
2. BET-C (BET Composite) reflects the advancement of all listed stocks (except Investment Funds)
3. BET-FI reflects the advancement of the five large Investment Funds created in the Mass Privatization Program

¹ The name of the RASDAQ was derived from NASDAQ, the second largest stock exchange in United States, because the RASDAQ was modeled on the NASDAQ. The main index of the RASDAQ was "RASDAQ-C".

4. ROTX (Romanian Traded Index) reflects the progress of the most liquid blue chips
5. BET-XT (BUCHAREST EXCHANGE TRADING EXTENDED INDEX) reflects the progress of the most liquid 25 stocks, including the 5 Investment Funds created in the Mass Privatization Program.
6. BET-NG (BUCHAREST EXCHANGE TRADING ENERGY & RELATED UTILITIES INDEX) which is an energetic sector index on Bucharest Stock Exchange (Bucharest Stock Exchange, 2013)

3.2 The Romanian legal environment, taxation and dividends

Romanian currency is Romanian New Leu (RON). Their accounting standards follow the 4th and 7th EU directives. However from 2012 and on all the financial institutions, banks and companies whose securities are traded on a regulated capital market should comply with IFRS.

Regarding residence and corporate taxation, a company is considered resident in Romania if it is incorporated in accordance with Romanian legislation or if its place of effective management and control is in Romania. Resident entities are subject to tax on their worldwide income. Non-resident companies are subject to tax on their Romanian-sourced income only. As for income, it is all taxable in general except for income that is specifically exempt². The standard profits tax rate is 16% Regarding capital gains, gains on the sales of shares and real property are included in overall profits and are taxed at the general corporate rate of 16% Nevertheless no separate capital gains tax is payable by resident entities.

As for dividends, dividend income obtained by a Romanian legal entity from another Romanian legal entity is non-taxable. Dividends received by a Romanian legal entity from a legal entity resident in another EU member state are considered non-taxable income as well if certain conditions are met. Regarding dividends paid by a resident legal entity to its shareholders are exempt from withholding tax, provided that the shareholders own a minimum of 15% of the share capital of this legal entity for an uninterrupted period of 2 years. Unless those conditions are met a 10% tax rate applies to dividends paid by resident entities to other resident entities, while a 16% tax rate applies to dividends paid to EU resident legal entities. (Deloitte, 2013) Those specifications and idiosyncrasies such as the special taxation treatment of dividends are what make Romania an interesting and unique institutional environment. An important point here is that the lack of tax differentiation between capital gains and dividends

² Income is considered non-taxable at the level of the Romanian legal entity, if the beneficiary of the dividends holds at least 10% of the share capital for at least two years ending on the date the dividends are paid.

taxation, leads us to believe that *a priori* the tax-effect hypothesis, as proposed by Elton and Gruber (1970), would not be applied to the Bucharest stock exchange.

The following two tables offer an overview of the taxation in Romania and the taxation in several countries around the world respectively.

Table 2 Taxation in Romania

Corporate Taxes	
Corporate income tax rate %	16
Capital gains tax rate %	16
Branch tax rate %	16
Withholding tax %	
* Dividends	0/10/16
* Interest	0/10/16
* Royalties	0/10/16
* Services	16
* Commissions	16
*Entertainment and sports activities	16
* Proceeds from liquidation	16

Table 3 Overview of the taxation on dividends in countries around the world

Country	Dividend Tax	Country	Dividend Tax
Austria	25%	Korea	20%
Belgium	25%	Netherlands	15%
Brazil	0%	South Africa	15%
Bulgaria	5%	Turkey	15%
Croatia	12%	Malta	0%
Cyprus	0%	Mexico	0%
China	50%	Monaco	0%
Denmark	0% / 15% / 27%	Netherlands	%0 / 15%
Estonia	0%	Nigeria	10%
France	30%	Norway	0 / 25%
Hong Kong	0%	Portugal	25% / 35%
Hungary	0%	Russia	15%
Czech Republic	15%	Saudi Arabia	5%
Germany	25%	Spain	21%
Greece	10%	United Arab Emirates	0%
Iran	0%	United Kingdom	0%
Italy	20%	USA	30%

Source: Deloitte

4. Research Design

4.1 Stock price Behavior on ex-dividend days

So far we have seen that the ex-dividend price anomaly is still open and the main focus of the researchers through the years is to provide a plausible justification of the price drop to dividend ratio. As we can recall from the literature review Elton and Gruber (1970) argued that a stockholder has the right to receive the dividend only if he/she owns the stocks until the ex-dividend day. In other words, the person that is eligible to receive the dividend is the one owning the stock on the ex-dividend day. The implication thought if the investor chooses to sell the stock ex-dividend is that despite the fact he/she will benefit from the dividend, he/she will have to expect to sell the stock on a lower price. In a market without transaction costs or taxes, the price fall of the stock from cum dividend day (P_c) to ex dividend day (P_e) should equal exactly the amount of the dividend (D). If we divide both sides with D , we get the classical ex-dividend drop ratio, also known as the Raw Price Ratio (RPR) that we can see graphically as follows:

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

The above ratio calculates the price change from the cum-dividend day to the ex-dividend day in terms of the dividend amount. That leads us to our first set of Hypotheses. We base our hypotheses on the RPR which we calculate it in 3 forms. First we calculate RPR using closing prices in both the cum-dividend day and ex-dividend day. Next we calculate the RPR using closing prices on the cum-dividend day and opening prices on the ex-dividend day. The third calculation involves again closing prices both on cum and ex-dividend dates but adjusts the ex-dividend closing prices on market movements. We base this 3rd calculation on studies of Kalay (1982), Michaely(1991) and Naranjo et al(2000) that argued that the ex-dividend day closing price is affected by the stock's normal daily return. Consequently we try to include this implication in our calculation by adjusting the ex-dividend closing price with the closing price of the daily market return, in our case the Bucharest stock Exchange Trading index (BET). This ratio is known as the market adjusted price ratio (MAPR)

$$MAPR = \frac{P_c - \left[\frac{P_e}{1 + Rm} \right]}{D}$$

The theoretical value of all the hypotheses described above, should equal one. This completes the first set of our hypotheses that are presented below:

H1a : Mean of RPRc-c = 1
H1b : Mean of RPRc-o = 1
H1c : Mean of MAPR = 1

There have been studies, such as those of Eades et al. (1984), Barclay (1987), Michaely (1991) and Bell and Jenkinson (2002) proving that the classical RPR often suffers from heteroskedasticity and independence problems. Heteroskedasticity arises when the standard deviations of a variable, monitored over a specific amount of time, are non-constant. In finance it is an often case to encounter a specific form of heteroskedasticity known as conditional heteroskedasticity, that connects with the prices of stocks. The level of volatility of these equities cannot be predicted over any period of time. In our case conditional heteroskedasticity occurs because the $\Delta P / D$ ratio is scaled over the dividend amount. This means that when the dividends are low, the weight given to the changes is excessive. This implication leads us to our second set of hypotheses. In order to avoid the problems discussed earlier, we calculate the price change from cum-dividend day to the ex-dividend day, scaled by the cum-dividend day. This ratio is called Raw Price Drop Ratio (Milonas et al. 2006, Dasilas, 2009) and we calculate it as follows:

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

As in the case of RPR, we calculate the RPDR in 3 forms. More specifically we first calculate the RPDR using closing prices on both cum and ex-dividend days. Next we calculate the ratio using closing prices on the cum-dividend day and opening prices on the ex-dividend day. Finally we calculate the ratio using again closing prices on both cum and ex-dividend days but we adjust the ex-dividend prices on the daily market returns (R_m) in our case the BET index. The latter ratio is also known as market-adjusted price drop ratio (MAPDR)

$$MAPDR = \frac{P_c - \left[\frac{P_e}{1 + R_m} \right]}{P_c}$$

All the price drop ratios described above should have a theoretical value equal to the dividend yield which is calculated as the dividend per share (DPS) divided by the stock price on the cum dividend day. $DY = \frac{D}{P_c}$

This concludes the second set of our hypotheses that is presented below:

H2a : Mean of RPDRc-c = DY

H2b : Mean of RPDRc-o = DY

H2c : Mean of MAPDR = DY

Furthermore we examine the market reaction around ex-dividend days, using the event study methodology as described by Dodd and Warner (1983) and Brown and Warner (1985). First we measure the stock price reaction in an event window of 20 days. Counting the ex-dividend day as the day 0 we examine the prices 10 days before (day -10 to day 0) and 10 days after (day 0 to day 10). Using similar technique as in Brown and Warner (1985) we measure the market reaction calculating the abnormal returns (AR) using the market model and the market-adjusted model. For the estimation of the market model parameters we use 240 observations, occurring prior the ex-dividend day, commencing 250 days prior and ending -11 days before day zero. The market returns are proxied again from the BET index. From those calculations we expect a mean abnormal return on ex-dividends days and a cumulative abnormal return prior and after the ex-dividend period equal to 0. This concludes our third set of hypotheses, which are presented below:

H3a: Mean of abnormal returns on ex-dividend days (AR) = 0

H3b: Cumulative abnormal returns prior and after the ex-dividend period (CAR) = 0

4.2 Ex-dividend trading volume behavior

Prior studies has shown that investigating the price behavior alone around the ex-dividend day cannot fully explain the reason for the price anomaly and cannot highlight and distinguish which hypothesis, short term or long term provides a valid justification for the ex-dividend anomaly. Lakonishok and Vermaelen (1986) suggested that an examination of the volume behavior around ex-dividend days would help discriminate between the tax-effect and the short-term trading hypotheses. In our search we have ruled out *a priori* the tax-effect hypothesis since there is no tax differentiation between capital gains and dividends income in Romania. Nevertheless, excessive trading volume around ex-dividend days has been recorded in countries where there is no taxation in dividends and capital gains, like in Greece (Milonas and Travlos, 2001, Dasilas, 2009), or Mexico (Kadapakkam and Martinez, 2005). More specifically Milonas and Travlos examined the price behavior around ex-dividend days in the Athens stock exchange and found positive abnormal returns along with positive abnormal volume around the ex-dividend days, in that time there was no taxation on dividends or capital gains in Greece. In order to provide more evidence for the short term trading hypothesis in Romania, we conduct an event study methodology on the trading volume. Following Lakonishok and Vermaelen (1986) we calculate the abnormal trading volume in a time frame of 110 days to 10 days prior the ex-dividend day and 10 days to 110 days after the ex-dividend day. The abnormal trading volume is in Ron value of shares traded.

As in the case of abnormal returns, we expect a mean abnormal volume on ex-dividend and a cumulative abnormal volume around ex-dividend day equal to 0. That leads us to our final set of hypotheses, which are presented below.

H4a: Mean of abnormal volume on ex-dividend days (AV) = 0

H4b: Cumulative abnormal volume prior and after the ex-dividend period (CAV) = 0
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4.3 Regression Analysis

Based on Kato and Loewenstein (1995), Michaely and Vila (1996), Wu and Hsu (2006, Naranjo et al.(2000), Dhaliwal and Zen Li (2006), Yahyaee et al(2007) and Dasilas (2009) techniques, we employ a cross-sectional regression analysis on abnormal returns on ex-dividend days against a number of independent variables such as:

Dependent Variable	Name
Ex-dividend day abnormal returns	AR ₀

Independent Variables	Name
a. Systematic risk	Beta
b. Divided yield	DY
c. Transaction costs	TC
d. Size	Size
e. Average volume	AvVol
f. Ex-dividend day abnormal volume	AbV

To analyze the impact of those independent variables on our dependent variable, we apply the ordinary least squares (OLS) technique. The model we use is presented below:

$$AR_{0,i} = a_0 + a_1 * Beta + a_2 * DY + a_3 * TC + a_4 * Size + a_5 * AvVol + a_6 * AbV + e_i$$

We calculate the systematic risk (beta) in a time frame of 240 days before the event (ex-dividend day) by applying the market model on days -250 to -11. Following Michaely and Vila (1995) argument that both systematic and idiosyncratic risk will decrease trading activities around ex-dividend days, we expect ex-dividend day abnormal returns to be negatively affected by the systematic risk.

Following Karpoff and Walkling (1988), Naranjo et al.(2000), Dhaliwal and Zhen Li (2006) and Dasilas (2009) we use the inverse of the stock price (1/Pc) as a proxy for transaction costs. As for the dividend yield (DY) we measure it as the ratio of the annual dividend over the price on the cum-dividend day (D/Pc). According to Lakonishok and Vermaelen (1986) and the short-term trading hypothesis, the dependent variable is expected to be positively related with transaction costs and dividend yield.

Regarding size, following Lasfer and Zenonos (2003) argument about firm size effect³, we expect an inverse relation between size and our dependent variable. We estimate variable "Size" as the natural logarithm of the market value of equity on the cum dividend day.

Next, we examine the relation of abnormal returns with liquidity. As a proxy for liquidity we use the average volume (AvVol) following Kato and Loewenstein. According to Lakonishok and Vermaelen (1986) we expect abnormal returns to be positively related with liquidity. We measured average volume using the mean-adjusted model during the estimated period, days -120 to -21 and days +21 to +121

Finally we examine the ex-dividend day abnormal volume (AbV). If short term-trading occurs around ex-dividend days we expect a positive relation between our dependent variable and the ex-dividend day abnormal volume.

5. Data

The data collected for this study were closing prices, opening prices and trading volume of all the companies listed in the Bucharest Stock Exchange as well as closing prices and trading volume of the Bucharest Stock Exchange Trading Index (BET). The data were obtained from the Bucharest stock Exchange website and the Bloomberg database. Sample period is from January 2000 to December 2012.

For a company to be included in our sample, it had to satisfy the following terms: a) price data are available for a period of 250 days preceding, and 10 days subsequent to the ex-dividend day, b) trading volume data are available for a period of 110 days prior and 110 after the ex-dividend day. The above criteria resulted in a sample of 263 companies.

³ Lasfer and Zenonos(2003) argued that smaller firms experience larger abnormal returns as compared to bigger ones

6. Empirical Findings

6.1 Ex-dividend raw and drop price ratios

Table 4 presents descriptive statistics for the period under study. The theoretical value of the mean and median raw price ratios equals unity and the theoretical value of the mean and median of raw price drop ratios equals the dividend yield. As we can see in the Table 4 the price drop is not only less than unity but also appears to have a negative sign, as the mean (median) of RPRc-c, RPRc-o and MAPR, equal to -0.116 (-0.128) , -0.157 (-0.161) and -0.098 (-0.132) respectively. Moreover regarding the price drop ratios they are also less than the dividend yield, which is 0.138 (0.079) and even present a negative sign. Their mean (median) equals to -0.021 (-0.010), -0.025 (-0.011) and -0.020 (-0.010) respectively. These findings imply that not only the price on ex-dividend day does not drop by the dividend amount, but also the price on the ex-dividend day increases as compared to the cum-dividend day. This is an interesting finding that is not in line with prior studies finding that the average price drop on ex-dividend day is less than the dividend amount. Nevertheless our findings that the stock prices increase on ex-dividend days are in line with the case of Japan, Kato and Loewenstein (1995) where they also found an increase in prices on ex-dividend day and dividend-related tax effects appeared as secondary. Moreover they argued that returns around ex-dividend day are due to the the proximity of many ex-dividend days, to the end of the fiscal years.

Table 5 presents the theoretical values and the mean and median of the raw price ratios and raw price drop ratios. To test our hypotheses we used the t-test and the Wilcoxon signed rank test⁴ for means and medians. Based on the tests applied we reject the hypothesis of mean of RPR = 1 (in all the 3 forms tested) for a 5% significance level. Moreover we reject the hypothesis of mean of RPDR=DY (in all the 3 versions tested) for a 5% significance level. We also find that the corresponding t-statistics of the mean for RPRc-c, RPRc-o, MAPR, RPDRc-c, RPDRc-o and MAPDR are statistically significant at the 1% level. The same applies for the median of RPRc-c, RPRc-o, MAPR, RPDRc-c, RPDRc-o and MAPDR Wilcoxon signed rank test, which are statistically significant at the 1% level. Collectively these findings suggest that the mean and median ratios are statistically

⁴ The Wilcoxon Signed Rank test is a nonparametric test that compares two paired groups. The test essentially calculates the difference between each set of pairs and analyzes these differences. The Wilcoxon Signed Rank test assumes that there is information in the magnitudes and signs of the differences between paired observations. As the nonparametric equivalent of the paired student's t-test, the Signed Rank can be used as an alternative to the t-test when the population data does not follow a normal distribution. (Wilcoxon Test, 2013)

different from their theoretical values and the price on ex-dividend day increases instead of dropping by the dividend amount. These findings suggest that an investor would have a great profit opportunity by buying on the cum-dividend and selling on the ex-dividend day.

Table 4 Descriptive Statistics

N=317	Dividend	Pc-Pe	RPR- close to close	RPR-close to open	MAPR	RPDR- close to close	RPDR- close to open	MAPDR	Dividend Yield
Mean	0.950	-0.066	-0.116	-0.157	-0.098	-0.021	-0.025	-0.020	0.138
Median	0.069	-0.004	-0.128	-0.161	-0.132	-0.010	-0.011	-0.010	0.079
St. Deviation	3.162	0.552	1.077	0.794	1.374	0.088	0.081	0.092	0.188
Minimum	2.606	-1.806	-0.693	-0.693	-0.715	-0.282	-0.282	-0.291	0.408
Maximum	31.750	2.480	7.129	3.952	7.605	0.205	0.215	0.199	1.270
Range	29.144	4.286	7.822	4.645	8.320	0.487	0.498	0.490	0.862
1st Quartile	0.024	-0.039	-0.566	-0.619	-0.585	-0.043	-0.048	-0.054	0.039
3rd Quartile	0.390	0.009	0.220	0.099	0.342	0.017	0.007	0.023	0.147

Table 5 Ex-Dividend stock price behavior

N=317	Theoretical Value	Mean	t-statistic	P-Value	Theoretical Value	Median	Wilcoxon signed rank P-Value
RPRc-c	1	-0.116	-18.10***	0	1	-0.128	13.23***
RPRc-o	1	-0.157	-25.45***	0	1	-0.161	13.83***
MAPR	1	-0.098	-13.95***	0	1	-0.132	12.66***
RPDRc-c	0.138	-0.021	-31.40***	0	0.079	-0.010	14.06***
RPDRc-o	0.138	-0.025	-34.92***	0	0.079	-0.011	14.49***
MAPDR	0.138	-0.020	-29.93***	0	0.079	-0.010	13.77***
Div. Yield		0.138				0.079	

Pc-Pe measures the price change from the cum dividend day to the ex-dividend day using closing prices. RPR close to close is the raw price ratio using closing prices both on the cum and ex-dividend day. RPR close to open is the raw price ratio using closing price both on the cum-dividend day and opening price on the ex-dividend day. MAPR is the market adjusted price ratio calculated with closing prices on both cum and ex-dividend days, yet adjusted for market movements, proxied with BET index. RPDR close to close is the raw price drop ratio calculated using closing prices both on the cum and ex-dividend days. RPDR close to open is the raw price drop ratio calculated using closing price on cum-dividend day and opening prices on ex-dividend days. MAPDR is the market adjusted price drop ratio calculated using closing prices both on cum and ex-dividend days, but adjusted for market movements, proxied again by the BET index. Finally dividend yield is measured as the ratio of the dividend divided by the closing price on cum-dividend day. “*” signs denote the statistical significance. “*” denotes statistically significant at the 10% level, “**” denotes statistically significant at the 5% level and “***” denote statistically significant at the 1% level.

6.2 Ex-dividend stock price behavior

In order to have a better insight of which factors determine the ex-dividend stock price behavior we apply an event study methodology in a time interval of 10 days prior and 10 days after the ex-dividend day and also an event study in a time window of 250 days prior to the ex-dividend day. We then calculate the abnormal returns using 2 models: 1) the market model and 2) the market adjusted model. For space reasons and following the argument of Cable and Holland (1999) that market model represents decently all the other models, we analyze and comment only the market model. Nevertheless both the market model and market adjusted model findings are presented in the following tables.

As analyzed in the literature review, we rule out *a priori* the first 2 explanations for the anomaly, since there is no taxation differential in the capital gains and dividends in Romania and since there are no microstructure impediments. That leads us to remain with one plausible explanation for this phenomenon, the short term trading hypothesis supported by Kalay (1982). Therefore we examine the short term trading hypothesis by analyzing the behavior of stock prices around ex-dividend days. According to that theory we should observe positive returns on the period prior to the ex-dividend and negative returns on the period post the ex-dividend day, reflecting the buying pressure before the ex-dividend day and the selling pressure after the ex-dividend day. The ex-dividend day returns should be low to reflect the level of transaction costs as suggested by Kalay (1982).

Table 6 presents the market reaction using the market model. We find that on the ex-dividend day the mean abnormal return equals to 8.90% which is statistically significant at the 1% level. These results corroborate the findings from Table 4, implying that in Romania, in essence there are significant returns to be gained on the ex-dividend day and the phenomenon is more severe as compared to the other markets. Prior to the ex-dividend day and more specifically 3 days before it we find positive abnormal returns yet not statistically significant at any conventional level. Post the ex-dividend day we observe negative abnormal returns on days +1 and +2 of, -1.987% and -1.079% respectively, both statistically significant at the 1% level.

Table 7 presents the cumulative abnormal returns in various time intervals around the ex-dividend day, helping us to gain a clearer and more summarized insight for the buying and selling pressure around the ex-dividend day. As we see for the period (-1 to day 0) we find positive abnormal returns of 7.765% statistically significant at the 1% level. For the post ex-dividend day period we observe negative and statistically significant abnormal returns of -3.644% and -3.456% in time windows +1 to +5 days and +1 to +10 days post the ex-dividend day (day 0) respectively, suggesting a significant selling pressure after the ex-dividend day and a statistically significant buying pressure before it.

Overall, the results of the Tables 6 and 7 imply an interest for dividend capture in Romania, suggesting that investors buy on the cum-dividend day or some days prior to it and sell the stocks on the ex-dividend day in order to capture the dividend, since there is a profit opportunity for this transaction as mentioned before.

Table 6 Abnormal Returns around ex-dividend day

	AR Market Model			AR Market Adjusted Model		
	AR%	T-Statistic		AR%	T-Statistic	
-10	0.235	0.84		0.224	0.91	
-9	-0.055	-0.20		0.250	0.99	
-8	0.132	0.47		0.156	0.60	
-7	-0.322	-1.16		-0.533	-1.68	*
-6	-0.089	-0.32		-0.286	-1.01	
-5	0.148	0.53		0.350	1.22	
-4	-0.674	-2.42	**	-0.748	-2.04	**
-3	0.411	1.48		0.726	1.91	*
-2	-0.411	-1.48		-1.249	-4.55	***
-1	-0.541	-1.94	*	-0.828	-2.89	***
0	8.901	31.94	***	0.239	0.55	
1	-1.987	-7.13	***	-2.511	-5.66	***
2	-1.079	-3.87	***	-1.398	-3.40	***
3	-0.248	-0.89		-0.152	-0.41	
4	-0.560	-2.01	**	-0.301	-0.89	
5	-0.280	-1.00		-0.135	-0.47	
6	-0.493	-1.77	*	-0.785	-2.39	**
7	-0.276	-0.99		-0.625	-1.35	
8	0.837	3.00	***	1.383	3.75	***
9	-0.279	-1.00		-0.295	-0.89	
10	0.493	1.77	*	0.674	2.85	***

* Denotes statistically significant at the 10% level

** Denotes statistically significant at the 5% level

*** Denotes statistically significant at the 1% level

Table 7 Cumulative abnormal returns around ex-dividend day

	AR Market Model			AR Market Adjusted Model		
	CAR %	T-Statistic		CAR %	T-Statistic	
CAR (-10,+10)	3.780	2.96	***	-5.609	-1.45	
CAR (-10,-1)	-1.099	-1.25		-1.860	-0.70	
CAR (+1,+10)	-3.456	-3.92	***	-3.978	-1.49	
CAR (-5,+5)	3.660	3.96	***	-5.766	-2.06	**
CAR (-5,-1)	-1.026	-1.65		-1.678	-0.89	
CAR (+1,+5)	-3.644	-5.85	***	-4.317	-2.29	**
CAR (-1,+1)	5.980	12.39	***	-2.977	-2.04	**
CAR (-1,0)	7.765	19.70	***	-0.566	-0.47	

6.3 Ex-dividend trading volume behavior

To have a better insight as to which factors affect the ex-dividend price anomaly we investigate the abnormal trading volume around the ex-dividend day. If the short-term trading hypothesis is valid we should observe a net increase in trading volume around ex-dividend days, as argued by Lakonishok and Vermaelen (1986). More specifically we expect to observe a positive abnormal volume before the ex-dividend day to reflect the buying pressure and negative after the ex-dividend day to reflect the selling pressure.

Table 8 shows the trading volume behavior in a time window of 10 days prior and 10 days after the ex-dividend day (day 0). We estimate the abnormal volume in currency value (Ron) and we compare it with the average volume of 110 days before and after the ex-dividend day, using the mean-adjusted model.

Table 8 Abnormal trading volume around ex-dividend day

	AV%	t-stat
-10	2.693	0.34
-9	7.242	0.91
-8	0.866	0.11
-7	16.509 *	1.81
-6	29.785 ***	2.91
-5	9.842	1.34
-4	26.847 ***	3.01
-3	22.299 **	2.48
-2	27.605 ***	2.72
-1	122.483 ***	6.25
0	30.264 **	2.27
1	-13.255 **	-2.16
2	-1.461	-0.18
3	-11.230	-1.55
4	-12.096 *	-1.78
5	-15.195 **	-2.16
6	-8.678	-1.04
7	-2.772	-0.30
8	-12.245 *	-1.77
9	-16.677 **	-2.52
10	-11.922 *	-1.70

* Denotes stat. significant at the 10% level

** Denotes stat. significant at the 5% level

*** Denotes stat. significant at the 1% level

Table 9 Cumulative Abnormal trading volume around ex-dividend day

	CAV	t-stat	
CAV (-10,-1)	2.542 ***	2.62	} prior the ex-dividend day
CAV (-5,-1)	1.993 ***	2.91	
CAV (-1,0)	1.445 ***	3.33	} post the ex-dividend day
CAV (-1,+1)	1.327 **	2.50	
CAV (+1,+5)	-0.507	-0.74	
CAV (+1,+10)	-1.009	-1.04	} around the ex-dividend day
CAV (-5,+5)	1.776 *	1.75	
CAV (-10,+10)	1.822	1.30	

As we can see in Table 8 the abnormal trading volume is 30.264% higher on the ex-dividend day compared to the average volume and statistically significant at the 99% confidence interval. Moreover, we can see that we have positive and statistical significant abnormal trading volume on the cum-dividend day or earlier, reflecting the buying pressure from investors and negative and statistically significant at the 1% level, reflecting the selling pressure. These results are in line with our findings from the abnormal returns implying that investors in Romania buy on the cum-dividend day or some days earlier and sell the stocks on the ex-dividend day in order to capture the dividend.

Table 9 shows the cumulative abnormal trading volume in various time windows before and after the ex-dividend day. We observe that we have positive abnormal trading volume in the periods preceding the ex-dividend day and negative abnormal trading volume in periods subsequent to the ex-dividend day. Moreover, we observe that on 2 days (i.e. cum and ex-dividend days) we have a cumulative abnormal trading volume of 1.445% higher than the average trading volume. Accordingly we reject the null hypotheses of mean of abnormal volume on ex-dividend days being equal to zero and cumulative abnormal volume prior and after the ex-dividend period being equal to zero, for a 95% confidence interval.

Overall, our findings are consistent with those of Kalay (1982), Lakonishok and Vermaelen (1986) Bowers and Fehrs (1995), Naranjo et al. (2000) and Dasilas (2009) among others, and they suggest that the short term hypothesis seems to explain the ex-dividend day phenomenon in the Romanian market.

6.4 Multivariate regression analysis results

Table 11 presents the results from the multivariate regression analysis using abnormal returns on the ex-dividend day as the dependent variable, against a number of dependent variables such as the dividend yield (DY), the systematic risk presented by the beta (beta), the transaction costs (TC), the size of the firm (Size), the average volume (AvVol) and the ex-dividend abnormal trading volume (AV). In order to avoid issues caused from multicollinearity between the variables transaction costs and firm size we run two regressions. The first regression excludes the firm size while the second one excludes the transaction costs. For significance reasons we present only the first regression.

Table 10 Regression analysis on ex-dividend day

Variable	Regression		
	Coefficient	t-Statistic	
Intercept	0.004	0.00	
DY	-0.916	-1.55	
Beta	-1.065	-0.57	
TC	0.194	4.37	***
AvVol	0.000	-0.11	
AV	0.039	0.81	
Adj. R-sq.	0.091		
D-W stat	1.866		
F-statistic	4.040		

AR is the abnormal returns on the ex-dividend day. DY is the dividend yield calculated as the ratio of the dividend per share over the stock closing price on the cum-dividend day. Beta is the slope, representing the systematic risk and is calculated with the market parameters model over a time window of 250 days prior the ex-dividend day. TC stands for the transaction costs calculated as the ratio of unity over the stock closing price on cum-dividend day. AvVol stands for the average normal volume calculated in a time window of 110 days to 10 days prior the ex-dividend day and 10 days to 110 days after the ex-dividend day. AV is the abnormal volume on the ex-dividend day calculated with the mean-adjusted model. DW represents the Durbin–Watson statistic used to detect the presence of autocorrelation. There is clearly no sign of autocorrelation. We also tested for heteroskedasticity using the White test and found no such evidence as all of the p-values were in excess of 0.05. The equation used for the regression is $AR_{0,i} = a_0 + a_1 * Beta + a_2 * DY + a_3 * TC + a_4 * Size + a_5 * AvVol + a_6 * AbV + e_i$ “*” signs denote the statistical significance. “*” denotes statistically significant at the 10% level, “**” denotes statistically significant at the 5% level and “***” denote statistically significant at the 1% level.

From the regression we observe that the coefficient of systematic risk (beta) has a negative sign, as expected based on the argument of Michaely and Vila (1995) however statistically insignificant at any conventional level. We also find that the dividend yield is negatively related with abnormal returns yet not statistically significant in any conventional level. Moreover, we observe that transaction costs are positively related with abnormal returns in a 99% confidence level ($t=4.37$). This result is in line with the short-term hypothesis and consistent with the findings of Wu and Hsu (1996) and Naranjo et al. (2000). For the rest of control variables we did not detect any statistical significance.

Overall, the results of our multivariate regressions are in line with the short-term trading hypothesis regarding the transaction costs, as they seem to affect ex-dividend day returns. Nevertheless, we found no evidence that the dividend yield affects the ex-dividend day returns. Our results from the regressions analysis are similar to prior empirical studies conducted in the US and other developed markets and they provide the short-term hypothesis as a plausible explanation for the ex-dividend day price anomaly.

7. Conclusion and suggestions

7.1 Conclusion

In this study we examine the stock price and trading volume behavior around the ex-dividend days, for a sample of stocks listed on the Bucharest stock exchange, spanning the period 2000 to 2012. Romania is an interesting market due to the fact that there is no tax differential between capital gains and dividends as both are taxed with the same tax rate. Nevertheless we find that in this tax neutralized environment a stock price anomaly does occur around the ex-dividend day. More specifically, we find that the price on the ex-dividend day does not drop by the full amount of the dividend as suggested by the Modigliani and Miller theory, but in fact it increases. Significant positive abnormal returns were observed before the ex-dividend day and significant negative abnormal returns were found after the ex-dividend day. We also had the same findings in the cumulative abnormal returns examination, implying buying pressure before the ex-dividend day and selling pressure after it. Because of the Romanian environment, we cannot support the tax related hypothesis or the microstructure impediments hypothesis and, therefore, we should rule out *a priori* those two hypotheses as an explanation for this anomaly. The only theory that supported empirical evidence was the short-term trading hypothesis. Indeed the findings from the event study on abnormal returns showed that dividend capture is prevalent in Romania, since there is a buying tendency before the ex-dividend day and selling tendency after the ex-dividend day reflecting the actions of short-term investors in order to benefit from the dividend and price change. Furthermore, looking at the trading volume behavior we observed a significant positive abnormal trading volume on the cum-dividend day and on ex-the dividend day and significant negative afterwards. These results are in line with the findings from the stock price behavior analysis. Finally, the results from the multiple regressions for the abnormal returns against a number of variables, showed that abnormal returns are significant negatively related with transaction costs, implying that investors would prefer stocks with lower transaction costs, a finding in line with the predictions of short-term trading hypothesis.

Overall, the ex-dividend price anomaly does occur in Romania. In fact, it shows an even greater profit opportunity as compared with other markets, for investors that buy a stock on the cum-dividend day and sell it on the ex-dividend day, since they will benefit from the dividend capture and in addition by the increased stock price. So eventually the short-term trading hypothesis offers an explanation to this anomaly in the Romanian market with evidence that short-term traders prefer the low transaction cost stocks more.

7.2 Research biases and suggestions for further research

In this study we examined the stock price behavior and the trading volume around ex-dividend days in the tax-neutralized and relatively new stock exchange of Bucharest. We should mention that the dataset used, was obtained from secondary sources such as the Bloomberg database however it can be considered to be a provider of top quality. Moreover our study focuses on stock prices and so it is subject to the underlying assumption that stockholders have the knowledge and understanding of the economic environment and all the potential relevant information.

Furthermore our results show that stock prices increase on ex-dividend days and the short-term trading hypothesis offers a plausible explanation for these findings. However the results are not in line with the majority of the findings in other markets, therefore it would be of great interest to conduct a future research, focusing on identifying the reasoning and the specific factors for this stock price increase on the ex-dividend day.

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