THE PHENOMENON OF THE ADVERSE MARKET REACTION TO DIVIDEND CHANGE ANNOUNCEMENTS: NEW EVIDENCE FROM EUROPE

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ABSTRACT

The dividend policy is one of the most debated topics in the finance literature. According to the dividend signalling hypothesis, which has motivated a significant amount of theoretical and empirical research, dividend change announcements trigger share returns because they convey information about management's assessment on firms' future prospects. Consequently, a dividend increase (decrease) should be followed by an improvement (reduction) in a firm's value.

Although there are empirical evidence supporting the positive relationship between dividend change announcements and the subsequent share price reactions, some studies have not supported this idea. Furthermore, several studies found evidence of a significant percentage of cases where share prices reactions are opposite to the dividend changes direction, like the works of Asquith and Mullins (1983), Benesh, Keown and Pinkerton (1984), Born, Mozer and Officer (1988), Dhillon and Johnson (1994) Healy, Hathorn and Kirch (1997), and, more recently, Vieira (2005).

We introduce a new approach to investigate the relationship between the market reaction to dividend changes and future earnings changes with the purpose of understanding why the market sometimes reacts negatively (positively) to dividend increases (decreases). We find only weak evidence for the dividend information content hypothesis. The Portuguese results suggest that the adverse market reaction to dividend change announcements is basically due to the fact that the market does not understand the signal given by firms though dividend change announcements. Moreover, we find no evidence of the *inverse signalling effect*, except for the UK market. The results suggest that the UK market investors have more capability to predict future earnings than the investors of the Portuguese and the French markets.

Key Words: *Cash Dividends, Signalling Hypothesis, Adverse Market Reaction*

JEL Classification: G35, G32

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.

Although there are empirical evidence supporting the positive relationship between dividend change announcements and the subsequent share price reactions, some studies have not supported this idea. 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, find no evidence of a significant relationship between dividend announcements and share returns. Furthermore, several studies found evidence of a significant percentage of cases where share prices reactions are opposite to the dividend changes direction, like the works of Asquith and Mullins (1983), Benesh, Keown and Pinkerton (1984), Born, Mozer and Officer (1988), Dhillon and Johnson (1994) Healy, Hathorn and Kirch (1997), and, more recently, Vieira (2005).

Asquith and Mullins (1983) found evidence supporting the dividend information content hypothesis. However, they verified that about 32% of their sample firms showed a negative market reaction to dividend initiations. Afterwards, Benesh, Keown and Pinkerton (1984) and Born, Moser and Officer (1988) showed that in 20 to 60% of the cases, the market reacted positively to dividend decreases and negatively to their increases. Dhillon and Johnson (1994) and Healy, Hathorn and Kirch (1997) found evidence of this enigmatic behaviour in about 34% (for dividend initiations) and 27% (for omissions) of the cases in the first study, and 42.5% of the cases in the latter. Although Sant and Cowan (1994) have found a negative reaction to dividend omission announcements in the announcement period, the results show that almost 23.4% of the sample had a reverse reaction, with a positive reaction to dividend omission announcements. In two recent studies, about 43% [Dhillon, Raman and Ramírez (2003)] and 41.7% [Borokhovich *et al.* (2004)] of the dividend increase announcements are associated with an adverse market reaction.

Of all these authors, only Healy, Hathorn and Kirch (1997) tried to identify a possible explanation for this evidence, concluding that a firm's dividend yield, PER, debt/equity

ratio and current ratio have an effect on the probability that the capital market will react negatively to an initial dividend announcement, since firms whose market reaction was negative documented lower dividend yield ratio and PER and higher debt/equity ratio, current ratio and growth earnings before the announcement.

In this context, we think it might be an opportunity for research. We would like to combine tests that analyse simultaneously the relation between dividend change announcements and: a) the market reaction to dividend changes and b) future earnings changes, which allows us to compare the results of share price reaction surrounding the dividend announcements and examine the relation between dividend changes and contemporaneous as well as future earnings changes. Furthermore, we would like to give special attention to the enigmatic cases in which a market reacts negatively (positively) to dividend increases (decreases), since several authors found similar evidence, but have not attempted to explore it.

Globally, we find only weak evidence for the dividend information content hypothesis. The Portuguese results suggest that the adverse market reaction to dividend change announcements is basically due to the fact that the market does not understand the signal given by firms though dividend change announcements. Moreover, we find no evidence of the *inverse signalling effect*, except for the UK market. The results suggest that the UK market investors have more capability to predict future earnings than the investors of the Portuguese and the French markets.

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

2. HYPOTHESES

In this section, we will formulate the hypotheses in order to analyse the relation between dividend changes and future earnings, conditioned to the relation between dividend change announcements and the subsequent market reaction. Consequently, we start by splitting the sample in distinct groups, according the relationship between dividend change announcements and the subsequent market share reaction. The relationship

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

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

Relation between dividend changes and the market reaction

Cells I and IV are consistent with the dividend information content hypothesis. However, as noted above, some authors have found evidence that about a third of its sample have results lie in cells II and III.

In this context, we will focus on the cases where the market reacts differently than would be expected under the dividend information content hypothesis; that is, the enigmatic cases in which market reacts positively to a dividend decrease (cell II) and negatively to a dividend increase (cell III), trying to find reasons that can explain the negative relation between dividend change announcements and subsequent share price reactions in the 3 days surrounding the announcement day.

We start to examine separately the observations in cells I and IV: positive relationship between dividends and the market reaction (the cases expected by dividend signalling theory) and then we analyse the dividend change announcement observations in cells II and III: negative relationship between the two variables (the enigmatic cases).

HYPOTHESIS 1 – RELATION BETWEEN DIVIDEND CHANGES AND FUTURE EARNINGS FOR THE EVENTS WITH A POSITIVE RELATION BETWEEN DIVIDEND CHANGE ANNOUNCEMENTS AND THE MARKET REACTION

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

> *H_1: "For the events with a positive relation between dividend change announcements and the market reaction, future earnings are positively associated with current dividend changes"*

The underlying idea of this hypothesis is that market reacts positively to a dividend increase announcement and negatively to a dividend decrease announcement, according the assumptions of the dividend information content hypothesis. This suggests that

investors expect future earnings to increase, in the first situation and expect future earnings to decrease, in the latter situation. Thus, dividend changes and future earnings should be positively related.

If we fail to reject the null hypothesis associated with H_1, we will infer that, although we observe a signalling effect relating 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, concluding that dividends do not have, per se, the potential to convey information to the market. If we reject the null hypothesis associated with H_1, we can find a positive (hypothesis H_1) or a negative association between dividend change announcements and future earnings. If the first situation happens (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. Consequently, we find no evidence of dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings.

HYPOTHESIS 2 – RELATION BETWEEN DIVIDEND CHANGES AND FUTURE EARNINGS FOR THE EVENTS WITH A NEGATIVE RELATION BETWEEN DIVIDEND CHANGE ANNOUNCEMENTS AND THE MARKET REACTION

The second hypothesis is related to the events with a negative relation between dividend changes and the subsequent market reaction (cells II and III). We start on investigating possible reasons for this behaviour.

There may be three reasons for the market to react negatively to dividend increases (cell III). First, the market may wrongly interpret the signal conveyed by managers. Second, managers may be signalling falsely, but investors recognise this and react appropriately. Third, it can be the result of the differential tax treatment between dividends and capital gains. However, Elton and Gruber (1970), among other authors, investigated the

relationship between corporate dividend policy and investor tax rates and found that the market prefers dividends to capital gains.

Mozes and Rapaccioli (1998) and Abeyratna and Power (2002) found possible reasons for situations in cell II (a positive market reaction to dividend decrease announcements) to happen.

Mozes and Rapaccioli (1998) found evidence that small dividend decreases do not provide a negative signal about future earnings probably because small dividend decreases may represent an attempt to keep resources for future growth opportunities. This may be a possible reason for an inverse relationship between dividend decreases and the subsequent market reaction.

Abeyratna and Power (2002) suggested that dividend decreases may not be bad news to the market concerning firms' future earnings, as assumed by signalling theory, but rather reflect managers' decisions to solve firms' financial problems. Their suggestion follows their evidence of a significant improvement in profitability as well as financial and liquidity ratios in a sample of firms that had, in a certain period, decreases in both dividends and earnings. In this situation, a share price increase could occur in the dividend decrease announcement period.

Finally, we can find some reasons, which can lead to situations in both cells II or III.

Consistent with the maturity hypothesis suggested by Grullon, Michaely and Swaminathan (2002), a dividend increase announcement may transmit two types of news: good news, i.e., the firms' systematic risk decreased, and bad news, i.e., limited growth opportunities. The former will lead to a positive market reaction and the latter to a negative reaction. Depending on the relative importance, we can be in cell I or III.

Elfakhani (1995) suggests that the share price reaction to dividend signal is determined, jointly, by three factors: the expected content favourableness from the dividend signal (flat, good, bad or ambiguous), the sign of dividend change and the dividend-signalling role (confirmatory, clarificatory or unclear). He states that content favourableness dominates the sign of dividend change since their results show that dividend decreases (increases) signalling good (bad) news bring on positive (negative) market answer. If it happens, we can be either in cell II or III.

Even without analysts' dividend forecasts, the market must anticipate the dividends announced by the firms with a history of high earnings growth. According to Healy,

Hathorn and Kirch (1997), the payment of a larger than expected dividend (in the case of dividend increases) 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 (cell III). Inversely, a smaller than expected cut in dividends (for dividend decreases) may signal that the firms have available investment opportunities that will sustain the earnings growth and the capital market would react positively (cell II).

Another possible and important reason for situations II and III to happen was very recently pointed out by Dhillon, Raman and Ramírez (2003), who highlighted a possible sample misclassification arising from the use of naïve dividend models that does not really distinguish between expected and unexpected dividend changes, and propose the use of dividend expectations based on analysts' forecasts. Their results suggest that if the dividend increase is smaller than was forecasted by analysts, the market may react negatively, leading to cell III; and if the dividend decrease is smaller than forecast by analysts, the market may react positively, leading to cell II. No change dividends can also be associated with negative or positive market reaction, depending on the dividend forecasts[1].

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

> *H_2: "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_2, we will infer that dividend change announcements and the subsequent market reaction are negatively related, and future earnings are not associated with dividend change announcements. Consequently, we find no evidence of the dividend information content hypothesis in what concerns both the relationship between dividend change announcements and: a) the market

[1] We consider the dividend forecasts analysis very important, but unfortunately we do not have access to dividend expectations based on analysts' forecasts, so, we cannot control for dividend forecasts.

reaction and b) the future earnings changes. If we reject the null hypothesis associated with H_2, we can find a negative (hypothesis H_2) or a positive association between dividend change announcements and future earnings changes. If the first situation happens (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* because earnings changes are directly related with the market reaction. So, we will give support to the *inverse signalling effect*. Otherwise, the market reacts negatively to dividend changes while the relation between dividend changes and future earnings 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, since each one of these relations is necessary but not sufficient conditions for the dividend signalling.

3. SAMPLE SELECTION AND METHODOLOGY

In this section, we will identify which data we must collect as well as the methodology to be used in order to test the formulated hypotheses.

SAMPLE SELECTION

We based this study in the initial sample of a previous study done recently [Vieira (2005)]. The sample is drawn from dividend announcements of firms listed on the Euronext Lisbon (EL), Euronext Paris (EP) and London Stock Exchange (LSE). We obtain the data on *Bloomberg* and *Datastream* databases and, for the Portuguese sample, the *Dhatis* database.

We will split the sample used in Vieira (2005) according to the market reaction to dividend changes surrounding the announcement period, considering the groups defined in the previous section. We regard as the “buy-and-hold” abnormal return (BHAR) to

measure the market reaction to dividend change announcements. The BHAR for share i from time *a* to *b* [$BHAR_{i\ (a\ to\ b)}$] takes the following form:

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

The time period *a* to *b* constitutes three trading days from t = -1, 0 +1.

The UK firms usually announce both dividends and earnings simultaneously. Therefore, the UK sample is divided into six categories, according to the scheme presented below:

Announcement Type		**Dividends**		
		Increases	No-changes	Decreases
Earnings	Increases	DIEI	DNCEI	DDEI
	Decreases	DIED	DNCED	DDED

Type of events for the UK, according the relation between dividends and earnings

Thus, there are the following events: dividend increase-earnings increase (DIEI), dividend increase-earnings decrease (DIED), dividend no-change-earnings increase (DNCEI), dividend no-change-earnings decrease (DNCED), dividend decrease-earnings increase (DDEI), and dividend decrease-earnings decrease (DDED).

Table 1 reports the number of dividend change announcement events for the three samples. For the Portuguese sample, we observe that 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. For the French sample, the values are, respectively, of 297, 156 and 141, and finally, for the UK sample, the values are 2,935, 1,762 and 1,173.

The results indicate that, respectively in the Portuguese, the French and the UK sample, approximately 57%, 53% and 60% of the events exhibit a positive relationship between dividend change announcements and the subsequent market reaction (not all statistically significant), which behaviour is consistent with the dividend signalling hypotheses (dividends containing information regarding the firm's future prospects). However, the evidence shows that, respectively for the Portuguese, the French and the UK samples, of about 43%, 47% and 40% 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.

METHODOLOGY

Our samples are an unbalanced panel data. Employing the panel data methodology, we use the three common techniques for estimating models with panel data, which are the pooled ordinary least squares (OLS), the fixed effects model (FEM), and the random effects model (REM). Subsequently, we will use an F-statistic and the Hausman (1978) test to choose the most appropriate model for our samples. We present the standard errors corrected for heteroscedasticity and covariance, based on the White's (1980) heteroscedasticity consistent standard errors method.

A. Methodology to Test Hypothesis 1

To test H_1, we consider the following regression:

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_1 \text{ PRDI x } \Delta D_{i,0} + \beta_2 \text{ NRDD x } \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \\ + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t} \quad [2a]$$

where:

- $E_{i,\tau}$ = earnings before extraordinary items for share i in year τ relative to the dividend event year (year 0);
- τ = 1 and 2;
- 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;
- $BV_{i,-1}$ = book value of equity for share i at the end of year -1;
- $ROE_{i,\tau-1}$ = return on equity for share i, calculated as $E_{i,\tau-1}/ BV_{i,\tau-1}$.

For the UK market, we need to adapt the regression in order to contemplate the different relationships between dividend and earnings changes. Thus, the regression will be formulated in the following manner:

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A} \text{ PRDIEI x } \Delta D_{i,0} + \beta_{1B} \text{ PRDIED x } \Delta D_{i,0} + \\ + \beta_{2A} \text{ NRDDEI x } \Delta D_{i,0} + \beta_{2B} \text{ NRDDED x } \Delta D_{i,0} + \\ + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t} \quad [2b]$$

where:

- PRDIEI = dummy variable that takes value 1 if there is a positive reaction to both dividend and earnings increases and 0 otherwise;
- PRDIED = dummy variable that takes value 1 if there is a positive reaction to dividend increases and earnings decreases and 0 otherwise;
- NRDDEI = dummy variable that takes value 1 if there is a negative reaction

to dividend decreases and earnings increases and 0 otherwise;

NRDDED = dummy variable that takes value 1 if there is a negative reaction to both dividend and earnings 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.

The regression [2] assumes that the relation between future earnings and past earnings levels and changes is linear. Consequently, we use the modified partial adjustment model suggested by Fama and French (2000) 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:

$$\begin{aligned}(E_{i,\tau} - E_{i,\tau\ 1})/BV_{i,\ -1} &= \alpha + \beta_1\ \mathrm{PRDI}\,x\,\Delta D_{i,0} + \beta_2\ \mathrm{NRDD}\,x\,\Delta D_{i,0} \\ &+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * \mathrm{DFE}_{i,0} \\ &+ \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * \mathrm{CE}_{i,0} + \varepsilon_{i,t}\end{aligned} \qquad [3]$$

In addition, we will do a similar analysis, but considering the negative relationship between dividend change announcements and the subsequent market reaction (BHAR).

B. Methodology to Test Hypothesis 2

For the sub sample of events with a negative relationship between dividend changes and share prices in the announcement period, we have formulated the alternative hypothesis H_2. To test this hypothesis, we will consider the same regression model as in H_1, but with different dummy variables:

$$\begin{aligned}(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} &= \alpha\ + \beta_1\ \mathrm{NRDI}\ x\ \Delta D_{i,0} + \beta_2\ \mathrm{PRDD}\ x\ \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \\ &+ \beta_4\,(E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}\end{aligned} \qquad [4a]$$

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.

Once more, we adapt the regression for the UK market in order to consider the different relations between dividend and earnings changes. The regression is the following:

$$(\mathrm{E}_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A}\ \mathrm{NRDIEI\ x\ \Delta\ D_{i,0}} + \beta_{1B}\ \mathrm{NRDIED\ x\ \Delta\ D_{i,0}} + \\ + \beta_{2A}\ \mathrm{PRDDEI\ x\ \Delta D_{i,0}} + \beta_{2B}\ \mathrm{PRDDED\ x\ \Delta D_{i,0}} + \\ + \beta_3 ROE_{i,\tau-1} + \beta_4\ (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t} \qquad [4b]$$

where:

NRDIEI = dummy variable that takes value 1 if there is a negative reaction to both dividend and earnings increases and 0 otherwise;
NRDIED = dummy variable that takes value 1 if there is a negative reaction to dividend increases and earnings decreases and 0 otherwise;
PRDDEI = dummy variable that takes value 1 if there is a positive reaction to dividend decreases and earnings increases and 0 otherwise;
PRDDED = dummy variable that takes value 1 if there is a positive reaction to both dividend and earnings 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.

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

$$(\mathrm{E}_{i,\tau} - E_{i,\tau\ -1})/BV_{i,\ 1} = \alpha + \beta_1\ \mathrm{NRDI\ x\ \Delta\ D_{i,0}} + \beta_2\ \mathrm{PRDD\ x\ \Delta\ D_{i,0}} \\ + \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * \mathrm{DFE_{i,0}} \qquad [5] \\ + \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * \mathrm{CE_{i,0}} + \varepsilon_{i,t}$$

4. EMPIRICAL RESULTS

We present the empirical results according the hypotheses formulated in the precedent section. We start to examine the events with a positive relationship between dividend changes and the market reaction. Next, we analyse the enigmatic cases of dividend change announcement observations with a negative relationship between the two variables.

RESULTS OF THE FIRST HYPOTHESIS

In what follows, 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 test hypothesis 1.

The pooled OLS, the FEM and the REM estimation results of regression [2] are shown in Table 2. The best model for each particular sample and year is chosen according to the F statistic and the Hausman test, and is highlighted[2].

The Portuguese sample results exhibit a positive and significant coefficient, at the 5% level, on dividend increases (with subsequent positive market reaction) for both years. This means that future earnings are positively related to dividend increases. Thus, the results concerning a positive reaction to dividend increases support hypothesis H_1 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 both 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_1 and, consequently, we do not find evidence supporting the dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings. This evidence is in accordance with Nissim and Ziv (2001) verification, since 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.

The French sample results show a positive coefficient on the PRDI events for both years. However, it is not statistically significant for the two periods. Thus, we find no evidence supporting the dividend information content hypothesis for the dividend increase events. The coefficient on the negative reaction to dividend decreases is negative for the two periods, contrary to what is expected. However, it is only marginally significant for $\tau = 2$, at the 10% level. This means that, although we observe a signalling effect related to the market reaction to dividend decreases, the future earnings are not related to dividend changes, except for $\tau = 2$, but even in this period, they are only marginally related. Generally, we can say that we find no evidence

[2] To simplify, we do not report the correlation matrix of the exogenous variables, but it is available from authors upon request. Variables show low correlations. The higher correlation coefficients, for all the three markets, are between ROE and the earnings changes in the announcement year for $\tau=1$. The coefficient is around 75% in the Portuguese sample, approximately 70% in the French sample and is below 20% in the UK market. 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.

supporting the dividend information content hypothesis in what concerns the relationship between dividend changes and future earnings.

The UK sample results exhibit statistically insignificant values for all the coefficients on dividend increase events, and for both periods. Thus, we find no evidence supporting the dividend information content hypothesis for the dividend increase events in what concerns the relationship between dividend changes and future earnings. The fact that, for $\tau = 1$, the coefficient on PRDIEI is positive, while the coefficient on PRDIED is negative, although both not significant, could be an indication of a strong power of current earnings over current dividends in explaining the firm's future prosperity. Indeed, the coefficient on current earnings changes is negative and statistically significant at 1% level. This evidence is in agreement with our previous conclusions, as well as with Abeyratna and Power (2002) results, among others.

The coefficient on the negative reaction to dividend decreases and earnings increases is positive for the two periods, as expected, but it is only statistically significant for $\tau = 2$, at the 5% level. The coefficient on the negative reaction to both dividend and earnings decreases is also expected to be positive, but it is negative for the two periods, and statistically significant for $\tau = 1$, at the 1% level. We would like to try to understand the reasons behind failing to document a positive relation between dividend changes and future earnings for the NRDDED events. The fact that the coefficient on NRDDEI is positive, while the coefficient on NRDDED is negative for the two periods, could be again an indication of current earnings having a stronger power in explaining the firm's future prosperity than current dividends. In summary, the results for the dividend decrease events are not consistent. Although we observe a signalling effect related to the market reaction to dividend decreases, we only reject the null hypothesis associated with H_1 for two coefficients. For $\tau = 1$, we reject the null hypothesis associated with H_1 for the NRDDED events, but the relation between future earnings and dividend changes is negative, finding no support for the signalling hypothesis. For $\tau = 2$, we reject the null hypothesis for the NRDDEI events, finding a positive relation between future earnings and dividend changes, as expected, supporting, only for this events, the dividend information content hypothesis. In summary, we find weak evidence supporting the dividend information content hypothesis.

In Table 3 we show the re-estimated coefficients of the regression models using the Fama and French (2000) methods, according to the regression [3], in order to overcome the problem of the mean reversion process of earnings being non-linear. Comparing the results from Table 2 to those of Table 3, we notice that, globally, the results are quite similar. The main differences occur in the Portuguese and in the French markets. In the Portuguese sample, the coefficient on a positive reaction to dividend increases is now only statistically significant for $\tau = 2$, which cancel some support to the signalling hypothesis, found before. However, in the French sample, the coefficient on a positive reaction to dividend increases becomes now statistically significant for $\tau = 2$, at the 5% level, giving some support to the dividend signalling hypothesis. Neither of the other coefficients has changed considerably, so, in global terms, the conclusions obtained before remain valid. One interesting evidence is the fact that the three coefficients that are positive and statistically significant occurs always for $\tau = 2$, which is an indication that the information content effect reinforces over time.

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_1 for the majority of the coefficients. Only 3 of the 16 coefficients exhibit a positive and significant relation between future earnings and dividend changes (one for each country, and all for $\tau = 2$). 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_1. Therefore, in global terms, the results provide weak evidence for the dividend information content hypothesis.

After analysing the events for which the behaviour is consistent with the dividend signalling hypothesis in what concerns the relationship between dividend change announcements and the subsequent market reaction, we will evaluate the events with a reverse relation between these two variables.

RESULTS OF THE SECOND HYPOTHESIS

We analyse the relationship between dividend changes with a respective reverse market reaction and future earnings, in order to analyse hypothesis H_2.

The pooled OLS, the FEM and the REM estimation results of regression [4] are shown in Table 4. The best model for each particular sample and year is chosen according to the F statistic and the Hausman test, and is presented in bold[3].

The Portuguese sample results exhibit a positive coefficient on dividend increases with a 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, as we have already conclude previously, testing the first hypothesis. Although for $\tau = 2$ the results exhibit a statistically significant relation between dividend changes and future earnings, we find no evidence of the dividend signalling hypothesis for the relation between dividend changes and share price movements in the announcement period, so, in general terms, we cannot give support to the dividend signalling hypothesis.

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 denominated by *inverse signalling effect*. Therefore, as we reject the null hypothesis associated with H_2 (and earnings and dividends are negatively related) for the first year after the dividend change announcement, 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 a short term period.

For the case of the French sample, none of the coefficients on dividend changes is statistically significant. Thus, we do not reject the null hypothesis. As we find no evidence of a positive relation between dividend change announcements and the

[3] Once more to simplify, we do not report the correlation matrix of the exogenous variables. The higher correlation coefficients, for all the three markets, are between ROE and the earnings changes in the announcement year for $\tau=1$. The coefficient is around 50% in the Portuguese sample, below 50% in the French sample and about 22% in the UK market. All the other correlation coefficients are below 22%. Thus, the correlation coefficients do not appear to be sufficiently large to cause concern about multicollinearity problems.

subsequent market reaction as well as between dividend changes and future earnings, we give no support the dividend information content hypothesis.

The UK sample results exhibit a significant value for two coefficients: the one of a negative reaction to both dividend and earnings increases (NRDIEI) and the other of a positive reaction to dividend decreases and earnings increases (PRDDEI). The coefficient on NRDIEI is negative for $\tau = 1$, as expected, but positive for $\tau = 2$. The coefficient on PRDDEI is negative, as supposed, but only statistically significant for the first period. For $\tau = 1$, the rejection of the null hypothesis associated with H_2 for the NRDIEI and PRDDEI variables provide evidence for the *inverse signalling hypothesis*. For $\tau = 2$, the rejection of NRDIEI variable (positive signal) indicates that, although the relation between dividend changes and future earnings is consistent with the dividend signalling effect, the market reaction to dividend change announcements is inverse. This suggests that the market did not understand the signal given by the firms through the dividend change announcements.

The fact that, for $\tau = 1$, the coefficients on NRDIEI and PRDDEI are negative and significant, while they are positive for $\tau = 2$ (although only significant for the first case), could be an indication of a strong power of investors predicting the short term earnings behaviour over the long term. Indeed, future earnings changes are in accordance with market reaction for the first period, but in contrast with market reaction two years after the dividend and earnings change announcements. This evidence suggests that the investors' forecasting capability decays over time.

Table 5 shows the re-estimated coefficients using the Fama and French (2000) methods, according to the regression [5], in order to overcome the problem of the mean reversion process of earnings being non-linear. Comparing the results from Table 4 to those of Table 5, we notice that, globally, the results are quite similar. The two main differences occur in the Portuguese and in the UK markets.

In the case of the Portuguese sample, the coefficient on the negative reaction to dividend increases (NRDI) is no more statistically significant for $\tau = 2$, but becomes statistically significant for $\tau = 1$, being positive, contrary to the expected. 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. All the other coefficients are statistically not different from zero.

In the case of the UK sample, the coefficients that are now statistically significant are the two coefficients on the positive reaction to dividend decreases (PRDDEI and PRDDED), both negative (for $\tau = 1$) and the coefficient on NRDIEI, positive (for $\tau = 2$). The differences are that, for $\tau = 1$, NRDIEI is now statistically insignificant and the coefficient on PRDDED becomes significant. Neither of the other coefficients has changed considerably.

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_2 for the majority of the coefficients. Only 1 of the 4 coefficients, for the Portuguese sample, and 3 of the 8, for the UK market, are statistically significant. For the dividend decrease events in the UK market, we find some evidence of the inverse signalling hypothesis. For the dividend increases in the Portuguese market, it seems that the market do not understand the signal conveyed by firms' dividend policy.

5. CONCLUSIONS

To summarise the results obtained so far, we can conclude that:

- 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_1 for the majority of the coefficients. Consequently, we find, for all the 3 countries, only weak evidence for the dividend information content hypothesis. Moreover, the results show that these three coefficients are all statistically significant for $\tau = 2$, which is an indication that the information content effect reinforces over time;

- Testing the second hypothesis, the results obtained do not allow us to reject the null hypothesis associated with H_2 for the French market, providing no evidence for the dividend information content hypothesis. In what concerns the Portuguese market, the global results suggest no relation between future earnings and dividend changes. Moreover, the results suggest that occasionally the market did not understand the signal given by firms through dividend change announcements;

- We find no evidence of the *inverse signalling effect*, except for the UK market, where we find a weak support to the hypothesis that for the events with a negative relation between dividend change announcements and the market reaction, future earnings are negatively associated with current dividend changes.

Globally, the results suggest that the UK market investors have more capability to predict future earnings than the investors of the Portuguese and the French markets.

SUGGESTIONS FOR FUTURE RESEARCH

The issue of the information content of dividends is far from been solved. As Black (1976, p. 5) comments: *"What should corporations do about dividend policy? We don't know"*. Very recently, about the dividend subject, Chu and Partington (2005, p. 2) state that *"(…) this remains a controversial issue"*. Thus, the research in this domain of corporate finance is still not over.

The phenomenon of an inverse relationship between dividend changes and market reaction was not satisfactory explained with this study.

We would like to understand the reasons behind failing to document a negative relation between dividend changes and future earnings for some of the negative reaction to dividend increases (in the Portuguese and the UK samples). In these situations, the positive relation between the two variables is in accordance with the dividend signalling hypothesis, but the market reaction is contradictory. Beyond the possible reasons already displayed in section 2, we wonder if the adverse relation between dividend change announcements and the market reaction could be endorsed to the failure of the naïve dividend changes model rather than to a real adverse reaction to dividend changes. Consequently, and also for robustness reasons, we will try to consider, in spite of the dividend changes, the dividend forecasts, when computing unexpected dividend changes, and the dividend yield ratio, in order to see if the main conclusions are unchanged.

Furthermore, a possible path of future research might be the attempt to understand the reasons why the association between the future earnings and the dividend changes is negative, addressing this question by analysing the firm-specific variables that can influence this relationship.

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TABLES

Table 1 - Sample Selection

This table reports the sample for the Portuguese, the French and the UK samples, based on the study of Vieira (2005). It reports the number of dividend change announcement events, according to the relationship between dividend change announcements and the share price reaction in the announcement period.

Portugal		
	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**
France		
	Events	
	Number	**%**
Dividend increases with positive BHAR	127	54.04
Dividend increases with negative BHAR	108	*45.96*
Dividend increases	**235**	**100.00**
Dividend decreases with negative BHAR	29	46.77
Dividend decreases with positive BHAR	33	*53.23*
Dividend decreases	**62**	**100.00**
	297	
Dividend increases with positive BHAR	127	42.76
Dividend decreases with negative BHAR	29	9.76
Direct relation between dividend changes and BHAR	**156**	**52.53**
Dividend increases with negative BHAR	108	36.36
Dividend decreases with positive BHAR	33	11.11
Inverse relation between dividend changes and BHAR	**141**	**47.47**
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	**297**	**100.00**

(Continue)

Table 1 - Sample Selection (continued)

UK		
	Events	
	Number	**%**
DIEI with positive BHAR	1201	62.20
DIEI with negative BHAR	730	*37.80*
DIEI	**1,931**	**100.00**
DIED with positive BHAR	448	61.29
DIED with negative BHAR	283	*38.71*
DIED	**731**	**100.00**
DDEI with negative BHAR	46	42.59
DDEI with positive BHAR	62	*57.41*
DDEI	**108**	**100.00**
DDED with negative BHAR	67	40.61
DDED with positive BHAR	98	*59.39*
DDED	**165**	**100.00**
	2,935	
DIEI with positive BHAR	1,201	40.92
DIED with positive BHAR	448	15.26
DDEI with negative BHAR	46	1.57
DDED with negative BHAR	67	2.28
Direct relation between dividend changes and BHAR	**1,762**	**60.03**
DIEI with negative BHAR	730	24.87
DIED with negative BHAR	283	9.64
DDEI with positive BHAR	62	2.11
DDED with positive BHAR	98	3.34
Inverse relation between dividend changes and BHAR	**1,173**	**39.97**
DIEI with null BHAR	0	0.00
DIED with null BHAR	0	0.00
DDEI with null BHAR	0	0.00
DDED with null BHAR	0	0.00
No relation between dividend changes and BHAR	**0**	**0.00**
Total of Dividend Change Announcement Events	**2,935**	**100.00**

Table 2 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and 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; PRDIEI (PRDIED) is a dummy variable that takes value 1 for a positive reaction to dividend increases and earnings increases (decreases) and 0 otherwise; NRDDEI (NRDDED) is a dummy variable that takes value 1 for a negative reaction to dividend decreases and earnings 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 for each particular sample.

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

Portugal

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	*		

(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 2 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and subsequent market reaction (continued)

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

France						
Coefficient	**Pooled OLS**		**FEM**		**REM**	
			τ = 1			
Constant	0.011				0.028	**
	(0.641)				(2.201)	
PRDI x $\Delta D_{i,0}$	0.126		**0.678**		0.389	
	(0.067)		**(0.345)**		(0.300)	
NRDD x $\Delta D_{i,0}$	0.048		**-0.189**		-0.149	
	(0.257)		**(-0.930)**		(-0.295)	
$ROE_{i,\tau-1}$	-0.258		**-0.936**	*	-0.646	*
	(-1.051)		**(-4.775)**		(-4.065)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	-0.257		**-0.194**		-0.347	
	(-1.166)		**(-0.777)**		(-2.009)	
N	129		129		129	
Adjusted R^2	0.099		0.602		0.739	
Test F	3.18	*				
Hausman Test			48.75	*		
			τ = 2			
Constant	0.003				0.020	
	(0.165)				(1.494)	
PRDI x $\Delta D_{i,0}$	2.466		**1.195**		1.299	
	(1.248)		**(1.281)**		(0.894)	
NRDD x $\Delta D_{i,0}$	-0.208		**-0.335**	***	-0.337	
	(-0.749)		**(-1.961)**		(-0.552)	
$ROE_{i,\tau-1}$	-0.430		**-1.006**	*	-0.688	*
	(-1.654)		**(-3.227)**		(-5.187)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	0.018		**-0.628**	**	-0.358	**
	(0.088)		**(-2.469)**		(-2.419)	
N	108		108		108	
Adjusted R^2	0.123		0.560		0.751	
Test F	2.57	*				
Hausman Test			8.75	***		

(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 2 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and subsequent market reaction (continued)

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A}\ \text{PRDIEI x}\ \Delta D_{i,0} + \beta_{1B}\ \text{PRDIED x}\ \Delta D_{i,0} + \beta_{2A}\ \text{NRDDEI x}\ \Delta D_{i,0} + \beta_{2B}\ \text{NRDDED x}\ \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}$$

	UK		
Coefficient	**Pooled OLS**	**FEM**	**REM**
	τ = 1		
Constant	0.010		**0.007**
	(0.658)		**(0.423)**
PRDIEI x $\Delta D_{i,0}$	0.055	2.075	**1.241**
	(0.037)	(0.856)	**(0.573)**
PRDIED x $\Delta D_{i,0}$	-1.645	-0.048	**-0.630**
	(-0.629)	(-0.021)	**(-0.285)**
NRDDEI x $\Delta D_{i,0}$	1.495	6.457	**4.554**
	(0.573)	(1.281)	**(0.876)**
NRDDED x $\Delta D_{i,0}$	-3.617 **	-5.021 *	**-4.567** *
	(-2.327)	(-3.274)	**(-3.501)**
$ROE_{i,\tau-1}$	-0.084	-0.103	**-0.095** **
	(-1.128)	(-1.227)	**(-2.572)**
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	-0.251 *	-0.269 *	**-0.264** *
	(-2.856)	(-3.049)	**(-9.638)**
N	1,510	1,510	1,510
Adjusted R^2	0.068	0.103	0.355
Test F	1.13 ***		
Hausman Test		5.49	
	τ = 2		
Constant	**-0.010**		-0.007
	(-0.581)		(-0.326)
PRDIEI x $\Delta D_{i,0}$	**1.338**	2.976	2.001
	(0.595)	(1.171)	(0.667)
PRDIED x $\Delta D_{i,0}$	**0.297**	0.652	0.372
	(0.108)	(0.261)	(0.115)
NRDDEI x $\Delta D_{i,0}$	**6.560** **	2.927	5.341
	(2.118)	(0.637)	(0.808)
NRDDED x $\Delta D_{i,0}$	**-0.166**	-1.080	-0.576
	(-0.192)	(-1.340)	(-0.290)
$ROE_{i,\tau-1}$	**-0.042**	-0.121	-0.077 ***
	(-0.575)	(-1.407)	(-1.798)
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	**0.043**	-0.004	0.018
	(0.479)	(-0.050)	(0.528)
N	1,260	1,260	1,260
Adjusted R^2	0.001	0.065	0.193
Test F	0.83		
Hausman Test		7.54	

* 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 3 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and 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; PRDIEI (PRDIED) is a dummy variable that takes value 1 for a positive reaction to dividend increases and earnings increases (decreases) and 0 otherwise; NRDDEI (NRDDED) is a dummy variable that takes value 1 for a negative reaction to dividend decreases and earnings 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 for each particular sample.

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

Portugal

Coefficient	Pooled OLS		FEM	REM
			τ = 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	
			τ = 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	

(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 3 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and subsequent market reaction using Fama and French Approach (continued)

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

France

Coefficient	**Pooled OLS**		**FEM**		**REM**
			τ = 1		
Constant	0.012				0.012
	(1.486)				(0.957)
PRDI x $\Delta D_{i,0}$	1.172		**1.505**		1.458
	(0.660)		**(0.871)**		(1.131)
NRDD x $\Delta D_{i,0}$	0.074		**-0.245**		-0.186
	(0.287)		**(-1.002)**		(-0.370)
N	128		128		128
Adjusted R^2	0.252		0.590		0.742
Test F	2.36	*			
Hausman Test			81.64	*	
			τ = 2		
Constant	**-0.167**				-0.006
	(-1.398)				(-0.326)
PRDI x $\Delta D_{i,0}$	**4.096**	**	0.362		2.596
	(2.104)		(0.202)		(1.434)
NRDD x $\Delta D_{i,0}$	**-0.360**		-0.240		-0.575
	(-1.256)		(-0.789)		(-0.783)
N	108		108		108
Adjusted R^2	0.151		0.304		0.593
Test F	1.33				
Hausman Test			25.52	*	

(Continue)

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

Table 3 - Regression of earnings changes on dividend changes for positive association between dividend change announcements and subsequent market reaction using Fama and French Approach (continued)

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A}\,\text{PRDIEI x}\,\Delta D_{i,0} + \beta_{1B}\,\text{PRDIED x}\,\Delta D_{i,0} + \beta_{2A}\,\text{NRDIEI x}\,\Delta D_{i,0} + \beta_{2B}\,\text{NRDIED x}\,\Delta D_{i,0} + \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * DFE_{i,0} + \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * CE_{i,0} + \varepsilon_{i,t}$$

UK

Coefficient	Pooled OLS		FEM		REM	
	τ = 1					
Constant	-0.004				-0.017	
	(-0.331)				(-0.903)	
PRDIEI x $\Delta D_{i,0}$	-0.026		**1.148**		0.666	
	(-0.018)		**(0.468)**		(0.306)	
PRDIED x $\Delta D_{i,0}$	-1.296		**-0.275**		-0.669	
	(-0.484)		**(-0.117)**		(-0.302)	
NRDDEI x $\Delta D_{i,0}$	1.053		**7.793**		4.785	
	(0.405)		**(1.505)**		(0.917)	
NRDDED x $\Delta D_{i,0}$	-3.468	**	**-4.565**	*	-4.222	*
	(-2.472)		**(-2.888)**		(-3.172)	
N	1,507		1,507		1,507	
Adjusted R^2	0.065		0.106		0.279	
Test F	1.15	**				
Hausman Test			26.46	**		
	τ = 2					
Constant	**0.012**				0.018	
	(0.699)				(0.762)	
PRDIEI x $\Delta D_{i,0}$	**1.138**		3.916		2.041	
	(0.506)		(1.630)		(0.688)	
PRDIED x $\Delta D_{i,0}$	**0.701**		1.424		0.755	
	(0.245)		(0.482)		(0.235)	
NRDDEI x $\Delta D_{i,0}$	**6.434**	**	5.963		5.890	
	(2.015)		(1.047)		(0.901)	
NRDDED x $\Delta D_{i,0}$	**-0.406**		-2.580		-1.236	
	(-0.433)		(-2.137)		(-0.613)	
N	1,246		1,246		1,246	
Adjusted R^2	0.012		0.019		0.197	
Test F	0.91					
Hausman Test			72.40	*		

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

Table 4 - Regression of earnings changes on dividend changes for negative association between dividend change announcements and 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; NRDIEI (NRDIED) is a dummy variable that takes value 1 for a negative reaction to dividend increases and earnings increases (decreases) and 0 otherwise; PRDDEI (PRDDED) is a dummy variable that takes value 1 for a positive reaction to dividend decreases and earnings 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 for each particular sample.

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

Portugal

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	*		

(Continue)

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

Table 4 - Regression of earnings changes on dividend changes for negative association between dividend change announcements and subsequent market reaction (continued)

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

France						
Coefficient	**Pooled OLS**		**FEM**		**REM**	
			τ = 1			
Constant	0.002				0.013	
	(0.360)				(1.535)	
NRDI x $\Delta D_{i,0}$	0.214		**0.153**		0.154	
	(1.303)		**(0.785)**		(0.662)	
PRDD x $\Delta D_{i,0}$	-0.062	***	**-0.197**		-0.166	
	(-1.715)		**(-0.793)**		(-0.767)	
$ROE_{i,\tau-1}$	-0.131	***	**-0.485**	*	-0.363	*
	(-1.675)		**(-3.723)**		(-3.894)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	-0.236	***	**-0.414**	*	-0.402	*
	(-1.958)		**(-6.478)**		(-5.356)	
N	127		127		127	
Adjusted R^2	0.097		0.655		0.802	
Test F	3.95	*				
Hausman Test			11.60	**		
			τ = 2			
Constant	0.023				0.020	**
	(1.598)				(2.389)	
NRDI x $\Delta D_{i,0}$	0.183		**-0.047**		-0.023	
	(0.724)		**(-0.454)**		(-0.084)	
PRDD x $\Delta D_{i,0}$	-0.009		**-0.063**		-0.073	
	(-0.035)		**(-0.573)**		(-0.242)	
$ROE_{i,\tau-1}$	-0.533	**	**-0.400**	*	-0.447	*
	(-2.200)		**(-3.793)**		(-5.273)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	0.070		**-0.102**		-0.074	
	(0.556)		**(-0.877)**		(-0.821)	
N	101		101		101	
Adjusted R^2	0.353		0.734		0.858	
Test F	3.37	*				
Hausman Test			12.15	**		

(Continue)

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

Table 4 - Regression of earnings changes on dividend changes for negative association between dividend change announcements and subsequent market reaction (continued)

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A}\ \text{NRDIEI x}\ \Delta D_{i,0} + \beta_{1B}\ \text{NRDIED x}\ \Delta D_{i,0} + \beta_{2A}\ \text{PRDDEI x}\ \Delta D_{i,0} + + \beta_{2B}\ \text{PRDDED x}\ \Delta D_{i,0} + \beta_3 ROE_{i,\tau-1} + \beta_4 (E_{i,0} - E_{i,-1})/BV_{i,-1} + \varepsilon_{i,t}$$

UK					
Coefficient	**Pooled OLS**		**FEM**		**REM**	
			τ = 1			
Constant	**0.020**				0.025	
	(1.127)				(1.041)	
NRDIEI x $\Delta D_{i,0}$	**-3.943**	***	-2.642		-3.260	
	(-1.764)		(-1.553)		(-1.148)	
NRDIED x $\Delta D_{i,0}$	**-1.959**		5.268		1.819	
	(-0.522)		(1.033)		(0.369)	
PRDDEI x $\Delta D_{i,0}$	**-8.159**	**	-7.472	**	-7.613	*
	(-2.437)		(-2.166)		(-4.630)	
PRDDED x $\Delta D_{i,0}$	**-0.186**		-1.269	***	-0.645	
	(-0.294)		(-1.658)		(-0.469)	
$ROE_{i,\tau-1}$	**-0.137**	***	-0.261	*	-0.215	*
	(-1.755)		(-2.708)		(-5.393)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	**-0.045**		-0.094		-0.079	**
	(-0.556)		(-1.349)		(-2.409)	
N	1,029		1,029		1,029	
Adjusted R^2	0.036		0.073		0.374	
Test F	1.09					
Hausman Test			15.43	**		
			τ = 2			
Constant	**-0.038**	***			-0.040	
	(-1.816)				(-1.510)	
NRDIEI x $\Delta D_{i,0}$	**7.547**	*	8.285	*	7.655	**
	(3.124)		(2.766)		(2.071)	
NRDIED x $\Delta D_{i,0}$	**-0.162**		2.168		0.641	
	(-0.041)		(0.588)		(0.109)	
PRDDEI x $\Delta D_{i,0}$	**0.262**		-1.192		-0.464	
	(0.051)		(-0.651)		(-0.191)	
PRDDED x $\Delta D_{i,0}$	**-0.255**		-3.655	**	-1.545	
	(-0.327)		(-2.112)		(-0.879)	
$ROE_{i,\tau-1}$	**-0.090**		-0.126		-0.105	**
	(-1.078)		(-1.276)		(-2.209)	
$(E_{i,0}-E_{i,-1})/BV_{i,-1}$	**-0.009**		-0.085		-0.054	
	(-0.106)		(-0.955)		(-1.439)	
N	882		882		882	
Adjusted R^2	0.003		0.008		0.344	
Test F	0.98					
Hausman Test			6.55			

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

Table 5 - Regression of earnings changes on dividend changes for negative association between dividend change announcements and 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; NRDIEI (NRDIED) is a dummy variable that takes value 1 for a negative reaction to dividend increases and earnings increases (decreases) and 0 otherwise; PRDDEI (PRDDED) is a dummy variable that takes value 1 for a positive reaction to dividend decreases and earnings 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 for each particular sample.

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

Portugal

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			

(Continue)

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

Table 5 - Regression of earnings changes on dividend changes for negative association between dividend change announcements and subsequent market reaction using Fama and French Approach (continued)

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

France			
Coefficient	**Pooled OLS**	**FEM**	**REM**
	τ = 1		
Constant	0.003		**-0.002**
	(0.629)		**(-0.274)**
NRDI x $\Delta D_{i,0}$	0.040	0.174	**0.131**
	(0.183)	(1.040)	**(0.551)**
PRDD x $\Delta D_{i,0}$	-0.061	-0.245	**-0.211**
	(-1.268)	(-1.172)	**(-0.950)**
N	127	127	127
Adjusted R^2	0.122	0.692	0.800
Test F	4.20 *		
Hausman Test		17.78	
	τ = 2		
Constant	-0.001		**0.009**
	(-0.186)		**(0.747)**
NRDI x $\Delta D_{i,0}$	0.250	-0.301 **	**-0.112**
	(0.734)	(-2.618)	**(-0.391)**
PRDD x $\Delta D_{i,0}$	-0.006	-0.168	**-0.028**
	(-0.021)	(-1.150)	**(-0.088)**
N	101	101	101
Adjusted R^2	0.029	0.737	0.860
Test F	5.53 *		
Hausman Test		10.96	

(Continue)

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** 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 for negative association between dividend change announcements and subsequent market reaction using Fama and French Approach (continued)

$$(E_{i,\tau} - E_{i,\tau-1})/BV_{i,-1} = \alpha + \beta_{1A}\,\text{NRDIEI x}\,\Delta D_{i,0} + \beta_{1B}\,\text{NRDIED x}\,\Delta D_{i,0} +$$
$$+ \beta_{2A}\,\text{PRDIEI x}\,\Delta D_{i,0} + \beta_{2B}\,\text{PRDIED x}\,\Delta D_{i,0} +$$
$$+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 * DFE_{i,0} + \gamma_4 PDFED_0 * DFE_{i,0}\right) * DFE_{i,0}$$
$$+ \left(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 * CE_{i,0} + \lambda_4 PCED_0 * CE_{i,0}\right) * CE_{i,0} + \varepsilon_{i,t}$$

UK			
Coefficient	**Pooled OLS**	**FEM**	**REM**
	τ = 1		
Constant	-0.017		-0.043
	(-0.908)		(-1.590)
NRDIEI x $\Delta D_{i,0}$	-3.296	**-2.365**	-2.632
	(-1.436)	**(-1.314)**	(-0.960)
NRDIED x $\Delta D_{i,0}$	-1.072	**6.955**	3.381
	(-0.296)	**(1.483)**	(0.709)
PRDDEI x $\Delta D_{i,0}$	-8.533 **	**-9.408** **	-8.813 *
	(-2.494)	**(-2.532)**	(-5.488)
PRDDED x $\Delta D_{i,0}$	-0.579	**-1.879** **	-1.218
	(-0.807)	**(-2.200)**	(-0.909)
N	1,029	1,029	1,029
Adjusted R^2	0.083	0.165	0.429
Test F	1.23 **		
Hausman Test		41.73 *	
	τ = 2		
Constant	**-0.032**		-0.059 ***
	(-1.367)		(-1.907)
NRDIEI x $\Delta D_{i,0}$	**6.036** **	8.563 *	6.897 ***
	(2.330)	(2.658)	(1.863)
NRDIED x $\Delta D_{i,0}$	**0.383**	4.137	2.149
	(0.101)	(1.103)	(0.369)
PRDDEI x $\Delta D_{i,0}$	**0.259**	0.086	0.392
	(0.052)	(0.039)	(0.162)
PRDDED x $\Delta D_{i,0}$	**-0.635**	-2.505	-1.346
	(-0.722)	(-1.361)	(-0.766)
N	882	882	882
Adjusted R^2	0.018	0.021	0.355
Test F	1.01		
Hausman Test		27.43 *	

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