THE EFFECTS OF DIVIDEND CHANGE ANNOUNCEMENTS: EVIDENCE FROM A SMALL EUROPEAN MARKET

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ABSTRACT

One of the most important assumptions of the signalling hypothesis is that dividend change announcements are positively correlated with share price reactions and future changes in earnings. Our study analyses these two relationships controlling for the non-linear patterns in the behaviour of earnings for a small and bank-based system European country, based on a unbalanced panel data sample. Our findings do not show a significant relationship between dividend change announcements and both the share and future earnings reactions. We analyse the cases of a negative reaction between dividend changes and share price reactions. The results suggest that the market did not understand the signal given by firms through dividend change announcements. Overall, our results do not support the dividend signalling content hypothesis.

Key Words: *Dividend Signalling Hypothesis; Post-announcement Market Reaction; Post-announcement Performance; Adverse Market Reaction*

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1. INTRODUCTION

One of the most important assumptions of the signalling hypothesis is that dividend change announcements are positively correlated with share price reactions and future changes in earnings.

Miller and Modigliani (1961) work sustains that, in a perfect capital market, dividends are irrelevant for firms shares value, that is, a firm value is independent of the dividend policy. However, some years latter, Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985) developed the signalling theory classic models, showing that, in a world of asymmetric information, better informed insiders use the dividend policy as a costly signal to convey their firm's future prospect to less informed outsiders. So, a dividend increase signals an improvement on firm's performance, while a decrease suggests a worsening of its future profitability. Consequently, a dividend increase (decrease) should be followed by an improvement (reduction) in a firm's profitability, earnings and growth. Moreover, there should be a positive relationship between dividend changes and subsequent share price reaction.

A. Dividend Announcements and Future Earnings

It is well documented that dividend change announcements are positively associated with future earnings. Brickley (1983), Aharony and Dotan (1994), Chen and Wu (1999), Nissim and Ziv (2001) and Arnott and Asness (2001), among others, analysed the case of dividend changes, concluding that there is a strong association between dividend changes and subsequent earnings. Similar results were obtained by Lipson, Maquieira and Megginson (1998), for the case of dividend initiations and, very recently, by Dhillon, Raman and Ramírez (2003), that have considered dividend analysts forecasts in order to determine dividend surprises.

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However, many empirical studies have failed to support this idea. Studies by Watts (1973), DeAngelo, DeAngelo and Skinner (1992, 1996), Benartzi, Michaely and Thaler (1997), Grullon, Michaely and Swaminathan (2002) and Benartzi *et al.* (2005) find little or no evidence that dividend changes predict abnormal increases in earnings.

B. Dividend Announcements and Share Price Reaction

There have been a significant number of empirical tests showing that dividend change announcements are positively associated with share returns in the days surrounding the dividend change announcement. Pettit (1972, 1976) found strong support that dividend change announcements convey information to the market. Similar results were obtained by several authors, such as by Aharony and Swary (1980), Benesh, Keown and Pinkerton (1984) and Dhillon and Johnson (1994) for dividend change announcements, Asquith and Mullins (1983) for dividend initiations, Lee and Ryan (2000, 2002) for dividend initiations and omissions and Lippert, Nixon and Pilotte (2000) for dividend increase announcements. Although all these studies were carried out on the American market, recently, Travlos, Trigeorgis and Vafeas (2001) analysed the market of Cyprus and Gurgul, Madjosz and Mestel (2003) analysed the Austrian market, finding also support for the dividend information content hypothesis.

Nevertheless, recent studies have not supported evidence for a positive relation between dividend changes and the market reaction. Studies done by Lang and Litzenberger (1989) and Benartzi, Michaely and Thaler (1997) for the American market, Conroy, Eades and Harris (2000) for the Japanese market, Chen, Firth and Gao (2002) for the Chinese market and Abeyratna and Power (2002), for the United Kingdom (UK), find no evidence of a significant relationship between dividend change announcements and share price reaction surrounding the announcement date.

In contrast to what was believed, Frankfurter and Wood (2002), after examining some empirical studies, concluded that the choice of the method of analysis, data type and sample period does not significantly affect the studies' results. So, it seems there must be other reasons for the contradictory results.

In this context, we will try to provide with further evidence on the roles of the dividend signalling hypotheses in explaining the information content of dividend change announcements, given emphasis to the cases where the market reacts differently that would be expected under the signalling theory, that is, the enigmatic cases in that market reacts negatively to dividend increases and positively to dividend decreases[1]. To the best of our knowledge, an analysis of this nature, using empirical procedures to analyse separately the cases in which dividend changes and share prices move in the opposite direction, has not previously been undertaken.

We expect finding no strong support for the dividend signalling hypothesis in our sample – a Portuguese sample – for several reasons. Firstly, the ownership of equity tends to be concentrated, which is expected to mitigate the information asymmetry problem. Secondly, Portugal is characterised by a bank-based system, where banks have more access to information than in a market-based system. Finally, it has a poor investor protection. Consequently, the need to use dividends as a signalling device must be less pronounced in Portugal than in the Anglo-Saxon markets. Indeed, the empirical results do not give support to the dividend signalling content hypothesis.

The remainder of this paper is organised as follows. Section 2 presents the hypotheses. The data and empirical methodology are described in Section 3. Section 4 discusses the empirical results and section 5 provides the conclusion.

2. HYPOTHESES

Firstly, we want to analyse the relation between dividend changes and the share price movements around dividend announcements. To do so, we formulate the following alternative hypothesis:

> *H_1: "The dividend changes are associated with a subsequent share price reaction in the same direction"*

This hypothesis reflects the signalling theory assumption that dividend announcements convey information to the market about firm's future profitability. Consequently, dividend changes and the subsequent share prices should be positively related.

Next, we will analyse the relation between dividend changes and future firm profitability. The hypothesis to be tested, in its alternate form, is:

[1] Several authors found evidence that in a significant percentage of cases, share prices reactions are opposite to the dividend changes direction, such as the studies of Asquith and Mullins (1983), Benesh, Keown and Pinkerton (1984), Dhillon and Johnson (1994) and Healy, Hathorn e Kirch (1997).

H_2: "Dividend increases (decreases) are associated with superior (inferior) future performance"

According the dividend information content hypothesis, we expect a positive relation between dividend changes and future firms' profitability.

Afterwards, we would like to examine the negative relation between dividend change announcements and share price reactions in the announcement period in greater detail. A considerable number of studies found a significant percentage of firms in their samples whose market reaction is opposite to the signal of dividend changes. Asquith and Mullins (1983) verified that about 32% of their sample firms showed a negative market reaction to dividend initiations. Similar results were obtained by Benesh, Keown and Pinkerton (1984), Born, Moser and Officer (1988), Dhillon and Johnson (1994), Healy, Hathorn and Kirch (1997), and, very recently, Dhillon, Raman and Ramírez (2003).

The relationship between dividend changes and the market reaction surrounding the announcement date can be described by the four situations presented below:

	Dividend Increases	Dividend Decreases
Positive market reaction	I – PRDI	II – PRDD
Negative market reaction	III - NRDI	IV - NRDD

First, we will examine a sub sample composed by the events with a positive (negative) market reaction to dividend increase (decrease) announcements, represented by Cells I and IV, which relation is consistent with the dividend information content hypothesis. After, we will analyse the sub sample of the events reported by Cells II and III, that is, the cases that, differently than would be expected under the dividend information content hypothesis, the market reacts positively to a dividend decrease (II) and negatively to a dividend increase (III).

For the observations in cells I and IV, we develop the following alternative hypothesis:

H_3: "For the events with a positive relation between dividend change announcements and the market reaction, future earnings are positively associated with current dividend changes"

We expect to find a positive relationship between future earnings and dividend change announcements, supporting the dividend information content hypothesis.

If we fail to reject the null hypothesis associated with H_3, we will infer that, although we observe a signalling effect related the market reaction to dividend change announcements (positive relationship between dividend changes and share price changes in the 3 days contiguous to the announcement date), the future earnings are not associated with dividend change announcements. Consequently, we find no evidence of dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings. If we reject the null hypothesis associated with H_3, we can find a positive (hypothesis H_3) or a negative association between dividend change announcements and future earnings. If it happens the first situation (positive relation), we will infer that a signalling effect exists and it is associated with share price movements in the announcement period and earnings forecast positively related with dividend changes, supporting the dividend information content hypothesis. Otherwise, we find evidence of a negative association between dividend changes and future earnings, contrary to the expected positive relation, which we will denominate by *inverse signalling effect*. Consequently, we find no evidence of dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings.

For the observations in cells II and III, we test the following alternative hypothesis:

> *H_4: "For the events with a negative relation between dividend change announcements and the market reaction, future earnings are negatively associated with current dividend changes"*

The underlying idea of this hypothesis is that, although dividends have increased (decreased), investors forecast a decrease (increase) in future earnings, and the market reacts according to this expectation. Thus, the market reacts negatively to a dividend increase announcement and positively to a dividend decrease announcement. In consequence, dividend changes and future earnings should be negatively related.

If we fail to reject the null hypothesis associated with H_4, we will infer that dividend change announcements and the subsequent market reaction are negatively related and, in addition, the future earnings are not associated with dividend change announcements. Consequently, we find no evidence of dividend information content hypothesis in what concerns both the relationship between dividend change announcements and market reaction and the relationship between dividend change announcements and future earning changes. If we reject the null hypothesis associated with H_4, we can find a negative (hypothesis H_4) or a positive association between dividend change announcements and future earnings changes. If it happens the first situation (negative relation), we will find evidence of a negative association between dividend changes and future earnings, as predicted in the alternate hypothesis, existing evidence of a signalling effect but contrary to the sign of dividends, which we have denominated by *inverse signalling effect*. So, we will give support to the *inverse signalling effect*. Otherwise, the market reacts negatively to dividend changes while future earnings changes are consistent with the dividend information content hypothesis. This result suggests that the market did not understand the signal given by firms through dividend change announcements. As a result, we will give support to the dividend information content hypothesis, but only in what concerns the relationship between dividend changes and future earnings changes. Globally, we cannot support the dividend signalling hypothesis.

3. DATA AND METHODOLOGY

To date little is still known about dividend policy of firms operating outside the Anglo-American corporate governance system. In this context, we opt to analyse a small and data scarce European market: the Portuguese market. As the best of our knowledge, our study is the first to quantify the reaction of share prices around dividend change announcements, as well as the future earnings behaviour for this market.

A. Data

Using the *Dhatis* database, we identify all the dividend announcements of firms listed on the *Euronext Lisbon* (EL) between 1988 and 2002. Our sample includes dividend events (increases, no change and decreases) from 1989 to 2002. To be included in the final sample, the dividend announcements must satisfy the following criteria:

1) The firm is not a financial institution;
2) The firm is listed on EL the year before and two years after the dividend events. This criteria controls for firms being listed and de-listed from one year to the next and minimizes the survivorship bias;
3) The firm's financial data is available on *Dathis* database at the year before and two years after the dividend events;

4) The company paid an annual ordinary dividend in the current and previous year. This criteria excludes dividend initiation and omission events;
5) The company's earnings announcements or other contaminates announcements, such as stock splits, stock dividends and mergers did not occur within 5 trading days of the dividend announcement. This criterion is likely to free the sampling period of any contaminating or noisy announcement effects.

B. Methodology

The methodology entails mainly sensitivity, event studies and panel data analysis.

We employ a conventional event-study methodology when examining the stock market reaction to the event of a dividend announcement, assuming that dividends follow a random walk[2]. The annual dividend change corresponding to the dividend announcement is defined as the difference between the announced dividend in year t and the prior year dividend, scaled by the announcement day share price[3]:

$$\Delta D_{i,t} = \frac{D_{i,t} - D_{i,t-1}}{P_{i,0}} \qquad [3.1]$$

where:

$\Delta D_{i,t}$ = dividend change per share i for year t;
$D_{i,t}$ = dividend per share i announced in year t;
$P_{i,0}$ = price of share i in the announcement day.

To measure the market reaction to dividend change announcements we opt to consider the buy-and-hold abnormal returns (BHAR)[4], computed as the geometrically compounded (buy-and-hold) return on the share minus the geometrically compounded return on the market index. Therefore, the "buy-and-hold" abnormal return for share i from time *a* to *b* [$BHAR_{i\,(a\ to\ b)}$] generating model takes the following form:

$$BHAR_{i(a\,to\,b)} = \prod_{t=a}^{b}(1+R_{i,t}) - \prod_{t=a}^{b}(1+R_{m,t}) \qquad [3.2]$$

2 We define the dividend process to be a martingale, having the background in the reluctance to change dividends evidence, which assumes that managers are averse to change dividends unless they perceive substantial changes in the future economic situation of their firm.
3 Although deflating the dividend change by the prior dividend is not unusual, deflating by price is more prevalent in the literature and is likely to be a better measure. See Nissim (2003) for an extensive discussion of the merits of normalizing the change in dividends by price per share.
4 For some Portuguese firms and years, we do not have enough historical price data to calculate firm's beta and consider the market model.

where $R_{i,t}$ is the return for share i in day t and $R_{m,t}$ is the market return for day t. The time period *a* to *b* constitutes three trading days, t = -1, 0 +1, where t = 0 is the dividend announcement day in the stock exchange journal. The average abnormal returns are calculated as follows, where N is the number of observations:

$$\overline{BHAR} = \frac{1}{N}\sum_{i=1}^{N} \mathrm{BHAR}_i \qquad [3.3]$$

To explore the relation between the wealth effect and dividend changes, the market's reaction to dividend change announcements is regressed against dividend changes:

$$BHAR_{i,1to3} = \alpha + \beta_1 \text{ DI x } \Delta \text{ D}_{i,0} + \beta_2 \text{ DD x } \Delta\text{D}_{i,0} + \varepsilon_{i,t} \qquad [3.4]$$

where:

DI = dummy variable that takes value 1 if dividend increases and zero otherwise;

DD = dummy variable that takes value 1 if dividend decreases and zero otherwise;

$\varepsilon_{i,t}$ = error term.

We address the question of whether no change dividend announcements have influence on the cumulative abnormal return, being revealed by the constant term in regression [3.4]. The coefficients of primary interest are β_1 and β_2. If dividend changes convey information about firm's future prospective, we expect β_1 and β_2 to reflect a significant positive relationship between dividend change announcements and the magnitude of share price reactions to these announcements.

The hypothesis 2 concerns the firm's performance after dividend changes. The evidence suggest that annual earnings are well described as a random walk [Watts and Leftwich (1977), among others], so the average earnings changes for a random sample of firms are therefore expected to be zero and, consequently, the change in earnings measures unexpected profitability.

We express annual earnings changes as the difference between earnings[5] in year t and earnings in year t-1, scaled by the book value of equity at the end of year t-1[6]. So, the standardized change in earnings for share i in year t, $\Delta E_{i,t}$, is defined as:

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5 We use earnings before extraordinary items to eliminate the transitory components of earnings.

6 We scale earnings changes by the book value of equity in order to compare our results with the ones of Nissim and Ziv (2001) and Benartzi *et al.* (2005), among others. Moreover, see Nissim and Ziv (2001, pp. 2117) for an explanation of the merits of deflating the earning changes by the book value of equity.

$$\Delta E_{i,t} = \frac{(E_{i,t} - E_{i,t-1})}{BV_{i,t-1}} \quad [3.5]$$

where:

$E_{i,t}$ = earnings before extraordinary items for share i in year t;

$BV_{i,t-1}$ = book value of equity for share i at the end of year t-1.

In order to verify if the results of Nissim and Ziv (2001) and Benartzi *et al.* (2005) hold in our samples, we examine the relation between dividend changes and future earnings changes based on Nissim and Ziv (2001) model, considering the following regression:

$$\begin{aligned}(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ DI x } \Delta \text{ D}_{i,0} + \beta_2 \text{ DD x } \Delta \text{D}_{i,0} + \beta_3 ROE_{i,\tau-1} + \\ + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}\end{aligned} \quad [3.6]$$

where:

τ = 1 and 2;

$E_{i,\tau}$ = earnings before extraordinary items for share i in year τ relative to the dividend event year (year 0);

$ROE_{i,\tau-1}$ = return on equity for share i, calculated as $E_{i,\tau-1}/ BV_{i,\tau-1}$.

We expect a positive relationship between dividend change announcements and future earnings.

The regression includes the return on equity and past changes in earnings to control for the mean reversion of earnings. However, this regression assumes that the rate of mean reversion is uniform across all observations. In fact, these models assume that the relation between future earnings and past earnings levels and changes is linear, which is strongly criticized by Benartzi *et al.* (2005, pp.3) *"The assumption of linear mean reversion in earnings made by NZ is inappropriate"*[7]. To overcome the problem of the mean reversion process of earnings being highly non-linear, we use the modified partial adjustment model suggested by Fama and French (2000) and adopted recently by Benartzi *et al.* (2005) as a control for the non-linearity in the relation between future earnings changes and lagged earnings levels and changes. The model is the following[8]:

[7] In fact, prior empirical evidence indicates that the mean reversion process of earnings is highly non-linear [see Brooks and Buckmaster (1976) and Fama and French (2000)].

[8] The dummy variables and squared terms are designated to pick up the documented non-linearities in the mean reversion and autocorrelation of earnings. Specifically, these variables are meant to capture the fact that large changes in earnings revert faster than small changes and that negative changes revert faster than positive changes.

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \Delta D_{i,0} + \begin{pmatrix} \gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \\ \gamma_4 PDFED_0 * DFE_{i,0} \end{pmatrix} * DFE_{i,0} + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}) * CE_{i,0} + \varepsilon_{i,t} \quad [3.7]$$

where:

$DFE_{i,0}$ = $ROE_{i,0} - E[ROE_{i,0}]$;

$E[ROE_{i,0}]$ = fitted value from the cross-sectional regression of $ROE_{i,0}$ on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and $ROE_{i,-1}$;

$CE_{i,0}$ = $(E_{i,0} - E_{i,-1}) / BV_{i,-1}$;

$NDFED_0$ = dummy variable that takes value 1 if $DFE_{i,0}$ is negative and 0 otherwise;

$PDFED_0$ = dummy variable that takes value 1 if $DFE_{i,0}$ is positive and 0 otherwise;

$NCED_0$ = dummy variable that takes value 1 if $CE_{i,0}$ is negative and 0 otherwise;

$PCED_0$ = dummy variable that takes value 1 if $CE_{i,0}$ is positive and 0 otherwise.

To examine the negative relation between dividend change announcements and share price reactions in greater detail, we split the sample, considering two groups: 1) the events with a positive relationship between dividend changes and the market reaction (situation presented in the previous section as cells I and IV) and 2) the events with a negative relationship between those two variables (cells II and III). We will consider the BHAR to measure the market reaction to dividend change. Therefore, we will consider that there is a positive (negative) reaction to dividend change announcements if the BHAR in the period -1 to +1 is positive (negative).

To test H_3, associated with the events showing a positive relationship between dividend changes and the market reaction, we will consider the following regression:

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ PRDI x } \Delta D_{i,0} + \beta_2 \text{ NRDD x } \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t} \quad [3.8]$$

where:

PRDI = dummy variable that takes value 1 if there is a positive reaction to dividend increases and 0 otherwise;

NRDD = dummy variable that takes value 1 if there is a negative reaction to dividend decreases and 0 otherwise.

We expect β_1 and β_2 to be positive and statistically significant, reflecting a positive relation between dividend changes and future earnings.

According to what we have done before, we will we use the Fama and French modified partial adjustment model as a control for the non-linearity in the relation between future earnings changes and lagged earnings levels and changes:

$$\begin{aligned}(\mathrm{E}_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} &= \alpha + \beta_1 \ \mathrm{PRDI x}\,\Delta\,\mathrm{D}_{\mathrm{i,0}} + \beta_2 \ \mathrm{NRDD x}\,\Delta\,\mathrm{D}_{\mathrm{i,0}} \\ &+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * \mathrm{DFE}_{\mathrm{i,0}} \\ &+ \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * \mathrm{CE}_{\mathrm{i,0}} + \varepsilon_{i,t}\end{aligned} \qquad [3.9]$$

To test H_4, associated with the events showing a negative relationship between dividend changes and the market reaction, we will consider a regression similar to [3.8], with different dummies:

$$\begin{aligned}(\mathrm{E}_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} &= \alpha + \beta_1 \ \mathrm{NRDI\ x}\,\Delta\,\mathrm{D}_{\mathrm{i,0}} + \beta_2 \ \mathrm{PRDD\ x}\,\Delta\mathrm{D}_{\mathrm{i,0}} + \beta_3 ROE_{i,\tau-1} + \\ &+ \beta_4 \ (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}\end{aligned} \qquad [3.10]$$

where:

NRDI	=	dummy variable that takes value 1 if there is a negative reaction to dividend increases and 0 otherwise;
PRDD	=	dummy variable that takes value 1 if there is a positive reaction to dividend decreases and 0 otherwise.

We expect β_1 and β_2 to be negative and statistically significant, reflecting a negative relation between dividend changes and future earnings.

After, we run the following regression to control for the non-linearity in the relation between future earnings changes and lagged earnings levels and changes:

$$\begin{aligned}(\mathrm{E}_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} &= \alpha + \beta_1 \ \mathrm{NRDI x}\,\Delta\,\mathrm{D}_{\mathrm{i,0}} + \beta_2 \ \mathrm{PRDD x}\,\Delta\,\mathrm{D}_{\mathrm{i,0}} \\ &+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * \mathrm{DFE}_{\mathrm{i,0}} \\ &+ \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * \mathrm{CE}_{\mathrm{i,0}} + \varepsilon_{i,t}\end{aligned} \qquad [3.11]$$

We will compare results to verify if findings are different when controlling the non-linearity in the relation between future earnings changes and lagged earnings levels and changes.

4. EMPIRICAL RESULTS

Table 1 reports the number of dividend events classified by sample selection criteria as well as the dividend events by years. The initial sample (Panel A) contains 529 observations. The sample selection criteria resulted in a final sample of 380 events: 158 increases, 121 decreases and 101 no change observations. As we can see, Portugal is a small market, with a low number of listed firms and a reduced number of events[9].

The preponderance of dividend increases over no-change and decreases is consistent with prior results that firms are reluctant to cut dividends, such as Lintner (1956). However, we would like to emphasize the significant number of dividend decreases (31.84% of the events). If we compare the samples of several studies in different markets, we find that our percentages are similar to the ones of some emergent markets, such as Thailand and Korea, and not with Anglo-Saxon countries[10]. Schematically:

			Percentage of Dividends		
Study	Market	Period	Increases	No-Change	Decreases
Nissim and Ziv (2001)	USA	1963-1997	38.1	59.7	2.2
Abeyratna and Power (2002)	UK	1989-1993	75.0	15.7	9.3
Aivazian, Booth and Cleary (2003)	Thailand	1981-1990	47.0	22.6	30.4
	Korea	1981-1990	42.0	14.6	43.4

As Panel B exhibits, the most frequent year of dividend changes is 1989, with 26 increases, 16 no changes and 16 decreases. In the period 1997-1999 the dividend increases are higher that the other events, whereas the 2000-2002 period denotes a convergence in the number of the different type of events.

A. Relation between dividend change announcements and the market reaction

In order to verify whether dividend changes are associated with subsequent share price reactions in the same direction, we consider buy-and-hold returns. Table 2 provides, in Panel A, the market adjusted buy-and-hold returns for dividend announcements[11]. The results show that for the event period and the dividend no change announcements, we find a non-significant buy-and-hold abnormal return. This supports the hypothesis that

[9] We only have knowledge of two works that have smaller samples. They are the works of Gurgul, Majdosz and Mestel (2003) that analysed the Austrian market and have a sample of 74 dividend increases, 27 decreases and 74 no-change dividends and Travlos, Trigeorgis and Vafeas (2001) that analysed the case of dividend increases in the Cyprus market, with a sample of 41 increases.

[10] One possible explanation for these sample statistics may be the exposure of emerging and Portuguese markets to more economic risks.

[11] To evaluate the robustness of the results, we repeated the tests using market-adjust returns considering β=1 for all firms and the results were similar.

firms that leave their dividends unchanged communicate no significant new information to the market. In what concerns dividend change announcements, although dividend increases and decreases show, respectively, a positive and a negative return on the announcement period - which is the expected signal - the returns are only statistically significant for the case of dividend decreases, and at a 10% level. Regarding dividend decrease announcements, the results suggest that they convey relevant information to the market. However, the lack of reaction when dividend increases are announced can be due to the market illiquidity or to the concentration of the corporate ownership, which makes dividend announcements less relevant. These results suggest that dividend increase announcements contain less relevant information than do dividend decrease announcements. The market reaction asymmetry between dividend increase and decrease announcements was also found by several authors, such as Aharony and Swary (1980) and Nissim and Ziv (2001). In what concerns the other periods, dividend no changes has a significant value for the abnormal return in the period preceding the announcement date (-5 to -2), indicating market anticipation. The market reaction to dividend decrease announcements is reinforced in the period -2 to +2, since the abnormal return is significant at 1%, which suggests that the market reacts in the five days surrounding the announcement date. Finally, it seems that the market reacts later in the case of dividend increase announcements, since the BHAR value is statistically different from zero in the period (+2 to +5), which suggests the inefficiency of the market. These results suggest that the need to use dividends as a signalling device must be less pronounced in Portugal than in the US and UK (where the major number of studies found statistically significant abnormal returns), where corporate ownership is more dispersed and stock markets are more important, namely in the firms' financing. Although to-date little is still known about dividend policy of firms operating outside the Anglo-American corporate governance system, Goergen, Renneboog and Silva (2005) also find that in Germany, because of the concentrated ownership, firms may not need to use dividends as a signal. Our results also suggest that the Portuguese market can be nearer to developing countries than to US or UK markets, in accordance with the opinion of Aivazian, Booth and Cleary (2003), that conclude that the heavy reliance on bank financing and the relative small emphasis placed on external capital markets as a source of finance in developing economies alleviates the informational asymmetry problems and reduces the signalling value associated with dividends. Furthermore, in what concerns dividend decreases, it suggests that investors prefer dividends over capital gains, confirmed by evidence found, in the Portuguese market, by Fernandes and Martins (2002). These authors found that if firms decrease the payment of dividends, shareholders prefer to decline their consumption level instead of selling shares, which shows evidence of a preference for dividends over capital gains and gives support to the Shefrin and Statman (1984) conclusions.

Panel B presents the cross-sectional distribution of the three-day abnormal returns. Results show that 45.57% of the dividend increase events have negative excess returns which is consistent with several authors that have found a negative perverse relationship between dividend change announcements and share prices reactions [Asquith and Mullins (1983), Healy, Hathorn and Kirch (1997) and Dhillon, Raman and Ramírez (2003), who found percentages of, respectively, 31.9%, 42.5% and 43%]. For the case of dividend decreases, results show that 39.67% of these events have positive excess returns. Dhillon and Johnson (1994) and Sant and Cowan (1994) found, respectively, a percentage of 27% and 23.4% of the events with a positive reaction to dividend omission announcements. These results induce us for further research about the phenomenon of an inverse relationship between dividend changes and the share prices reaction.

In order to analyse the relation between the wealth effect and dividend changes, we regress the equation [3.4], which results are reported in Table 3[12]. As we are working with panel data, we report the pooled OLS, the fixed effect model (FEM) and the random effect model (REM) results as well as the F test and the Hausman's statistic results in order to choose the best model to work with. The best model is presented in bold.

Based on pooled OLS results, we can see that the cross-sectional regression confirms the event study results. The negative slope, which captures the effects of no change announcements, is not statistically significant, showing that a zero change in dividend by itself holds little useful information to the market. The coefficients for dividend changes are positive, reflecting a positive relationship between dividend change announcements and the magnitude of share price reactions to these announcements. These results suggest that the magnitude of the positive (negative) share price reaction increases with the intensity of the positive (negative) information being conveyed.

[12] We have repeated the tests using as dependent variable the market-adjust returns considering β=1 for all firms and the results were similar.

However, only the coefficient on dividend increases is statistically significant at 1% level. This result suggests that dividend increases convey useful information to the market. Consequently, we only reject the null hypothesis for dividend increases, supporting the dividend-signalling hypothesis only for this type of announcement. In what concerns the dividend decreases we cannot reject the null hypothesis and thus our results do not support this hypothesis. It seems that the market does not understand the signal given by firms through dividend decrease announcements, or, at least, does not react.

B. Relation between dividend change announcements and future earnings changes

In order to analyse the relation between dividend changes and future earnings changes, we consider the regression [3.6], which controls for the earnings change in the dividend change year. To examine whether dividend changes contain information on future earnings changes beyond the earnings change in the dividend change year, the change in earnings, deflated by the book value of equity[13] was considered as an additional control variable[14]. We start by estimating the Pearson correlations among the independent variables. Panel A of Table 4 presents the correlation matrix among the exogenous variables along with the statistical significance. Only the ROE is statistically correlated with the change in current earnings, but is still below 50%. Consequently, it does not appear to be sufficiently large to cause concern about multicollinearity problems. The pooled, FEM and REM results from the regression [3.6] is reported in Panel B. The best model for both periods, according to the F and the Hausman tests, is the FEM. We can see that, although the coefficients on dividend changes have the expected signal, they are not statistically significant, meaning that dividend change announcements have no influence in future earnings[15]. In both years (τ = 1 and 2), the coefficient on ROE is negative and significant, which means that ROE is an important predictor of earnings changes, in accordance with Freeman, Ohlson and Penman (1982). The coefficient on earnings changes is statistically insignificant for τ = 1 and 2, showing no evidence of recent earnings performance being predictive of future earnings performance.

[13] This can create influential observations when book value is close to zero. However, we do not have in our sample any case where book value is less than 10% of total assets.

[14] Since we identify dividend events (dividend increases, decreases, and no-change) in the years 1989 through 2002, and we have earnings data through 2002, the sample includes dividend events that occurred from 1989 to 2001 for τ = 1 and from 1989 through 2000 for τ = 2.

[15] Nissim and Ziv (2001) suggested that a possible explanation for the lack of correlation between dividend decreases and future earnings can be due to accounting conservatism. For more detail, see Nissim and Ziv (2001), pp. 2126.

Summarising the results obtained so far, we can see that for the Portuguese market, we could not reject the null hypothesis that dividend increases (decreases) are not associated with future earnings increases (decreases). Consequently, we are unable to find evidence supporting the dividend signalling hypothesis that dividend change announcements are positively related with future changes in earnings. These results are consistent with the findings of Watts (1973) and Benartzi, Michaely and Thaler (1997), as well as some recent studies, such as the ones of Grullon, Michaely and Swaminathan (2002) and Benartzi *et al.* (2005), all of them done in the US market.

Table 5 exhibits the re-estimated coefficients of the regression models using the Fama and French (2000) methods in order to overcome the problem of the mean reversion process of earnings being non-linear, according the regression [3.7]. When we consider dividend changes without distinguishing between dividend increases or decreases (Panel A), we find no evidence that the magnitude of dividend changes conveys information about future earnings. When dividend increases and decreases are treated separately (Panel B), the results show that only for the second year following the dividend changes (τ =2), the coefficient on dividend increases is statistically significant. Neither of the other coefficients on dividend changes is significantly different from zero. Accounting for non-linearities in the mean reversion process, leads to the conclusion that changes in dividends are not very useful in predicting future earnings changes. The results cannot give strong support to the assumption of dividend signalling hypothesis that dividend change announcements are positively related with future changes in earnings. These results are quite similar to the ones of Benartzi *et al.* (2005), who conclude that, after controlling for the non-linear patterns in the behaviour of earnings, dividend changes contain no information about future earnings.

In sum, our findings do not show a significant relationship between dividend change announcements and both the share price reactions and future earnings, so, we do not find support to the dividend signalling content hypothesis, which is consistent with some recent studies, such as those of DeAngelo, DeAngelo e Skinner (1996), Benartzi, Michaely and Thaler (1997) and Benartzi et al. (2005) and with the idea that in countries with concentrated ownership firms do not need to use dividends as a signal, like the results of Goergen, Renneboog and Silva (2005). Furthermore, we find that a significant percentage of events show a share price reaction opposite to the signal of *dividend changes, according Benesh, Keown and Pinkerton (1984), Dhillon and Johnson (1994) and Healy, Hathorn and Kirch (1997) evidence.*

C. Relation between dividend changes and future earnings changes, conditioned to the relation between dividend change announcements and the market reaction

To examine the negative relation between dividend change announcements and the market reaction in greater detail, we will split the sample according to the market reaction to dividend changes, considering two distinct groups: 1) the sub-sample of events with a positive relationship between dividend changes and the market reaction in the announcement period, i.e., a positive reaction to dividend increases (PRDI) and a negative reaction to dividend decreases (NRDD); 2) the sub-sample of events with a negative relationship between dividend changes and the market reaction, i.e., a negative reaction to dividend increases (NRDI) and a positive reaction to dividend decreases (PRDD). Table 6 reports the number of dividend change announcement events according the relationship between dividend change announcements and the share price reaction in the announcement period. Of the 279 dividend change announcement events, 159 events exhibit a direct relation between dividend changes and the BHAR, while the remainder 120 events show an inverse relation between the two variables. Approximately 57% of the events exhibit a positive relationship between dividend change announcements and the subsequent market reaction, which behaviour is consistent with the dividend signalling hypotheses (dividends containing information regarding the firm's future prospects). However, we find evidence of about 43% of dividend change events showing an inverse relationship between dividend change announcements and the market reaction in the 3 days surrounding the announcement day, the majority of which being dividend increases with negative BHAR. This evidence is in accordance with several authors results and confirms the need to examine these enigmatic situations.

C.1. Relation between dividend changes and future earnings changes for events with a positive relation between dividend changes and the market reaction

Following, we analyse the relationship between dividend changes and future earnings for the events with a positive relationship between dividend changes and the market reaction, in order to analyse hypothesis 3. According to the firth hypothesis, for firms whose market reaction following the dividend announcement are positively associated with dividend changes, it is expected a positive relation between dividend changes and future profitability, measured in terms of future earnings changes. We assume that if market reacts positively (negatively) to dividend increases (decreases), market expects future earnings to increase (decrease).

The pooled least squares, the FEM and the REM estimation results of regression [3.8] are shown in Table 7[16]. The best model for both periods is the FEM. The results exhibit a positive and significant coefficient, at the 5% level, on dividend increases (with subsequent positive market reaction) for both years, as predicted. This means that future earnings are positively related to dividend increases. Thus, the results concerning a positive reaction to dividend increases support hypothesis three and provides evidence for the dividend information content hypothesis. The coefficient on the negative reaction to dividend decreases is positive for $\tau = 1$, but negative for $\tau = 2$, contrary to what is expected. However, it is not statistically significant for neither the periods. This means that, although we observe a signalling effect related to the market reaction to dividend decreases, we cannot reject the null hypothesis associated with H_3 and, consequently, we do not find evidence supporting the dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings. The evidence that results are not symmetric for dividend increases and decreases is in accordance with Nissim and Ziv (2001) verification[17].

Table 8 shows the re-estimated coefficients of the regression models using the Fama and French (2000) methods, according to the regression [3.9], in order to overcome the problem of the mean reversion process of earnings being non-linear. Comparing the results from Table 7 to those of Table 8, we notice that the main difference occurs in the coefficient on a positive reaction to dividend increases, that is now only statistically significant for $\tau = 2$, which cancel some support to the signalling hypothesis, found before. Neither of the other coefficients has changed considerably, so, in global terms, the conclusions obtained before remain valid.

[16] For simplify reasons, we do not report the correlation matrix of the exogenous variables. Variables show low correlations. The higher correlation coefficients is between the ROE and the earnings changes in the announcement year for τ=1. The coefficient is around 75%. All the other correlation coefficients are below 25%. In general, the correlation coefficients do not appear to be sufficiently large to cause concern about multicollinearity problems.

[17] These authors found evidence of dividend increases associated with future profitability, measured in terms of earnings, whereas dividend decreases are not related to future profitability, after controlling for current profitability.

Overall, after controlling for the non-linear patterns in the behaviour of earnings, the results obtained do not allow us to reject the null hypothesis associated with H_3 for the majority of the coefficients. Consequently, although we observe a signalling effect related to the market reaction to dividend change announcements (positive relationship between dividend changes and share price changes in the 3 days contiguous to the announcement date), we find weak support to the hypothesis H_3. Therefore, the results provide weak evidence for the dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings.

C.2. Relation between dividend changes and future earnings changes for events with a negative relation between dividend changes and the market reaction

We analyse the relationship between dividend changes and future earnings for the events with a negative relationship between dividend changes and the market reaction, in order to test hypothesis 4. According to the fourth hypothesis, for firms whose market reaction in the dividend announcement period is negatively associated with the dividend change, it is expected a negative relation between dividend changes and future earnings changes. We assume that if market reacts negatively (positively) to dividend increases (decreases), market expects future earnings to decrease (increase).

The pooled least squares, the FEM and the REM estimation results of regression [3.10] are shown in Table 9[18]. The best model for both periods is the first one. The results exhibit a positive coefficient on dividend increases (with subsequent negative market reaction) for both years, contrary to what is expected. However, it is only marginally significant for $\tau = 2$, at the 10% level. Thus, although the market reacts negatively to dividend increases, the future earnings are consistent with the dividend information content hypothesis. This is an indication that the market did not understand the signal given by firms through dividend increase announcements. We have already reached to the same conclusion when we test the first hypothesis. For $\tau = 2$, we find evidence for the dividend signalling hypothesis for the relation between dividend changes and future earnings, but find no evidence for the dividend signalling hypothesis for the relation between dividend changes and share price movements in the announcement period.

[18] Once more, we do not report the correlation matrix of the exogenous variables. The higher correlation coefficients is between the ROE and the earnings changes in the announcement year for τ=1. The coefficient is around 50%. All the other correlation coefficients are below 22%. In general, the correlation coefficients do not appear to be sufficiently large to cause concern about multicollinearity problems.

The coefficient on the positive reaction to dividend decreases is negative for both years, as expected. However, it is only statistically significant for the first period, at the 10% level. This result suggests that, although dividends have decreased, investors forecast an increase in future earnings, and the market reacts according to this expectation, existing evidence of a signalling effect but contrary to the sign of dividends, which we have denominate by *inverse signalling effect*. Therefore, as we reject the null hypothesis associated with H_4 for the first year after the dividend change announcement, and earnings and dividends are negatively related, we give support to the inverse signalling effect, but only for $\tau = 1$, which can be interpreted as a capability to predict the future firm's prospects in the short term period.

Table 10 exhibits the re-estimated coefficients of the regression, according to the regression [3.11]. Comparing the results from Table 9 to those of Table 10, we notice that the main diference is that the coefficient on the negative reaction to dividend increases becomes now statistically significant for $\tau = 1$ and it becomes negative and insignificant for $\tau = 2$. The conclusion obtained before for $\tau = 2$ is now evidenced for $\tau = 1$, that, although the market reacts negatively to dividend increases, the future earnings are consistent with the dividend information content hypothesis, suggesting that the market did not understand the signal given by firms through dividend increase announcements. Neither of the other coefficients has changed considerably, so, the main conclusions obtained before remain valid.

To summarise, the results obtained after controlling for the non-linear patterns in the behaviour of earnings suggest no relation between future earnings and dividend changes, and thus, we find no evidence for the dividend signalling hypothesis. However, for one situation (NRDI, $\tau = 1$), the results exhibit evidence that, although the market reacts negatively to dividend changes, the future earnings are consistent with the dividend information content hypothesis, suggesting that the market did not understand the signal given by firms through dividend change announcements. Overall, we find no evidence of dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings for the events with a negative relation between dividend change announcements and the market reaction.

We would like to understand the reasons behind failing to document a negative relation between dividend changes and future earnings for the negative reaction do dividend increases for $\tau = 1$. The positive relation between the two variables is in accordance with the dividend signalling hypothesis, but the market reaction is contradictory[19].

5. CONCLUSIONS

In spite of the assumptions of the signalling hypothesis that dividend change announcements are positively correlated with share price reactions and future changes in earnings, many studies were unable to find a reliable link between dividend change announcements and future changes in earnings or return.

First, we analyse the relationship between dividend change announcements and share returns in the days surrounding the dividend change announcement. Second, we test the link between dividend change announcements and future earnings, controlling for the non-linear patterns in the behaviour of earnings. Our findings do not show a significant relationship between dividend change announcements and both the share and future earnings reactions, so, we do not find support to the dividend signalling content hypothesis, which is consistent with some recent studies, such as those of DeAngelo, DeAngelo e Skinner (1996), Benartzi, Michaely and Thaler (1997) and Benartzi *et al.* (2005). The results suggest that in countries with concentrated ownership firms do not need to use dividends as a signal, like the results of Goergen, Renneboog and Silva (2005). Furthermore, we find a significant percentage of events showing a share price reaction opposite to the signal of dividend changes.

Finally, we split the sample according the relationship between dividend change announcements and the subsequent market reaction, with the aim to analyse the enigmatic cases of a negative reaction between dividend changes and share price reactions. Our findings suggest that, for some of the events, the market did not understand the signal given by firms through dividend change announcements.

Globally, this paper does not support the dividend signalling content hypothesis.

[19] One possible reason for this to happen can be the fact that the market has wrongly interpreted the signal conveyed by managers. Another reason can be associated with the expected dividend. Healy, Hathorn and Kirch (1997) and Dhillon, Raman and Ramírez (2003) conclude that the payment of a larger than expected dividend may signal that the firm does not have any available investment opportunities that will sustain the earnings growth and the capital market would react negatively.

We would like to extent this work in three different paths. Firstly, we would like to analyse firm-specific factors that can help explaining the relationship between dividend changes and the subsequent market reaction, namely for the cases where the reaction is contrary to what is expected. Some authors, such as Ghosh and Woolridge (1988), Eddy and Seifert (1988), Mitra and Owers (1995) and Healy, Hathorn and Kirch (1997) documented the relationship between the valuation effect of dividend changes and firm-specific variables, such as the firm size and the magnitude of dividend change. Maybe this can be an explanation for the inverse relationship between dividend change announcements and subsequent share prices and earnings as well as the positive relation between dividend changes and future earnings for the negative reaction do dividend increases. Secondly, we suposse it will be interesting to test the relation between dividend changes and future earnings (hypothesis 2), considering different measures of future performance, such as operating performance, debt and liquidity ratios. This will allow us to address issues concerning the *window dressing* phenomenon and the maturity hypothesis suggested by Grullon, Michaely and Swaminathan (2002). Finally, we would try to extent the same approach to different European countries, such as France, Germany and the UK to compare our results and give further evidence on the dividend signalling hypotheses.

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Table 1

Sample Selection

This table reports the number of dividend events, classified by sample selection criteria (Panel A) as well as the frequency of dividend changes by year (Panel B). To be included in the final sample, a dividend announcement must satisfy the following criteria: 1) The firm is not a financial institution; 2) The firm is listed in the EL the year before and two years after the dividend events; 3) The firm's financial data is available on the *Dhatis* database at the year before and two years after the dividend events; 4) The company paid an annual ordinary dividend in the current and previous year; 5) The dividend, earnings or other potentially contaminating announcements did not occur within 5 trading days of each other.

Panel A: Sample	Dividend Increases	No Change	Dividend Decreases	Total
Total number of dividend events	210	139	180	529
Dividend events with other dividend types declaration events	4	5	8	17
Dividend events with firms not listed in the stock exchange the year before and two years after the events	40	24	44	108
Dividend events which earnings or other potentially contaminating announcements occurs within 5 days of the dividend change announcement	4	3	6	13
Dividend events with missing data	4	6	1	11
Total excluded dividend events	52	38	59	149
Total number of dividend events for analysis	**158**	**101**	**121**	**380**
Events Percentage (%)	**41.58**	**26.58**	**31.84**	**100.00**

Panel B: Frequency of dividend changes by year

Year	Dividend Increases		No Change		Dividend Decreases		Total for Year	
	Number	Percent. (%)	Number	Percent. (%)	Number	Percent. (%)	Number	Percent. (%)
1989	26	16.46	16	15.84	16	13.22	58	15.26
1990	21	13.29	5	4.95	14	11.57	40	10.53
1991	13	8.23	14	13.86	11	9.09	38	10.00
1992	12	7.59	9	8.91	15	12.40	36	9.47
1993	9	5.70	13	12.87	6	4.96	28	7.37
1994	5	3.16	6	5.94	11	9.09	22	5.79
1995	5	3.16	6	5.94	6	4.96	17	4.47
1996	6	3.80	6	5.94	4	3.31	16	4.21
1997	11	6.96	4	3.96	5	4.13	20	5.26
1998	14	8.86	3	2.97	6	4.96	23	6.05
1999	16	10.13	5	4.95	4	3.31	25	6.58
2000	9	5.70	7	6.93	8	6.61	24	6.32
2001	5	3.16	2	1.98	10	8.26	17	4.47
2002	6	3.80	5	4.95	5	4.13	16	4.21
Total	**158**	**100.00**	**101**	**100.00**	**121**	**100.00**	**380**	**100.00**

Table 2

Abnormal returns for the announcement period

This table reports the market-adjusted returns for the announcement and other periods (Panel A). Market-adjusted buy-and-hold returns for the dividend increases, dividend non-changes and dividend decreases events (1989 to 2002) are calculated for different event periods and are computed as follows:

$$BHAR_{i(a\ to\ b)} = \prod_{t=a}^{b} (1 + R_{i,t}) - \prod_{t=a}^{b} (1 + R_{m,t})$$

where $BHAR_{i\ (a\ to\ b)}$ = abnormal return for share i from time *a* to *b*, $R_{i,t}$ = return for share i in day t and $R_{m,t}$ market return for day t. The market return is based on the PSI-Geral Index, since is the only that covers the whole sample period. *t*-Statistics are calculated based on the cross-sectional variance in the mean abnormal return and are reported in parentheses. In Panel B we present the cross-sectional distribution of 3 day abnormal returns for dividend change announcements.

Panel A: BHAR mean for different periods

	Sample Size	Mean Days -5 to -2	Mean Days -2 to +2	Mean **Days -1 to +1**	Mean Days-5 to +5	Mean Days +2 to +5
Increases	N = 158	0.0042	0.0055	0.0034	0.0136**	0.0056***
		(1.233)	(1.361)	(1.172)	(2.389)	(1.804)
Non-Changes	N = 101	0.0077**	-0.0009	-0.0022	0.0101***	0.0045
		(2.148)	(-0.219)	(-0.638)	(1.790)	(1.277)
Decreases	N = 121	0.0000	-0.0108*	-0.0056***	-0.0074	-0.0019
		(-0.014)	(-2.648)	(-1.755)	(-1.376)	(-0.555)

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Panel B - Cross-sectional distribution of 3 day abnormal returns for dividend change announcements

	Dividend Increases			**Dividend Non-Changes**				**Dividend Decreases**		
Size of 3-day Abnormal Return (AR)	**Nº of Events**	**% of Events**	**Cum. % of Events**	**Nº of Events**	**% of Events**	**Cum. % of Events**	**Size of 3-day Abnormal Return (AR)**	**Nº of Events**	**% of Events**	**Cum. % of Events**
	N=158			**N=101**				**N=121**		
AR < -0.12	0	0.00	0.00	0	0.00	0.00	0.12 < AR	1	0.83	0.83
-0.12 ≤ AR < -0.06	3	1.90	1.90	7	6.93	6.93	0.06 < AR ≤ 0.12	5	4.13	4.96
-0.06 ≤ AR < -0.04	5	3.16	5.06	4	3.96	10.89	0.04 < AR ≤ 0.06	1	0.83	5.79
-0.04 ≤ AR < -0.02	19	12.03	17.09	7	6.93	17.82	0.02 < AR ≤ 0.04	15	12.40	18.18
-0.02 ≤ AR < 0.00	45	28.48	45.57	32	31.68	49.50	0.00 < AR ≤ 0.02	26	21.49	39.67
0.00 ≤ AR < 0.02	52	32.91	78.48	31	30.69	80.20	-0.02 < AR ≤ 0.00	44	36.36	76.03
0.02 ≤ AR < 0.04	20	12.66	91.14	12	11.88	92.08	-0.04 < AR ≤ -0.02	9	7.44	83.47
0.04 ≤ AR < 0.06	7	4.43	95.57	3	2.97	95.05	-0.06 < AR ≤ -0.04	12	9.92	93.39
0.06 ≤ AR < 0.12	5	3.16	98.73	5	4.95	100.00	-0.12 < AR ≤ -0.06	8	6.61	100.00
0.12 ≤ AR	2	1.27	100.00	0	0.00	100.00	AR ≤ -0.12	0	0.00	100.00
	158	100.00		101	100.00			121	100.00	

Table 3

Regression of market reaction on dividend changes

This table reports the regression of dividend changes on market's reaction. $BHAR_3$ is the buy and hold accumulated abnormal return on the 3-day period; $\Delta D_{i,t}$ is the dividend per share change for year t; DI is a dummy variable that takes value 1 if dividend increases and zero otherwise; DD is a dummy variable that takes value 1 if dividend decreases and zero otherwise. The table presents the results estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

$$BHAR_i = \alpha + \beta_1 \text{ DI x } \Delta \text{D}_{i,0} + \beta_2 \text{ DD x } \Delta \text{D}_{i,0} + \varepsilon_{i,t}$$

Coefficient	**Pooled OLS**	**FEM**	**REM**
Constant	**-0.001**		-0.001
	(-0.414)		(-0.217)
DI	**0.011***	0.014*	0.013
	(9.457)	(6.381)	(1.522)
DD	**0.007**	0.003	0.004
	(1.252)	(0.633)	(0.334)
N	380	380	380
Adjusted R^2	0.001	0.011	0.224
Test F	1.05		
Hausman Test		0.76	

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 4

Regression of earnings changes on dividend changes and correlation matrix

This table reports the estimation of a regression relating earnings changes to dividend changes and the correlations between the independent variables. Panel A presents the Pearson correlations between independent variables, for years τ =1 and τ =2 (year 0 is the event year). E_τ denotes earnings before extraordinary items in year τ; BV_{-1} is the book value of equity at the end of year -1; $\Delta D_{i,0}$ is the annual change in the cash dividend payment, scaled by the share price in the announcement day; DI is a dummy variable that takes the value 1 if dividend increases and 0 otherwise; DD is a dummy variable that takes the value 1 if dividend decreases and 0 otherwise; $ROE_{\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity at the end of year τ-1. Panel B presents the regression results estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

Panel A: Pearson correlations between independent variables (significance in parenthesis)

		τ = 1		
	$DI \times \Delta D_{i,0}$	$DD \times \Delta D_{i,0}$	$ROE_{i,\tau-1}$	$(E_{i,0}-E_{i,-1})/BV_{i,-1}$
$DI \times \Delta D_{i,0}$	1.000	0.038	0.012	-0.069
		(0.474)	(0.825)	(0.194)
$DD \times \Delta D_{i,0}$		1.000	0.043	0.029
			(0.424)	(0.589)
$ROE_{i,\tau-1}$			1.000	0.484*
				(0.000)
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$				1.000
		τ = 2		
	$DI \times \Delta D_{i,0}$	$DD \times \Delta D_{i,0}$	$ROE_{i,\tau-1}$	$(E_{i,0}-E_{i,-1})/BV_{i,-1}$
$DI \times \Delta D_{i,0}$	1.000	0.074	0.056	-0.003
		(0.173)	(0.302)	(0.958)
$DD \times \Delta D_{i,0}$		1.000	0.017	0.009
			(0.758)	(0.875)
$ROE_{i,\tau-1}$			1.000	0.298*
				(0.000)
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$				1.000

(Continue)

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 4

Regression of earnings changes on dividend changes and correlation matrix (continued)

Panel B:

$(E_{i,\tau} \quad E_{i,\tau \; 1})/BV_{\;1} = \alpha + \beta_1 \, DI \, x \, \Delta D_{i,0} + \beta_2 \, DD \, x \, \Delta D_{i,0} + \beta_3 ROE_{i,\tau \; 1} + \beta_4 (E_{i,0} \quad E_{i, \; 1})/BV_{i, \; 1} + \varepsilon_{i,t}$

Coefficient	Pooled OLS		FEM		REM	
			τ = 1			
Constant	0.028	**			0.048	*
	(2.537)				(2.694)	
DI x $\Delta D_{i,0}$	-0.019	**	**0.005**		0.001	
	(-2.302)		**(0.498)**		(0.053)	
DD x $\Delta D_{i,0}$	0.018		**0.035**		0.034	
	(0.497)		**(0.709)**		(0.490)	
$ROE_{i,\tau-1}$	-0.442	*	**-0.725**	*	-0.687	*
	(-3.587)		**(-4.578)**		(-8.931)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	-0.346	*	**0.055**		-0.008	
	(-2.765)		**(0.400)**		(-0.116)	
N	364		364		364	
Adjusted R^2	0.50		0.602		0.691	
Test F	2.11	*				
Hausman Test			62.09	*		
			τ = 2			
Constant	0.008				0.027	
	(0.992)				(1.458)	
DI x $\Delta D_{i,0}$	0.152	*	**0.053**		0.075	
	(2.642)		**(0.674)**		(0.585)	
DD x $\Delta D_{i,0}$	-0.041		**0.036**		0.02	
	(-0.681)		**(0.630)**		(0.210)	
$ROE_{i,\tau-1}$	-0.39	*	**-0.701**	*	-0.642	*
	(-3.947)		**(-4.618)**		(-9.373)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	0.129		**-0.106**		-0.022	
	(1.020)		**(-1.071)**		(-0.329)	
N	346		346		346	
Adjusted R^2	0.089		0.234		0.407	
Test F	1.78	*				
Hausman Test			79.5	*		

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 5

Regression of earnings changes on dividend changes using Fama and French Approach

This table reports the estimation of a regression relating earnings changes to dividend changes considering globally (Panel A) and with dividend increases and decreases treated separately (Panel B) using the Fama and French (2000) approach to predict expected earnings. E_τ denotes earnings before extraordinary items in year τ (year 0 is the event year); BV_{-1} is the book value of equity at the end of year -1; ΔD_t is the annual change in the cash dividend payment, scaled by the share price in the announcement day; ROE_τ is equal to the earnings before extraordinary items in year τ scaled by the book value of equity at the end of year τ; DFE_0 is equal to $ROE_0 - E[ROE_0]$, where $E[ROE_0]$ is the fitted value from the cross-sectional regression of ROE_0 on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and ROE_{-1}; CE_0 is equal to $(E_0 - E_{-1})/BV_{-1}$; $NDFED_0$ is a dummy variable that takes value 1 if DFE_0 is negative and 0 otherwise; $PDFED_0$ is a dummy variable that takes value 1 if DFE_0 is positive and 0 otherwise; $NCED_0$ is a dummy variable that takes value 1 if CE_0 is negative and 0 otherwise; $PCED_0$ is a dummy variable that takes value 1 if CE_0 is positive and 0 otherwise; DI (DD) is a dummy variable that takes the value 1 for dividend increases (decreases) and 0 otherwise. The regressions were estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

Panel A: $$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \Delta D_{i,0} + \begin{pmatrix} \gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \\ \gamma_4 PDFED_0 * DFE_{i,0} \end{pmatrix} * DFE_{i,0} + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}) * CE_{i0} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS	FEM		REM
		τ = 1		
Constant	**0.010**			0.011
	(1.206)			(0.810)
Dividend changes	**0.006**	0.024	**	0.013
	(0.837)	(2.073)		(0.497)
N	364	364		364
Adjusted R^2	0.597	0.614		0.680
Test F	1.19			
Hausman Test		68.74	*	
		τ = 2		
Constant	**-0.002**			-0.008
	(-0.194)			(-0.440)
Dividend changes	**0.018**	0.018		0.016
	(0.365)	(0.370)		(0.211)
N	347	347		347
Adjusted R^2	0.107	0.107		0.281
Test F	0.78			
Hausman Test		23.62	*	

(Continue)

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 5

Regression of earnings changes on dividend changes using Fama and French Approach (continued)

Panel B:

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ DI } \Delta \text{ D}_{i,0} + \beta_2 \text{ DD } \Delta \text{ D}_{i,0} + \begin{pmatrix} \gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \\ \gamma_4 PDFED_0 * DFE_{i,0} \end{pmatrix} * \text{DFE}_{i,0}$$
$$+ \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * \text{CE}_{i0} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS		FEM		REM
			τ = 1		
Constant	**0.009**				0.011
	(1.129)				(0.832)
DI x $\Delta D_{i,0}$	**0.008**		0.018		0.010
	(0.940)		(1.617)		(0.356)
DD x $\Delta D_{i,0}$	**-0.002**		0.056		0.027
	(-0.062)		(1.416)		(0.386)
N	364		364		364
Adjusted R^2	0.596		0.613		0.679
Test F	1.19				
Hausman Test			69.97	*	
			τ = 2		
Constant	**-0.005**				-0.005
	(-0.539)				(-0.306)
DI x $\Delta D_{i,0}$	**0.151**	*	0.050		0.106
	(3.402)		(0.574)		(0.762)
DD x $\Delta D_{i,0}$	**-0.055**		-0.006		-0.027
	(-0.817)		(-0.083)		(-0.264)
N	347		347		347
Adjusted R^2	0.108		0.052		0.256
Test F	0.76				
Hausman Test			23.24	*	

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 6

Sub Sample Selection

This table reports the number of dividend change announcement events for the Portuguese market, according the relationship between dividend change announcements and the share price reaction in the announcement period.

	Events	
	Number	**%**
Dividend increases with positive BHAR	86	54.43
Dividend increases with negative BHAR	72	*45.57*
Dividend increases	**158**	**100.00**
Dividend decreases with negative BHAR	73	60.33
Dividend decreases with positive BHAR	48	*39.67*
Dividend decreases	**121**	**100.00**
	279	
Dividend increases with positive BHAR	86	30.82
Dividend decreases with negative BHAR	73	26.16
Direct relation between dividend changes and BHAR	**159**	**56.99**
Dividend increases with negative BHAR	72	25.81
Dividend decreases with positive BHAR	48	17.20
Inverse relation between dividend changes and BHAR	**120**	**43.01**
Dividend increases with null BHAR	0	0.00
Dividend decreases with null BHAR	0	0.00
No relation between dividend changes and BHAR	**0**	**0.00**
Total of Dividend Change Announcement Events	**279**	**100.00**

Table 7

Regression of earnings changes on dividend changes for positive association between dividend change announcements and the subsequent market reaction

This table reports the estimation of a regression relating earnings changes to dividend changes for the sub sample of events whose market reaction is positively related with dividend changes. $E_{i,\tau}$ denotes earnings before extraordinary items in year τ (year 0 is the event year); $BV_{i,-1}$ is the book value of equity at the end of year -1; $\Delta D_{i,t}$ is the annual change in the cash dividend payment, scaled by the share price in the announcement day; PRDI (NRDD) is a dummy variable that takes the value 1 for a positive (negative) reaction to dividend increases (decreases) and 0 otherwise; $ROE_{i,\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity at the end of year τ-1. The regression results are estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ PRDI x } \Delta D_{i,0} + \beta_2 \text{ NRDD x } \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS		FEM		REM	
			τ = 1			
Constant	0.053	*			0.068	*
	(4.101)				(3.309)	
PRDI x $\Delta D_{i\,0}$	-0.017	**	**0.029**	**	0.019	
	(-2.413)		**(2.217)**		(0.705)	
NRDD x $\Delta D_{i\,0}$	0.090	***	**0.042**		0.055	
	(1.679)		**(1.092)**		(0.734)	
$ROE_{i.\tau-1}$	-0.637	*	**-0.879**	*	-0.831	*
	(-5.462)		**(-4.265)**		(-9.447)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	-0.207	***	**0.086**		0.027	
	(-1.794)		**(0.528)**		(0.339)	
N	152		152		152	
Adjusted R^2	0.603		0.666		0.785	
Test F	1.42	***				
Hausman Test			24.46	*		
			τ = 2			
Constant	0.001				0.023	
	(0.044)				(0.967)	
PRDI x $\Delta D_{i\,0}$	0.130	***	**0.136**	**	0.133	
	(1.907)		**(2.213)**		(1.173)	
NRDD x $\Delta D_{i\,0}$	-0.065		**-0.038**		-0.038	
	(-0.891)		**(-0.846)**		(-0.432)	
$ROE_{i.\tau-1}$	-0.386	**	**-0.761**	*	-0.695	*
	(-1.998)		**(-3.387)**		(-6.886)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	0.344	**	**-0.173**		0.007	
	(2.451)		**(-1.182)**		(0.082)	
N	147		147		147	
Adjusted R^2	0.182		0.441		0.600	
Test F	2.01	*				
Hausman Test			73.88	*		

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 8

Regression of earnings changes on dividend changes for positive association between dividend change announcements and the subsequent market reaction using Fama and French Approach

This table reports the estimation of a regression relating earnings changes to dividend changes for the sub sample of events whose market reaction is positively related with dividend changes. $E_{i,\tau}$ denotes earnings before extraordinary items in year τ (year 0 is the event year); $BV_{i,-1}$ is the book value of equity at the end of year -1; $\Delta D_{i,t}$ is the annual change in the cash dividend payment, scaled by the share price in the announcement day; $ROE_{i,\tau}$ is equal to the earnings before extraordinary items in year τ scaled by the book value of equity at the end of year τ; $DFE_{i,0}$ is equal to $ROE_{i,0} - E[ROE_{i,0}]$, where $E[ROE_{i,0}]$ is the fitted value from the cross-sectional regression of $ROE_{i,0}$ on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and $ROE_{i,-1}$; $CE_{i,0}$ is equal to $(E_{i,0} - E_{i,-1})/BV_{i,-1}$; $NDFED_0$ is a dummy variable that takes value 1 if $DFE_{i,0}$ is negative and 0 otherwise; $PDFED_0$ is a dummy variable that takes value 1 if $DFE_{i,0}$ is positive and 0 otherwise; $NCED_0$ is a dummy variable that takes value 1 if $CE_{i,0}$ is negative and 0 otherwise; $PCED_0$ is a dummy variable that takes value 1 if $CE_{i,0}$ is positive and 0 otherwise; PRDI (NRDD) is a dummy variable that takes the value 1 for a positive (negative) reaction to dividend increases (decreases) and 0 otherwise. The regression results are estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

$$(E_{i,\tau} \quad E_{i,\tau \; 1})/BV_{i, \; 1} = \alpha + \beta_1 \text{ PRDI x } \Delta D_{i,0} + \beta_2 \text{ NRDD x } \Delta D_{i,0}$$
$$+ (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}) * DFE_{i,0}$$
$$+ (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}) * CE_{i,0} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS	FEM	REM
		$\tau = 1$	
Constant	**-0.013**		-0.017
	(-0.930)		(-0.814)
PRDI x $\Delta D_{i.0}$	**-0.006**	0.028	0.021
	(-0.440)	(1.348)	(0.661)
NRDD x $\Delta D_{i.0}$	**0.015**	-0.004	0.008
	(0.527)	(-0.117)	(0.095)
N	152	152	152
Adjusted R^2	0.630	0.591	0.743
Test F	0.80		
Hausman Test		15.95	
		$\tau = 2$	
Constant	**-0.014**		0.001
	(-1.031)		(0.033)
PRDI x $\Delta D_{i.0}$	**0.130** *	0.100	0.109
	(3.016)	(1.197)	(0.911)
NRDD x $\Delta D_{i.0}$	**-0.074**	-0.028	-0.041
	(-0.941)	(-0.476)	(-0.442)
N	147	147	147
Adjusted R^2	0.247	0.298	0.571
Test F	1.15		
Hausman Test		26.54	

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 9

Regression of earnings changes on dividend changes for negative association between dividend change announcements and the subsequent market reaction

This table reports the estimation of a regression relating earnings changes to dividend changes for the sub sample of events whose market reaction is negatively related with dividend changes. $E_{i,\tau}$ denotes earnings before extraordinary items in year τ (year 0 is the event year). $BV_{i,-1}$ is the book value of equity at the end of year -1; $\Delta D_{i,t}$ is the annual change in the cash dividend payment, scaled by the share price in the announcement day; NRDI (PRDD) is a dummy variable that takes the value 1 for a negative (positive) reaction to dividend increases (decreases) and 0 otherwise; $ROE_{i,\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity at the end of year τ-1. The regression results are estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ NRDI x } \Delta D_{i,0} + \beta_2 \text{ PRDD x } \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS		FEM		REM	
			τ = 1			
Constant	**-0.008**				0.003	
	(-0.469)				(0.109)	
NRDI x $\Delta D_{i,0}$	**0.002**		-0.203		-0.057	
	(0.009)		(-0.569)		(-0.147)	
PRDD x $\Delta D_{i,0}$	**-0.142**	***	-0.038		-0.103	
	(-1.941)		(-0.319)		(-0.580)	
$ROE_{i,\tau-1}$	**0.021**		-0.204		-0.124	
	(0.104)		(-0.890)		(-0.661)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	**-0.244**		-0.407	**	-0.360	**
	(-0.903)		(-2.386)		(-2.382)	
N	116		116		116	
Adjusted R^2	0.006		0.016		0.355	
Test F	0.95					
Hausman Test			6.20			
			τ = 2			
Constant	**0.008**				0.038	
	(0.487)				(1.244)	
NRDI x $\Delta D_{i,0}$	**0.423**	***	-0.176		0.236	
	(1.812)		(-0.347)		(0.455)	
PRDD x $\Delta D_{i,0}$	**-0.044**		0.492	**	0.180	
	(-0.202)		(2.268)		(0.575)	
$ROE_{i,\tau-1}$	**-0.336**	**	-0.920	*	-0.672	*
	(-2.188)		(-3.393)		(-5.581)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	**-0.176**		0.116		0.042	
	(-1.394)		(0.758)		(0.210)	
N	105		105		105	
Adjusted R^2	0.062		0.142		0.378	
Test F	1.20					
Hausman Test			35.41	*		

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level

Table 10

Regression of earnings changes on dividend changes for negative association between dividend change announcements and the subsequent market reaction using Fama and French Approach

This table reports the estimation of a regression relating earnings changes to dividend changes for the sub sample of events whose market reaction is negatively related with dividend changes. $E_{i,\tau}$ denotes earnings before extraordinary items in year τ (year 0 is the event year); $BV_{i,-1}$ is the book value of equity at the end of year -1; $\Delta D_{i,t}$ is the annual change in the cash dividend payment, scaled by the share price in the announcement day; $ROE_{i,\tau}$ is equal to the earnings before extraordinary items in year τ scaled by the book value of equity at the end of year τ; $DFE_{i,0}$ is equal to $ROE_{i,0} – E[ROE_{i,0}]$, where $E[ROE_{i,0}]$ is the fitted value from the cross-sectional regression of $ROE_{i,0}$ on the log of total assets in year -1, the market-to-book ratio of equity in year -1, and $ROE_{i,-1}$; $CE_{i,0}$ is equal to $(E_{i,0} – E_{i,-1})/BV_{i,-1}$; $NDFED_0$ is a dummy variable that takes value 1 if $DFE_{i,0}$ is negative and 0 otherwise; $PDFED_0$ is a dummy variable that takes value 1 if $DFE_{i,}$ is positive and 0 otherwise; $NCED_0$ is a dummy variable that takes value 1 if $CE_{i,0}$ is negative and 0 otherwise; $PCED_0$ is a dummy variable that takes value 1 if $CE_{i,0}$ is positive and 0 otherwise; NRDI (PRDD) is a dummy variable that takes the value 1 for a negative (positive) reaction to dividend increases (decreases) and 0 otherwise. The regression results are estimated using pooled OLS, FEM and REM. The numbers in parentheses are the t-statistics corrected for heteroscedasticity using the White (1980) method. It reports the F test, a test for the equality of sets of coefficients, and the Hausman (1978) test, a test with H_0: random effects are consistent and efficient, versus H_1: random effects are inconsistent, in order to choose the most appropriate model.

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ NRDI x } \Delta D_{i,0} + \beta_2 \text{ PRDD x } \Delta D_{i,0} + (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}) * \text{DFE}_{i,0} + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}) * \text{CE}_{i,0} + \varepsilon_{i,t}$$

Coefficient	Pooled OLS		FEM		REM	
			τ = 1			
Constant	**-0.021**				-0.055	***
	(-1.188)				(-1.948)	
NRDI x $\Delta D_{i,0}$	**0.426**	**	0.646	**	0.614	***
	(2.005)		(2.444)		(1.700)	
PRDD x $\Delta D_{i,0}$	**-0.097**		-0.219	***	-0.205	
	(-1.200)		(-1.962)		(-1.288)	
N	116		116		116	
Adjusted R^2	0.194		0.231		0.520	
Test F	1.10					
Hausman Test			17.44	***		
			τ = 2			
Constant	**0.047**				0.057	
	(1.479)				(1.350)	
NRDI x $\Delta D_{i,0}$	**-0.044**		-0.863	**	-0.236	
	(-0.264)		(-2.182)		(-0.397)	
PRDD x $\Delta D_{i,0}$	**-0.001**		0.648	**	0.192	
	(-0.003)		(2.162)		(0.555)	
N	105		105		105	
Adjusted R^2	0.017		0.032		0.190	
Test F	0.49					
Hausman Test			6.05			

* Significantly different from zero at the 1% level
** Significantly different from zero at the 5% level
*** Significantly different from zero at the 10% level