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Content

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Abstract

In this paper, we test the information content of dividends (ICD) hypothesis for Norwegian non-listed firms, to explore whether dividend changes have positive relationship with future earnings. After applying both linear and nonlinear models, we find it difficult to support the ICD hypothesis for Norwegian non-listed firms, including large and small firms. Since there is a tax reform during 2004 to 2006 in Norway, we test the ICD hypothesis separately in two different tax systems as well as in certain years with transitionary rules. The results demonstrate that dividend decreases negative relate with further earnings in new tax system and ICD valid for small firms in 2001 and for the entire sample in 2005.

Key words: Dividend changes, ICD hypothesis, tax reform, ROE, future earnings

1. Introduction

Miller and Modigliani (1961) develop the information content of dividends (ICD) hypothesis, dividend increases convey positive information about future earning and profitability while dividend decreases convey negative information. Many researchers have done empirical tests on this hypothesis and some results show support for it, while some find little or no evidence to support it.

As one of the most important issues in corporate finance, the ICD hypothesis is discussed frequently, but most of the reports focus on the US market rather than other countries. Considering that the market environments what companies face, such as regulatory regimes, economic and tax policies, are quite different in Norway from those in the United States, we believe that it is worthwhile to test the hypothesis in Norwegian market. An additional motivation for this study was given by the 2004-2006 Norwegian tax reform. This constitutes a significant opportunity to explore the ICD hypothesis in the same market, but under different dividend taxation systems. Furthermore, we focus on a sample of mainly private firms, which represents a significant departure from the approach used in most previous papers on the subject.

In this paper, we focus on testing the ICD hypothesis for Norwegian non-listed firms from 1994 to 2009, aiming to find whether there is a significant positive relationship between dividend changes and further earnings. Taking into account the effects of firm size on dividends policy, we also test the ICD hypothesis on different firm sizes: the large Norwegian firms and small Norwegian firms. Additionally, as we mentioned before, the Norwegian government issued new tax policies from 2004 to 2006 with the effect of increasing the marginal tax rate on dividend income. This reform influenced the policies of dividend payment significantly, hence we test the ICD hypothesis in different periods based on the different tax systems: 1998-2003 and 2006-2009 respectively, and also investigate the hypothesis in 2001, 2004 and 2005 in which certain transitionary rules were implemented.

We begin by using model equations similar to those employed by Nissim and Ziv (2001), the basic model analysis and the asymmetric analysis for dividend increases and dividend decreases. The models employed by Nissim and Ziv (2001) assume that the process and the autocorrelation of earnings is linear, but some scholars argue that the mean reversion process and the autocorrelation of earning are nonlinear. Therefore, we also employ the nonlinear model equation suggested by Grullon et al. (2005) in order to control for the problem of nonlinearity of earnings. In all the models, all the regression coefficients are estimated by using the Fama and Macbeth (1973) procedure.

We cannot find evidence to support the ICD hypothesis for non-listed Norwegian firms in the whole period, nor for large or small Norwegian firms under both the linear and nonlinear models. The results also indicate that the ICD hypothesis is not valid in both two different periods, but valid in 2001 for small firms and in 2005 for non-listed market.

Our paper is organized as follows. Section 2 introduces the relevant theories regarding the ICD hypothesis, and some articles about dividend changes as a signal of firm performance. Section 3 reports our sample selection and data description. In Section 4, we test the ICD hypothesis for Norwegian non-listed firm using both a linear model and nonlinear model of earnings expectations and then analyze the regression results. Section 5 presents the conclusions of our study. In the Appendix, we show the many variable measurement procedures in our tests.

2. Literature Review

Many researchers and market practitioners believe that dividend policies convey informational content regarding firm's expected profitability, they provide many important theoretical (e.g. Miller and Rock, 1985)) and empirical results supporting the hypotheses (e.g. Nissim and Ziv, 2001). However, some scholars report different findings through actual tests of the relationship between dividend changes and future earnings changes, e.g. Benartzi, Michaely and Thaler (1997).

2.1 Theoretical Framwork

2.1.1 Dividend payment modeling

Dividend payment modeling work begins with Lintner's (1956) ground-breaking study, he documents that "*major changes in earnings or levels of earnings "out of line" with existing dividend rates were the most important determinants of the company's dividend decisions"(Lintner,1956,101),* which means the main determinants of changes in dividend are current earnings and preceding dividend level. Additionally, in Lintner (1956)'s study, "*the managements generally believed that, their fiduciary responsibilities and standards of fairness required them to distribute part of any substantial increase in earnings to the stockholders in dividends unless there were other compelling reasons to the contrary" (Lintner, 1956, 100),* it implies firms increase their dividends only when managements are confident that increased earnings would be sustained.

2.1.2 The information content of dividends (ICD) hypotheses

On the basis of Lintner's study, Miller and Modigliani (1961) develop a theory called 'the information content of dividends (ICD) hypotheses', which is also the core problem we desire to investigate and check. *"A change in the dividend rate is often followed by a change in the market price (sometimes spectacularly so), such a phenomenon would not be incompatible with irrelevance to the extent that it* *was merely a reflection of what might be called the "informational content" of dividends"(Miller and Modigliani,1961,430).*

The definition of ICD implies a firm has adopted a policy of dividend stabilization with a long established and generally appreciated "target payout ratio," investors have good reason to interpret a change in dividend policy as a change in management's points of future profit prospects for the firm.

We prefer the definition by Watts (1973): information content of dividends refers to *"the hypothesis which states that dividends convey information about future earnings-information that enables market participants to predict future earnings more accurately" (Watts, 1973, 191).*

2.1.3 Dividend signaling theory

Compared with previous papers, Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) provide formal models to show that dividends can be used as a signal of firm quality. Bhattacharya (1979)'s article develops the signaling cost structure model in which cash dividends function as a signal of future cash flows of firms under an imperfect-information condition. Bhattacharya believes that the model is not only realistic (dividends linked only to expected cash flows), but also the only simple structure consistent with the assumption of an exogenously costly dividend-signaling equilibrium. John and Williams (1985) develop a signaling equilibrium with taxable dividends. According to its properties, insiders in firms with truly more valuable future cash inflows distribute larger dividends and receive higher stock prices and dividends reveal information more than that conveyed by public audits of corporate cash inflows. Miller and Rock (1985) show an informational consistent signaling equilibrium exists under asymmetric information and the trading of shares that restores the time consistency of investment policy, but leads in general to lower levels of investment than the optimum achievable under full information and/or no trading.

In a word, the above articles suggest us that dividend changes convey valuable information about future cash flows and future earnings. Specifically, dividend increases convey good news; oppositely, dividend decreases convey bad news. The models also predict a positive relationship between dividend changes and the price reaction to dividend changes.

2.2 Empirical studies and Results

2.2.1 Support Studies

Pettit (1972), Aharony and Swary (1980), Asquith and Mullins (1983), Dielman and Oppenheimer (1984) prove that dividend change is positively associated with abnormal returns in the stock price of the underlying firm by assessing the announcements of dividend change and related responses in the stock market. It indicates that dividend increases can be seen as a positive signal of the firm's future earnings and then also of the firm's shares value. One of the key implications of these models is that dividend changes should positively relate with changes in firm profitability (earnings growth rates or return on assets).

Kale and Noe (1990) present a two-period model in which dividends act as a signal of the stability of the firm's future cash flows. It documents that firms with more stable future cash flows pay a higher dividend and dividends are seen to be an increasing function of expected cash flow. Brooks, Charlton and Hendershott (1998) report that firms have a high frequency of relatively large dividend increases prior to the cash flow shock. The dividend changes can be interpreted as signals about future profitability by investors. However, they also suggest that signaling only plays a relatively minor role in corporate dividend policy. According to Koch and Shenoy (1999), their research results indicate that dividend policies interact to provide significant predictive information regarding expected cash flow.

Goergen et al. (2005) reports that net earnings are key determinants of dividend changes consistent with Lintner (1956)'s point. However, they find the occurrence of a loss is a key determinant of dividends in addition to the traditional key determinant, the level of net earnings. Additionally, the majority of dividend cuts or omissions are temporary.

2.2.2 Different findings

However, there are some studies not supporting ICD hypothesized relation between dividend changes and future earnings, studies by Watts (1973), Gonedes (1978), Penman (1983), Healy and Palepu (1988), DeAngelo, DeAngelo and Skinner (1996), Benartzi, Michaely and Thaler (BMT, 1997), and Grullon, Michaely and Swaminathan (2002). They find little or no evidence that dividend changes can predict future earnings.

For example, Watts (1973) finds that on average the relationship between future earnings changes and current unexpected dividend changes is positive, but this is not statistically significant; furthermore, any inside information management may use in determining dividends is lost in the noise in the dividend model. Thus, he concludes that the ICD is not economically meaningful. DeAngelo, DeAngelo and Skinner (1996) suggest that managers tend to increase dividends because of overoptimistic forecasts about future earnings, and therefore the ICD is unreliable. Benartzi, Michaely and Thaler (1997) find no evidence of positive abnormal earnings changes after dividend increases. Grullon, Michaely and Swaminathan (2002) point that firms which increase dividends experience significant decline in their systematic risk, profitability, capital expenditures and cash levels, and suggest that dividend increases may be an important element of a firm's long-term transition from growth to a more mature phase.

2.2.3 Nissim and Ziv

Although many papers do not support 'the ICD hypothesis', the study of Nissim and Ziv (2001), who uses an alternative methodology, provides strong evidence supporting this hypothesis. They argue that researchers have been using the wrong models to control for the expected changes in earnings and the wrong models result in failing to discover the true relation between dividends and future earnings. Nissim and Ziv investigate the relation between dividend changes and future profitability, measured in terms of either future earnings or future abnormal earnings. They document several important findings as following:

a) Dividend changes are positively related to earnings changes in each of the two years following the dividend change after controlling for the expected change in future earnings.

b) Dividend changes provide information about the level of profitability in subsequent years, incremental to market and accounting data.

However, the findings are not symmetric for dividend increases and decreases. Dividend increases are associated with future profitability for at least four years after the dividend change, whereas dividend decreases are not related to future profitability after controlling for current and expected profitability. Nissim and Ziv point that the lack of association between dividend decreases and future profitability is caused by accounting conservatism.

However, some scholars consider the results shown by Nissim and Ziv (2001) are likely to be biased. Although NZ add the ROE and lagged variable of earnings into the model to tackle the problem of autocorrelation, NZ still do not take account of the nonlinear mean reversion process of earning. Elgers and Lo (1994) and Fama and French (2000) point out the mean reversion process and the level of autocorrelation in the earning process are not linear. Therefore, Grullon *et al.* (2005) issues a nonlinear model to control the nonlinearity of earning process and the empirical results of Grullon *et al.* (2005) objects to Nissim and Ziv’s (2001) findings.

2.2.4 Firm size and dividend policy

In this paper, we also examine the relationship between the ICD hypothesis and firm size. Many scholars have found that there is a relation between firm size and dividends policy. Fama and French (2001) indicate that the decline of the percent of firms paying cash dividends during 1978-1999 is due in part to the changing characteristics of publicly traded firms. They document that larger firms and more profitable firms are more likely to pay dividends. It indicates that there is a significant relation between firm size and dividend policy. On the basis of this article, DeAngelo, DeAngelo and Stulz (2006) also consistently reveal statistically significant relations between the probability of a firm pays dividends and its size, showing that the probability that a firm pays dividends is significantly and positively related to profitability and size, and negatively related to growth.

2.2.5 2004- 2006 Norwegian shareholder income tax reform

Norwegian 2006 shareholder income tax reform, which introduces a partial double taxation of dividends paid to individual Norwegian shareholders. It increases top marginal tax rates on individual dividend income from 0 to 28%. The shareholder income tax applies to all income from shares, both dividends and capital gains. This means that the effective marginal tax rate on income from shares is 48.2 %, close to the top marginal tax rate on labor income of 47.8 %.

The first warning of shareholder income tax increase in prospect came in 2000, when the parliament approved a temporary tax on capital gains and dividends for the income year 2001. In 2001, the interim tax was abolished, but no new tax system was introduced. The Skauge Committee presented its recommendations early 2003, the government proposal came early 2004, and transitory rules were passed on March 26, 2004. The parliament agreed to the reform the same year, to be implemented from January 1, 2006. (Alstadsæter and Fjærli, 2009, 9)

Alstadsæter and Fjærli (2009) document strong timing effects on dividend payout on a large panel of non-listed firms, with a surge of dividends prior to 2006 and a sharp drop after. They show that the model set-up with stylized life-cycle behavior of firms appears to be fairly realistic, with high asset growth increasing the probability of zero dividends and with mature firms being more likely to pay dividends. The most important finding is that the timing of dividend payments appear to be sensitive to changes in the taxation of shareholders, this conclusion indicates that 2006 Norwegian shareholder income tax reform may reflect the relation between the dividend changes and future profitability surrounding the tax reform year, for example, tax exemption for dividends paid to corporations as owners from March 26, 2004, and no tax on dividends until January 1st 2006, distribute earnings as tax exempt dividends during the accounting year of 2004. It may be an explanation of the extreme increase in corporate profits from 2003 to 2004.

3. Data

3.1 Sample Selection

We collected all the data for our analysis from the Centre for Corporate Governance Research (CCGR) database, paying special attention to the private industry in general, including non-listed firms and family firms in particular. The data provided by the CCGR is relatively complete and high-quality. By including accounting and ownership data for non-listed Norwegian firms the initial sample contained 2 542 956 firm-years ranges from 1994 until 2009, that represented 14 un-consolidated variables. However, since this initial un-consolidated data could cause noise in our study we applied certain filters in order to remove firms that could skew the analysis.

First, since our study only focuses on Norwegian private limited liability companies (AS) and Norwegian public limited liability companies (ASA), we removed all the other types of firms, so that only AS and ASA firms remained. The firms which are not independent were also deleted, because cash transfers could be distorted for those firms.

Secondly, we found some abnormal data in the sample, such as negative tangible assets, zero revenues. This indicated the possibility that the sample contained some erroneous observations and certain shell firms, which are not the object of our study. In order to reduce the noise and get valid empirical results, we employed a number of criteria in order to exclude the abnormal observations from the sample:

i. Dividends < 0;
ii. Total tangible assets≤0;
iii. Total assets≤0;
iv. Revenues≤0.

Furthermore, since the objective and the methodology of our paper is based on NZ's paper, we followed similar criteria of data selecting as those employed by NZ in order to complete the final sample selection. Firms were only included in the final sample if they paid an ordinary yearly cash dividend in the current year and in the previous year. Since firms in Norway only pay dividends once a year rather than every quarter as in the US, we needn't employ the remaining three criteria used by NZ. In the end, there were 69 164 firm-years in our final sample ranging over the period 1998 to 2009.

3.2 Data Description

In this part, we make a simple description of our sample data. As Table 1 shows, the dividend events are divided into three types: increase, decrease and no change in dividends. The total numbers of firms that experience for increases, decreases and no changes in dividends during 1999-2009 are 28023, 20393, and 5748 respectively. We observe that increases in dividends are more frequent than decreases in dividends, similar to Nissim and Ziv's (2001) finding.

Table 1

Frequency of firm-year observations with at least one dividend event by fiscal year

Year	Increase	Decrease	No change	Total
1999	3349	1556	862	5767
2000	2708	3597	1101	7406
2001	4741	2049	1054	7844
2002	5263	2983	879	9125
2003	4438	4813	791	10042
2004	5277	3497	323	9097
2005	423	752	102	1277
2006	566	293	158	1017
2007	477	213	120	810
2008	462	329	183	974
2009	319	311	175	805
Total	**28023**	**20393**	**5748**	**54164**

This table reports the numbers of firms that increase, decrease or do not change dividends compared with the previous year.

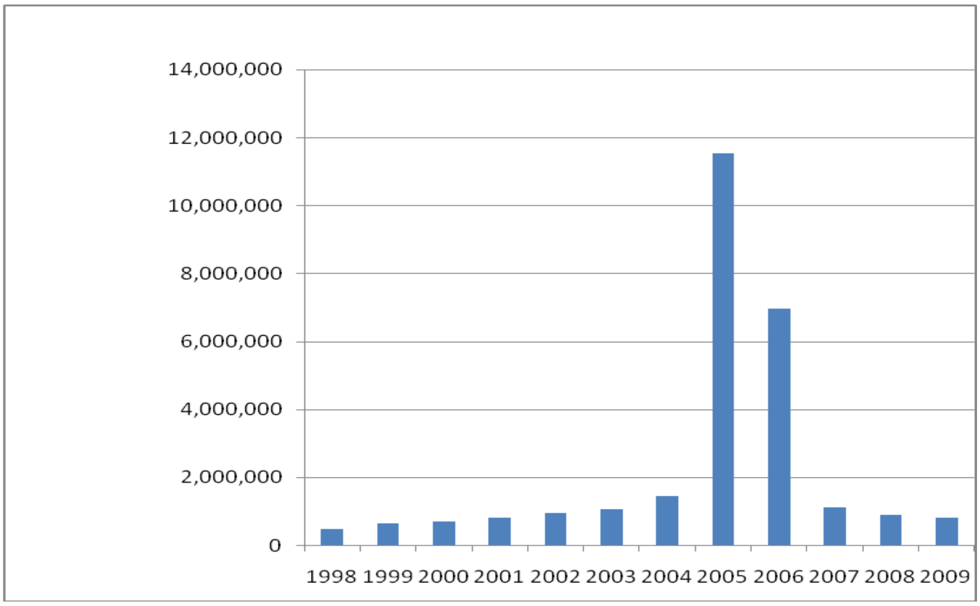
From Table 1, we observe that the numbers of firms with dividend increases, decreases and no changes fell dramatically in 2005. This is attributable to the tax reform in Norway which was implemented from January 1, 2006. The reform increased the top marginal tax rates on individual dividend income from 0 to 28%. In 2005, the number of firms with dividend increases dropped by 92% compared to the number in 2004. Nearly 59% firms chose to reduce their dividends in 2005; however, most firms (58%) increased their dividends in 2004. Additionally, there are a large number of firms omitting dividends. The 2004-2006 tax reform has had a significant impact on firm dividend policy during those years. In order to observe the impact of the tax reform on the ICD hypothesis, we separate the sample into two periods: 1998-2003 and 2006-2009.

As shown in Figure 1, there was a substantial increase in annual average dividend from 1998 to 2005. According to Alstadsæter and Fjærli (2009), savings spurred by lower marginal tax rates on capital income can be a reason to explain some of dividends increase in this period. A lot of this dividend growth can also be attributed to the change of economic incentives for the firms through the introduction of the dual income tax in 1992, as discussed by Alstadsæter, Fjærli and Thoresen (2009). There is a sharp increase in average dividends in 2005 (see Figure 1), which can seen as clear timing effects in response to the increased dividend taxes of 2006. Since some large firms still paid dividends to respond to the higher tax rate, while the majority of small firms stopped paying dividends in 2005, thus the average dividend increased dramatically when the tax rate is higher because of the decreased number of small firms that year.

There was a substantial decrease in average dividend from 2006-2009 (see Figure 1), with dividends dropping sharply both in 2006 and 2007. The decrease in dividends after the implementation of the tax reform can be explained by several factors: *one is the pure timing effect and is only a transitory effect, as the firms* *accelerate their dividend payments prior to the reform. And another reason is that closely held firms find substitutes for dividend payments such as hiding consumption expenditures into the operating expenses, or that they believe that tax rates will drop again in the future. In the meanwhile, the corporation is used more or less as a savings box. This is a more permanent effect.* (Alstadsæter and Fjærli, 2009, 25) Additionally, from our point of view, the financial crisis in 2007-2009 also can be a reason for the decrease in dividends.

Figure 1

Annual average dividends per firm during 1998-2009



We have also constructed a table of summary statistics (Table 2) for each of the three dividend variation groups (increasing, decreasing and no change) and for the whole sample. The statistics illustrate the average percentage change in dividends ($R\Delta DIV$), the Return on earnings (ROE) and the average size of firms in each dividend change percentile group.

In Table 2, $R\Delta DIV$ refers to the percentage change in dividends and is defined as below:

$$R\Delta DIV_0 = \frac{DIV_0 - DIV_{-1}}{DIV_{-1}} \quad (1)$$

In Equation (1), $R\Delta DIV_0$ means the dividend at year 0 and $R\Delta DIV_{-1}$ means the dividend in the year before.

Table 2

Descriptive statistics for dividend event observations

	Mean	Median	STD	10%	25%	50%	75%	90%
Panel A. Dividend Increases								
R△DIV(%)	251.60	81.82	1325.94	14.29	33.33	81.98	200.00	468.42
ROE (%)	91.30	58.79	115.80	-0.74	18.30	58.80	133.11	239.90
Total Equity	3195862	436000	52944332	123000	205000	437000	1066000	2724000
Panel B. Dividend Decrease								
R△DIV(%)	-42.64	-40.00	25.26	-79.55	-61.36	-40.00	-21.15	-10.00
ROE (%)	57.69	32.68	94.67	-17.39	4.86	32.68	89.54	173.13
Total Equity	2409947	387000	34947288	113000	181000	388000	961000	2490000
Panel C. No Change								
ROE (%)	23.90	14.00	48.82	-11.30	2.34	14.00	37.12	69.18
Total Equity	3473438	939000	27701029	208000	425000	940000	2308000	5886000
Panel D. Whole Sample								
R△DIV(%)	114.12	5.56	964.49	-59.97	-27.88	5.59	88.02	260.00
ROE (%)	71.53	41.28	105.29	-8.67	9.04	41.30	105.49	202.92
Total Equity	2929418	453000	44627688	122000	206000	454000	1131000	3019000

This table reports sample firm characteristics about RΔDIV, ROE and total equity. RΔDIV is the annual percentage change in the cash dividend payment. ROE means return on earnings, is equal to the earnings before extraordinary items scaled by the book value of equity. Total equity is the market value of equity. The values of all financial variables are determined at the beginning of the year of the dividend announcement.

Panel A reports that the average change in dividend for the 'dividend increases' group is 251.60%, which is considerably larger than the 16.42% reported in the US study (Nissim and Ziv, 2001). One reason why the average increase in dividend in Norway is significantly larger than that in the US is because the firms in the Nissim and Ziv article are large firms that usually have stable dividend payments. Our sample includes many small firms that usually have more volatile dividend payout. Another reason is the tax reform discussed above; dividends increased quickly from 1998 to 2005, and peaked in 2005. In panel B, representing the 'dividend decrease' group, the average change in dividend is

42.64%, and this is very close to the average drop of 42.67% reported by Nissim and Ziv.

We have also made a comparative analysis for the five subgroups formed on the basis of different percentages of dividend change. As shown in panel A (the 'dividend-increase' group) the larger the dividend increase, the higher were the values of firms' ROE. However, in the 'dividend-decrease' group (Panel C), the larger the dividend decrease, the lower were the firm ROE values. This seems to indicate that firms increase dividends with ROE increases and decrease dividends with ROE decreases, i.e. dividend changes are positively related to changes in firm profitability (earnings growth rates or ROE), which are very consistent with the ICD hypothesis we discuss. It also shows that the more profitable firms are more likely to pay dividends (Fama and French, 2001).

Another firm characteristic---total equity, the market value of the equity, is far larger in the 'dividend-increase' group than that of the 'dividend-decrease' group. This case is similar to the one which reported in the United States. Similar to DeAngelo, DeAngelo and Stulz (2006), we observed that the probability of a firm paying dividends is significantly and positively related to profitability and firm size.

4. Empirical Analysis

4.1 Linear Model of Earnings Expectations

In this section, we initially investigate the ICD hypothesis using two linear models of earnings expectations as a baseline.

4.1.1Cross-sectional Analysis

At the beginning, we conduct basic cross-sectional regression analysis employed by Nissim and Ziv (2001) to assess the ICD hypothesis. As the Equation (2) show, E_t is the earnings before extraordinary items in year t, B_{-1} denotes the book value of equity at the end of the previous year, ROE_{t-1} is the return on B_{t-1}, and $R\Delta DIV_0$ is the change rate of dividend in current year calculated by Equation (1).

$$(E_t - E_{t-1}) / B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \varepsilon_t \qquad (2)$$

We test the ICD hypothesis using data collected from 1998 to 2009, the independent variable of the regression is derived from $R\Delta DIV_0$ from 1999 to 2008 for t = 1 and from 1999 to 2007 for t = 2.

Here, we use Equation (2) to assess the ICD hypothesis for small firms, large firms and the whole sample during 1998-2009. Table 3 reports some statistics from Equation (2).

In the panel A of the ‘small firms’ group and the panel C (whole sample), the coefficients of dividend changes are positive and negative for t=1 and t=2 respectively, but all of them are insignificant, which means there is no significant relation between dividend changes and further earnings changes for small Norwegian non-listed firms. In the panel B of the ‘large firms’ group, the coefficients of dividend changes are negative for t=1 and t=2 and statistically significant for t=1. This demonstrates that as the dividend increases (decreases), the future earnings tend to decrease (increase) for the next year.

Table 3

Summary Statistics from cross-sectional regressions of the future earnings change, deflated by the book value, on the dividend change and control variables

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \varepsilon_t$$

t	α_0	α_1	α_2	R^2	N
Panel A: Small firms					
1	-0.0099	0.0959	-0.0018	0.4249	603
t-value	-0.2055	0.9215	-1.1651		
2	0.1753	-0.2521	0.0010	0.0010	394
t-value	3.1225*	-1.5144	0.7575		
Panel B: Large firms					
1	0.3213	-0.0156	-0.0015	0.0267	32576
t-value	2.0153**	-4.1034*	-1.6051		
2	0.0918	-0.0014	-0.0013	0.0292	19642
t-value	0.4697	-0.1271	-0.8919		
Panel C: Whole sample					
1	0.3134	0.0035	-0.0015	0.0304	33179
t-value	2.0075**	0.2042	-1.6210		
2	0.0872	-0.0057	-0.0012	0.0277	20036
t-value	0.4561	-0.5403	-0.8302		

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t denotes the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} denotes the book value of equity at the end of year -1. $R\Delta DIV_0$ denotes the annual percentage change in the cash dividend payment in year 0. ROE_{t-1} equals the earnings before extraordinary items in year t = 1 scaled by the book value of equity at the end of year t = 1. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significantly different from zero at the 1%, 5% and 10% levels, respectively.

In short, our results do not support the ICD hypothesis but indicates a negative relationship between dividend changes and further earning in subsequent year for large Norwegian non-listed firms. The conclusion are very different from that reported by Nissim and Ziv (2001), α_1 is positive and significant in the US market.

However, Benartzi (1997) reports that changes in dividend and changes in contemporaneous earnings are highly correlated, which means that the negative relationship between dividend changes and earnings changes in large firm may because of the autocorrelation of earning. And the solution is to add the lagged variable of the dependent variable, using $(E_0 - E_{-1})/B_{-1}$ as an independent variable. We will do that in the next model.

4.1.2Cross-sectional Analysis for asymmetric dividend changes

Some scholars document that the ICD hypothesis may be asymmetrical for dividend increase and dividend decrease, so it is better to do separate analysis for dividend increase and dividend decrease. Considering the problem of autocorrelation mentioned in previous model, we employ the following equation used by Nissim and Ziv (2001), to split the effects of dividend increase group and dividend decrease group.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC \times R\Delta DIV_0 + \alpha_2 DPC \times R\Delta DIV_0$$
$$+ \alpha_3 (E_t - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t \quad (3)$$

In the equation (3), both DPC and DNC are dummy variables. When dividend change is positive, DPC is equal to 1 and DNC is 0; when dividend change is negative, DPC takes the value of 0 and DNC is 1. Thus, α_1 represents the coefficient of the dividend increase group and α_2 presents the coefficient of the dividend decrease group.

Table 4 reports the regression results and it indicates that there is no evidence to support the ICD hypothesis. All the three panels show that the coefficients of dividend changes, including the dividend increases and dividend decreases, are not statistically significant for t=1 and t=2.

Combining the results of two linear models, we can conclude that the ICD hypothesis is not valid for non-listed firms in Norway. Additional, considering the possible problem of autocorrelation caused by the first model, we cannot say a negative relationship between dividend changes and further earnings for large Norwegian non-listed firms.

Table 4

Summary statistics from cross-sectional regression of the future earnings change, deflated by the book value, on the dividend change and control variables

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC(R\Delta DIV_0) + \alpha_2 DNC(R\Delta DIV_0) + \alpha_3 (E_0 - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t$$

t	α_0	α_1	α_2	α_3	α_4	R^2	N
Panel A: Small firms							
1	-0.0927	0.3598	0.2518	-0.2213	-0.0018	0.4538	603
t-value	-1.2348	1.2944	0.3883	-0.5641	-1.1925		
2	0.0687	0.0585	-1.2265	0.5028	0.0003	0.1962	394
t-value	0.8251	0.4391	-1.4769	1.2753	0.2529		
Panel B: Large firms							
1	0.2694	0.0104	-0.0945	-0.3559	-0.0004	0.1359	32575
t-value	1.6614***	1.2662	-0.7010	-3.7533*	-0.5760		
2	0.1014	-0.0041	-0.0031	0.0489	-0.0012	0.0423	19642
t-value	0.4571	-0.4033	-0.0129	0.7296	-0.9195		
Panel C: Whole sample							
1	0.2478	0.0270	-0.1110	-0.3554	-0.0004	0.1398	33178
t-value	1.5409	1.0936	-0.8441	-3.7399*	-0.5176		
2	0.0846	-0.0018	-0.0270	0.0484	-0.0011	0.0412	20036
t-value	0.3951	-0.1781	-0.1158	0.7177	-0.8600		

This table reports estimates of regressions relating raw earnings changes to dividend changes. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

4.2 Nonlinear Model of Earnings Expectations

The previous models used assume that the earnings' process of and autocorrelation are linear, however, many scholars, such as Fama and French (2000), argue that the process and autocorrelation of earnings are nonlinear. So we employ the nonlinear model suggested by Grullon, Michaely and Swaminathan (2002), as shown in equation (4), to test the valid of ICD hypothesis.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0 + \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right) \times DFE_0 + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \;) \times CE_0) + \varepsilon_t \quad (4)$$

In this equation, DEF_0 equals to ROE_0-E [ROE_0] and E [ROE_0] is the fitted value from the regression of ROE on the logarithm of total assets in previous year, the logarithm of sales-to-assets ratio in previous year and ROE in previous year. $NDFED_0$ ($PDFED_0$) takes the value of 1 if DFE_0 is negative (positive) and 0 otherwise. CE_0 refers to $(E_0-E_{-1})/B_{-1}$ and $NCED_0$ (PCED) take the value of 1 if CE_0 is negative (positive) and 0 otherwise. DPC is the dummy variable for dividend increases, and DNC is for dividend decrease.

Table 5

Summary statistics from nonlinear regression of the future earnings change, deflated by the book value, on the dividend change

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0 + \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right) \times DFE_0 + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \;) \times CE_0) + \varepsilon_t$$

t	α_0	α_1	α_2	R^2	N
Panel A: Small firms					
1	-0.1180	0.0245	0.0030	0.4781	569
t-value	-2.0305**	1.5469	0.0436		
2	0.0884	-0.0456	0.0428	0.3216	365
t-value	2.6883*	-1.5411	0.3894		
Panel B: Large firms					
1	0.1312	0.0011	0.0739	0.1880	31619
t-value	1.3399	0.4704	0.2256		
2	-0.0502	0.0063	-0.1692	0.0902	18817
t-value	-0.3730	0.4862	-0.3251		
Panel C: Whole sample					
1	0.1143	0.0246	0.0653	0.1888	32188
t-value	1.2168	0.9514	0.1991		
2	-0.0477	0.0091	-0.1918	0.0897	19182
t-value	-0.3874	0.8003	-0.3735		

This table reports estimates of regressions relating raw earnings changes to dividend changes. 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 logarithm of the total assets in year -1, the logarithm of the market-to-book ratio of equity in year-1, and ROE_{-1}. CE_0 is equal to $(E_0\text{-}E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative; it is 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

The results of nonlinear model are shown in table 5. Similar to the results of second linear model, in all the three panels, the coefficients of dividend increase group and dividend decrease group are not statistically significant. Consequently, the ICD hypothesis is not valid in the Norwegian non-listed firms.

Overall, both the linear and nonlinear models demonstrate that the Norwegian non-listed firms do not support the ICD hypothesis. And we interpret this finding as follows.

i. The survey conducted by Kent, Tarun and Ohannes (2005) reports that compared to the managers in US, Norwegian managers more concern about the legal rules and constraints when setting dividend policies. On the other hand, Norway government is likely to implement strict regulars and constrains to protect the stockholders' rights. Therefore, we believe the current business regulations in Norway make the ICD hypothesis invalid for non-listed firms.

ii. Before the Norwegian tax reform in 2006, the tax rate on dividend is lower than on the earned income, so the managers in Norway have high incentive to shift the earned income as the dividend income. And the reform was announced in advance, and certain rules were implemented from 2004, so managers would advance shifting the earned income. As we can see in the figure 1, the average dividend payment per firm increases sharply from 2004 to 2005, even although the further earnings of firms may reduce. In short, the dual income tax system before 2006 reduces the effect of ICD in Norway.

4.3 ICD on Tax Reform

4.3.1 Analysis before and after tax reform

Considering that Norway implement a tax reform which increase the dividend taxation from 2004 to 2006, and there is a strong timing effects on dividend payments in 2004 and 2005, we break up our whole sample into two periods: 1998-2003 and 2006-2009, before the announcement of tax reform and after the implementation of the tax reform respectively. It is interesting to test the ICD hypothesis under different tax reforms.

Here we just test the results of these two periods based on the equation (3) and equation (4), linear model and nonlinear model respectively.

Table 6 presents the results of linear model. In panel A (small firms), for t=1, the coefficient of dividend decrease α_2 is positive and significant for the first period (1999-2003). For t=2, both the coefficients on dividend increase and dividend decrease are negative and statistically significant, but the coefficient on dividend increase is quite small, only -0.0174. On the other hand, panel B (large firms) and panel C (whole sample) show that the coefficients on dividend changes are not statistically significant. This result indicates before the new tax system was announced, dividend decreases in Norwegian small non-listed firms are predictive of further earnings for the following two years and there is a negative and weak relation between dividend increases and further earnings in the second following year. However, ICD hypothesis still does not work in Norwegian non-listed market.

Table 6

Cross-sectional regressions of the future earnings change, deflated by the book value, on the dividend change and control variables for two periods 1998-2003 and 2006-2009

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC(R\Delta DIV_0) + \alpha_2 DNC(R\Delta DIV_0) + \alpha_3 (E_0 - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t$$

	T	α_0	α_1	α_2	R^2	N
Panel A: Small firms						
1	1999-2003	-0.0202	-0.0032	0.1106	0.3698	447
	t-value	-0.3816	-0.3890	1.6803***		
	2006-2008	-0.3995	1.4327	0.9042	0.6749	19
	t-value	-4.1768*	1.5742	0.2913		
2	1999-2003	0.1310	-0.0174	-0.3482	0.2389	322
	t-value	2.0025**	-2.0920**	-2.2217**		
	2006-2007	-0.0149	0.1725	-3.6685	NA	8
	t-value	-0.0724	0.2590	-0.9400		
Panel B: Large firms						
1	1999-2003	0.4040	0.0050	0.1259	0.1828	29379
	t-value	1.2337	0.7800	0.8200		
	2006-2008	0.0850	0.0015	-0.4033	0.0876	1426
	t-value	1.6387	0.4436	-1.4519		
2	1999-2003	-0.0708	-0.0082	-0.2726	0.0479	18254
	t-value	-0.1900	-0.7615	-1.0167		
	2006-2007	0.2894	-0.0235	0.4954	0.0736	505
	t-value	0.7467	-0.9008	0.5098		
Panel C: Whole sample						
1	1999-2003	0.3965	0.0042	0.1231	0.1827	29826
	t-value	1.2370	0.6611	0.8046		
	2006-2008	0.0814	0.0016	-0.4070	0.0879	1445
	t-value	1.6465***	0.4628	-1.4438		
2	1999-2003	-0.0775	-0.0060	-0.2745	0.0480	18576
	t-value	-0.2133	-0.5873	-1.0571		
	2006-2007	0.2644	-0.0205	0.4574	0.0687	513
	t-value	0.7301	-0.8891	0.4915		

This table reports estimates of regressions relating raw earnings changes to dividend changes. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

The results of nonlinear model are shown in Table 7. For panel A (small firms) shows that the coefficients for both the dividend increase and dividend decrease are not statistically significant while for panel B (large firms) and panel C, the coefficients of dividend decrease in the second period, after tax reform. The result demonstrates that for large Norwegian non-listed firm and entire non-listed market, there is negative relationship between changes in dividend decrease and further earning after the tax reform and this relationship only last for next one year.

Table 7

Nonlinear regressions of the future earnings change, deflated by the book value, on the dividend change for two periods 1998-2003 and 2003-2009

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0$$
$$+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right) \times DFE_0 +$$
$$(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \ ) \times CE_0) + \varepsilon_t$$

	T	α_0	α_1	α_2	R^2	N
Panel A: Small firms						
1	99-03	-0.0988	0.0049	0.0207	0.4528	413
	t-value	-2.8648*	0.9121	0.2082		
	06-08	NA	NA	NA	NA	NA
	t-value	NA	NA	NA		
2	99-03	0.0669	-0.0177	-0.0082	0.3827	293
	t-value	2.1974**	-1.4604	-0.0688		
	06-07	NA	NA	NA	NA	NA
	t-value	NA	NA	NA		
Panel B: Large firms						
1	99-03	0.1233	-0.0004	0.4142	0.1964	28432
	t-value	0.6060	-0.1960	0.6427		
	06-08	0.1350	0.0000	-0.2575	0.1126	1425
	t-value	2.0395*	0.0056	-2.0265**		
2	99-03	-0.0266	-0.0110	-0.5705	0.0473	17432
	t-value	-0.1321	-1.1082	-0.6337		
	06-07	-0.3137	0.0513	0.1692	0.2317	504
	t-value	-0.8979	1.0780	0.2045		
Panel C: Whole sample						
1	99-03	0.1169	-0.0014	0.4196	0.1963	28845
	t-value	0.5958	-1.2576	0.6519		
	06-08	0.1279	0.0001	-0.2585	0.1129	1444
	t-value	2.0992**	0.0341	-1.9747*		
2	99-03	-0.0295	-0.0049	-0.5838	0.0476	17725
	t-value	-0.1551	-0.5868	-0.6549		
	06-07	-0.2681	0.0474	0.1406	0.2271	512
	t-value	-0.8792	1.0846	0.1761		

This table reports estimates of regressions relating raw earnings changes to dividend changes. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

The results of linear model and nonlinear models are quite different, but we believe the results of nonlinear model are trustier, because the nonlinear model has higher R-squares. Besides, some papers find the mean reversion in accounting profitability for Norwegian non-listed firms (see Knell Bjorn Nodal and Randi Naps, 2009). What's more, the number of small firms in our sample is somewhat less, as we see in the tables of regression results, which mean that the negative relationship in the small firms indicated by linear model is not somewhat valid. Furthermore, before the tax reform, the firms' managers are more likely to minimize the tax payment by shifting the earned income as dividend income, which is documented by Sorensen (1994), Hagen and Sorensen (1998), Lind the et.al (2004), and Alstadsæter (2007). Thus, we expect that changes in dividend before tax reform do not contain managers' expectations of further earning and the results of nonlinear model more fit our expectation.

However, the nonlinear model presents a negative relationship between dividend decreases and further earning changes, but the ICD hypothesis imply to a positive relationship. Therefore ICD hypothesis is not valid in both periods and we interpret the negative relationship after tax reform as follows:

i. Dividends decrease may be result from the low earnings in previous year rather than the expectation of further earnings.
ii. The purpose of decreasing the dividends payment is for firms' reinvestment which will boom the further earning.

4.3.2 Analysis on special years

At last, we are also quite interested to test the ICD hypothesis in 2004 and 2005 in which these is a strong timing effect of dividend resulted from the announcement of tax reform. Since Norway approved a temporary tax on capital gains and dividends in 2001, we take account of 2001 as well.

Table 8 presents the results of linear model. In Panel A (small firms), the coefficients on dividend increase are positive and significant in 2001 and 2005 while the coefficient on dividend decrease is positive and significant in 2001. Only the dividend decrease coefficient in Panel B (large firms) is significant in 2004. For Panel C (whole sample), α_1 is positive and significant in 2005 and α_2 is negative and significant in 2004. Thus, in 2001, ICD hypothesis is valid for Norwegian small non-listed firms and the dividend decreases convey more information. In 2004, only dividend decreases have negative relationship to further earning for Norwegian large non-listed firms and whole non-listed market. Opposite, only dividend increases convey information in 2005 for small firms and whole sample, which supports the ICD hypothesis.

Table 8

Summary statistics from cross-sectional regression of the future earnings change, deflated by the book value, on the dividend change in 2001, 2004 and 2005

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC(R\Delta DIV_0) + \alpha_2 DNC(R\Delta DIV_0) + \alpha_3 (E_0 - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t$$

	2001	2004	2005
Panel A small firms			
α_1	0.0166 (2.0472**)	0.0187 (0.1000)	0.3703 (16.4577*)
α_2	0.3706 (2.0340**)	0.2165 (0.5918)	-0.3117 (-1.1288)
Panel B large firms			
α_1	-0.0052 (-0.2068)	-0.0037 (-0.4310)	0.0784 (1.1690)
α_2	-0.0580 (-0.0274)	-0.4612 (-2.4715**)	0.0968 (0.4184)
Panel C whole sample			
α_1	-0.0050 (-0.1992)	-0.0033 (-0.3907)	0.2476 (8.6196*)
α_2	-0.0688 (-0.0331)	-0.3822 (-2.1896**)	-0.1225 (-0.5985)

This table only reports the results at t=1, since there is no significant coefficients of α_1 and α_2 at t=2 in 2001, 2004 and 2005. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

The results of nonlinear model are displayed in table 9. Similar to the results of linear model, in 2001, only Norwegian small non-listed firms support the ICD hypothesis, but only dividend increases contain the information of further earnings. In 2004, the dividend decreases in Norwegian large non-listed firms and whole non-listed market also negative relate to further earning and ICD hypothesis does not work. In 2005, the dividend increases support the ICD hypothesis only for entire non-listed market.

Table 9

Summary statistics from nonlinear regressions of the future earnings change, deflated by the book value, on the dividend change in 2001, 2004 and 2005

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0$$
$$+\left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right)\times DFE_0 +$$
$$(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \;\;)\times CE_0) + \varepsilon_t$$

	2001	2004	2005
Panel A small firms			
α_1	0.0261 (1.7653***)	0.1137 (0.6377)	0.0334 (0.9268）
α_2	0.2798 (0.6796)	(-0.0540) (-0.1450)	(-0.0281) (-0.1655)
Panel B large firms			
α_1	(-0.0050) (-0.1999)	(-0.0044) (-0.5408)	0.0169 (0.3024)
α_2	2.9441 (1.1621)	(-0.5083) (-2.3750**)	(-0.0507) (-0.2358)
Panel C whole sample			
α_1	(-0.0048) (-0.1932)	(-0.0043) (-0.5452)	0.2567 (8.8710*)
α_2	2.9483 (1.1850)	(-0.4106) (-2.0912**)	(-0.2590) (-1.3017)

This table only reports the results at t=1, since there is no significant coefficients of α_1 and α_2 at t=2 in 2001, 2004 and 2005. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

The results are so surprising. We expected that ICD hypothesis is not valid in these three years, since the dividend changes may owing to the responses of managers to the changes of dividend taxation, rather than because of the further expectation of managers. However, the regression results of both linear model and nonlinear model demonstrate that ICD hypothesis is valid in 2001 for small non-listed firms and in 2005 for the entire non-listed market.

5. Conclusion

In this paper, we investigate the validity of the ICD hypothesis for the Norwegian non-listed firms during 1994-2009.

We conduct our study using the linear model employed by Nissim and Ziv (2001) and nonlinear model of earnings expectations employed by Grullon et al. (2005). However, the results of both models do not provide any evidence to support ICD hypothesis for the entire sample, which are quite different from the results of Nissim and Ziv (2001), but similar to that of Grullon et al. (2005).

The linear and nonlinear models also demonstrate that ICD hypothesis is not valid for both Norwegian small non-listed firms and Norwegian large non-listed firms. But the initial linear model presents that dividend changes negatively relate with future earnings for large firms. However, there is a problem associated with residual cross-correlations in this initial model, so we conclude that there is no significant relationship between dividend changes and further earnings for large and small Norwegian non-listed firms.

Taking into account the tax reform in Norway from 2004 to 2006, we split the whole period into two periods: 1998-2003 and 2006-2009 to test the ICD hypothesis under different tax systems. There is one-year negative relationship between dividend decreases and further earnings after the tax reform for entire sample and large Norwegian non-listed firm under the nonlinear model. However, the ICD hypothesis is still not valid in both tax systems since the ICD hypothesis imply to a positive relationship.

When we test the relation between dividend changes and further earnings changes in 2001, 2004, and 2005, since these three years involve certain transitions of dividend taxation reform, we expected that the transitory rules would disturbances the dividend policies and make the ICD hypothesis invalid, however, the results are surprising, ICD valid for small non-listed firms in 2001 and for the entire sample in 2005.

In conclusion, our results demonstrate that the ICD hypothesis is not valid during 1998 to 2009 for Norwegian non-listed firms, but valid in 2001 for small firms and in 2005 for non-listed market.

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Appendix

Table 1

Annual statistics from basic regression of future earnings change, deflated by the book value, on the dividend change and control variables (t=1)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t denotes the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} denotes the book value of equity at the end of year -1. $R\Delta DIV_0$ denotes the annual percentage change in the cash dividend payment in year 0. ROE_{t-1} equals the earnings before extraordinary items in year t = 1 scaled by the book value of equity at the end of year t = 1. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significantly different from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1}) / B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
α_0	-0.1700	0.0192	-0.1333	0.0677	0.0840	0.1784	0.1297	-0.2480	-0.0171	NA
SD	0.0387	0.0366	0.0428	0.0395	0.0362	0.0956	0.1213	0.1919	0.1465	NA
t-value	-4.3941*	0.5246	-3.1142*	1.7148***	2.3223**	1.8665***	1.0697	-1.2923	-0.1166	NA
p-value	0.0000	0.6012	0.0027	0.0895	0.0223	0.0666	0.2886	0.2323	0.9145	NA
α_1	-0.0002	-0.0245	0.0193	-0.0021	-0.0003	0.0989	0.2629	0.8256	-0.3169	NA
SD	0.0003	0.0359	0.0081	0.0148	0.0043	0.1235	0.0182	0.3140	0.2442	NA

Table 1 (continued)

t-value	-0.5953	-0.6827	2.3785**	-0.1429	-0.0615	0.8008	14.4442*	2.6297*	-1.2976	NA
p-value	0.5535	0.4965	0.0203	0.8867	0.9511	0.4262	0.0000	0.0302	0.2852	NA
α_2	-0.0077	-0.0005	-0.0093	-0.0016	-0.0014	-0.0019	-0.0036	0.0045	0.0049	NA
SD	0.0005	0.0005	0.0005	0.0005	0.0005	0.0011	0.0013	0.0019	0.0013	NA
t-value	-15.7226*	-1.0090	-19.2699*	-2.9145*	-3.0550*	-1.7668***	-2.7060*	2.3882**	3.8631*	NA
p-value	0.0000	0.3157	0.0000	0.0044	0.0029	0.0820	0.0086	0.0440	0.0307	NA
R^2	0.7730	-0.0050	0.8487	0.0606	0.0684	0.0248	0.8168	0.4985	0.7380	NA
Panel B: Large firms										
α_0	-0.0896	0.1424	1.6742	0.1757	0.3391	0.4188	0.1115	0.3678	0.1275	-0.0547
SD	0.0383	0.0219	0.5042	0.0149	0.0186	0.0569	0.0959	0.1189	0.0633	0.0658
t-value	-2.3390**	6.4895*	3.3203*	11.7798*	18.2136*	7.3654*	1.1627	3.0944*	2.0140**	-0.8315
p-value	0.0194	0.0000	0.0009	0.0000	0.0000	0.0000	0.2453	0.0022	0.0445	0.4060
α_1	-0.0127	-0.0442	-0.0049	-0.0018	-0.0173	-0.0200	-0.0240	-0.0110	-0.0112	-0.0091
SD	0.0036	0.0103	0.0249	0.0012	0.0034	0.0086	0.0588	0.0189	0.0067	0.0101
t-value	-3.5733*	-4.2960*	-0.1975	-1.5500	-5.0937*	-2.3190**	-0.4093	-0.5858	-1.6680***	-0.8975
p-value	0.0004	0.0000	0.8434	0.1212	0.0000	0.0206	0.6824	0.5586	0.0959	0.3698
α_2	-0.0093	-0.0016	-0.0010	-0.0019	-0.0018	-0.0011	0.0018	0.0004	-0.0008	0.0002
SD	0.0003	0.0002	0.0044	0.0001	0.0001	0.0003	0.0007	0.0008	0.0005	0.0125
t-value	-29.1386*	-7.8687*	-0.2199	-17.1113*	-13.5879*	-3.4313*	2.6554*	0.5068	-1.6797***	0.0134
p-value	0.0000	0.0000	0.8260	0.0000	0.0000	0.0006	0.0081	0.6128	0.0936	0.9893
R^2	0.1636	0.0167	-0.0004	0.0413	0.0255	0.0156	0.0061	-0.0062	0.0064	-0.0018
Panel C: Whole sample										
α_0	-0.0969	0.1401	1.6408	0.1736	0.3351	0.3925	0.1263	0.3521	0.1254	-0.0546
SD	0.0376	0.0215	0.4960	0.0147	0.0184	0.0529	0.0887	0.1137	0.0626	0.0656

Table 1 (continued)

t-value	-2.5760**	6.5035*	3.3078*	11.8266*	18.2368*	7.4158*	1.4239	3.0977*	2.0026**	-0.8320
p-value	0.0100	0.0000	0.0009	0.0000	0.0000	0.0000	0.1548	0.0022	0.0457	0.4057
$\boldsymbol{\alpha_1}$	-0.0031	-0.0442	-0.0047	-0.0018	-0.0168	-0.0189	0.1557	-0.0105	-0.0113	-0.0091
SD	0.0017	0.0102	0.0247	0.0012	0.0033	0.0084	0.0281	0.0185	0.0067	0.0101
t-value	-1.8379***	-4.3442*	-0.1902	-1.5510	-5.0598 *	-2.2516**	5.5472 *	-0.5658	-1.6813***	-0.8995
p-value	0.0661	0.0000	0.8492	0.1210	0.0000	0.0246	0.0000	0.5720	0.0933	0.3687
$\boldsymbol{\alpha_2}$	-0.0093	-0.0016	-0.0010	-0.0019	-0.0018	-0.0010	0.0015	0.0005	-0.0007	0.0002
SD	0.0003	0.0002	0.0043	0.0001	0.0001	0.0003	0.0006	0.0008	0.0005	0.0124
t-value	-29.6945*	-7.9027*	-0.2210	-17.2211*	-13.6227*	-3.3952*	2.2882**	0.6331	-1.6027	0.0185
p-value	0.0000	0.0000	0.8251	0.0000	0.0000	0.0007	0.0224	0.5273	0.1096	0.9853
$\mathbf{R^2}$	0.1627	0.0166	-0.0004	0.0412	0.0253	0.0141	0.0455	-0.0054	0.0059	-0.0018

Table 2

Annual statistics from basic regression of future earnings change, deflated by the book value, on the dividend change and control variables (t=2)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t denotes the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} denotes the book value of equity at the end of year -1. $R\Delta DIV_0$ denotes the annual percentage change in the cash dividend payment in year 0. ROE_{t-1} equals the earnings before extraordinary items in year t = 1 scaled by the book value of equity at the end of year t = 1. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significantly different from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007
α_0	0.1761	0.0619	0.5299	0.0436	0.0667	0.2500	0.1508	0.1237	NA
SD	0.0845	0.0773	0.1838	0.0302	0.0482	0.1001	0.2558	0.2457	NA
t-value	2.0839**	0.8003	2.8836*	1.4422	1.3860	2.4967**	0.5894	0.5036	NA
p-value	0.0414	0.4263	0.0058	0.1533	0.1716	0.0159	0.5718	0.6645	NA
α_1	0.0004	-0.0010	-0.0287	0.0014	0.0041	-0.1213	-0.5533	-1.3188	NA
SD	0.0006	0.0766	0.0609	0.0121	0.0291	0.1120	0.5056	1.1409	NA
t-value	0.6734	-0.0127	-0.4711	0.1137	0.1412	-1.0829	-1.0943	-1.1560	NA
p-value	0.5032	0.9899	0.6397	0.9098	0.8883	0.2840	0.3057	0.3671	NA
α_2	0.0080	-0.0007	0.0006	-0.0001	-0.0011	-0.0041	0.0023	0.0029	NA
SD	0.0010	0.0009	0.0013	0.0004	0.0005	0.0010	0.0026	0.0019	NA
t-value	8.4419*	-0.7998	0.4289	-0.3279	-2.0946**	-4.2575*	0.8712	1.4905	NA

Table 2 (continued)

p-value	0.0000	0.4267	0.6699	0.7439	0.0410	0.0001	0.4090	0.2746	NA
R^2	0.5246	-0.0201	-0.0316	-0.0243	0.0418	0.2509	0.0654	0.6308	NAs
Panel B: Large firms									
α_0	0.3234	0.1834	-1.3837	0.2725	0.3655	0.0520	0.5563	0.5008	-0.0441
SD	0.0360	0.0199	0.6108	0.0199	0.0661	0.0914	0.1818	0.1994	0.0970
t-value	8.9956*	9.1971*	-2.2655**	13.6918*	5.5263*	0.5688	3.0597*	2.5116**	-0.4542
p-value	0.0000	0.0000	0.0235	0.0000	0.0000	0.5697	0.0025	0.0137	0.6499
α_1	0.0326	0.0046	0.0091	0.0009	-0.0265	0.0042	0.0383	-0.0774	0.0011
SD	0.0082	0.0106	0.0463	0.0014	0.0272	0.0118	0.1030	0.0779	0.0067
t-value	3.9875*	0.4343	0.1964	0.6506	-0.9719	0.3556	0.3721	-0.9940	0.1624
p-value	0.0001	0.6641	0.8443	0.5153	0.3315	0.7222	0.7102	0.3227	0.8711
α_2	0.0076	-0.0022	-0.0054	-0.0015	-0.0005	0.0016	0.0004	-0.0043	-0.0072
SD	0.0003	0.0002	0.0055	0.0001	0.0003	0.0006	0.0014	0.0013	0.0184
t-value	22.2230*	-12.6711*	-0.9680	-10.9208*	-1.5755	2.7692*	0.2516	-3.2360*	-0.3940
p-value	0.0000	0.0000	0.3331	0.0000	0.1156	0.0058	0.8016	0.0017	0.6938
R^2	0.1193	0.0351	-0.0003	0.0202	0.0018	0.0085	-0.0082	0.0908	-0.0045
Panel C: Whole sample									
α_0	0.3456	0.1814	-1.3605	0.2686	0.3311	0.0546	0.5302	0.4780	-0.0443
SD	0.0348	0.0197	0.6023	0.0196	0.0606	0.0844	0.1733	0.1903	0.0963
t-value	9.9279*	9.2290*	-2.2588**	13.7028*	5.4651*	0.6467	3.0591*	2.5118**	-0.4594
p-value	0.0000	0.0000	0.0240	0.0000	0.0000	0.5180	0.0025	0.0136	0.6462
α_1	0.0015	0.0045	0.0084	0.0010	-0.0249	0.0043	0.0335	-0.0810	0.0011
SD	0.0016	0.0105	0.0459	0.0014	0.0257	0.0114	0.1004	0.0762	0.0067
t-value	0.9404	0.4255	0.1833	0.6706	-0.9702	0.3767	0.3340	-1.0630	0.1601

Table 2 (continued)

p-value	0.3471	0.6705	0.8546	0.5025	0.3323	0.7065	0.7387	0.2903	0.8729
α_2	0.0077	-0.0022	-0.0051	-0.0015	-0.0004	0.0014	0.0005	-0.0040	-0.0070
SD	0.0003	0.0002	0.0054	0.0001	0.0003	0.0005	0.0014	0.0013	0.0182
t-value	22.9435*	-12.7151*	-0.9449	-10.9128*	-1.4051	2.6267**	0.3444	-3.1100*	-0.3825
p-value	0.0000	0.0000	0.3448	0.0000	0.1604	0.0088	0.7309	0.0024	0.7023
R^2	0.1175	0.0348	-0.0003	0.0199	0.0010	0.0068	-0.0076	0.0816	-0.0045

Table 3

Annual statistics from asymmetric regression of future earnings change, deflated by the book value, on the dividend change and control variables (t=1)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t denotes the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} denotes the book value of equity at the end of year -1. $R\Delta DIV_0$ denotes the annual percentage change in the cash dividend payment in year 0. ROE_{t-1} equals the earnings before extraordinary items in year t = 1 scaled by the book value of equity at the end of year t = 1. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC(R\Delta DIV_0) + \alpha_2 DNC(R\Delta DIV_0) + \alpha_3 (E_0 - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
α_0	-0.1904	0.0389	-0.0953	0.0572	0.0886	0.2285	-0.1633	-0.5166	-0.2823	NA
SD	0.0359	0.0542	0.0483	0.0515	0.0443	0.1508	0.1139	0.2247	0.6986	NA
t-value	-5.2964*	0.7183	-1.9749**	1.1115	2.0003**	1.5155	-1.4330	-2.2994**	-0.4041	NA
p-value	0.0000	0.4745	0.0527	0.2691	0.0483	0.1347	0.1566	0.0611	0.7555	NA
α_1	-0.0001	-0.0334	0.0166	0.0013	-0.0004	0.0187	0.3703	2.5474	0.3180	NA
SD	0.0002	0.0484	0.0081	0.0161	0.0044	0.1870	0.0225	0.9495	1.3088	NA
t-value	-0.5126	-0.6889	2.0472**	0.0832	-0.0896	0.1000	16.4577*	2.6830*	0.2430	NA
p-value	0.6099	0.4927	0.0448	0.9339	0.9288	0.9207	0.0000	0.0364	0.8482	NA
α_2	0.0138	0.0763	0.3706	0.0380	0.0541	0.2165	-0.3117	4.7066	-2.8981	NA
SD	0.1249	0.1419	0.1822	0.1419	0.1310	0.3659	0.2761	5.1159	2.3534	NA
t-value	0.1109	0.5375	2.0340**	0.2680	0.4127	0.5918	-1.1288	0.9200	-1.2315	NA

Table 3 (continued)

p-value	0.9120	0.5923	0.0462	0.7893	0.6807	0.5561	0.2631	0.3931	0.4342	NA
α_3	-0.7243	-0.1009	-0.2353	-0.2480	-0.0849	0.1180	-0.8175	-2.2059	2.3066	NA
SD	0.1054	0.1200	0.1210	0.1155	0.0771	0.2497	0.1360	1.1364	3.0494	NA
t-value	-6.8731*	-0.8409	-1.9452***	-2.1481**	-1.1008	0.4728	-6.0085*	-1.9412***	0.7564	NA
p-value	0.0000	0.4027	0.0562	0.0342	0.2737	0.6380	0.0000	0.1003	0.5877	NA
α_4	-0.0052	-0.0002	-0.0092	-0.0010	-0.0012	-0.0021	0.0007	0.0071	-0.0053	NA
SD	0.0005	0.0006	0.0005	0.0006	0.0005	0.0011	0.0013	0.0033	0.0154	NA
t-value	-9.8020*	-0.3578	-18.9743*	-1.6655***	-2.5163**	-1.8297***	0.5426	2.1939**	-0.3457	NA
p-value	0.0000	0.7214	0.0000	0.0990	0.0135	0.0721	0.5892	0.0707	0.7881	NA
R^2	0.8632	-0.0163	0.8560	0.0852	0.0609	0.0007	0.8852	0.5893	0.7604	NA
Panel B: Large firms										
α_0	-0.1528	0.1336	1.6891	0.1228	0.2274	0.2629	0.1561	0.1874	0.0485	0.0191
SD	0.0370	0.0262	0.5802	0.0171	0.0242	0.0652	0.1425	0.1379	0.0712	0.0656
t-value	-4.1278*	5.1040*	2.9112*	7.1866*	9.4006*	4.0321*	1.0952	1.3587	0.6816	0.2918
p-value	0.0000	0.0000	0.0036	0.0000	0.0000	0.0001	0.2737	0.1756	0.4958	0.7705
α_1	0.0051	0.0295	-0.0052	-0.0003	-0.0042	-0.0037	0.0784	0.0048	-0.0053	0.0049
SD	0.0030	0.0096	0.0251	0.0012	0.0034	0.0085	0.0671	0.0194	0.0066	0.0095
t-value	1.7089***	3.0737*	-0.2068	-0.2317	-1.2521	-0.4310	1.1690	0.2501	-0.7954	0.5227
p-value	0.0875	0.0021	0.8362	0.8168	0.2106	0.6666	0.2427	0.8027	0.4267	0.6014
α_2	0.6782	0.2446	-0.0580	-0.1114	-0.1238	-0.4612	0.0968	-0.9328	-0.2844	0.0072
SD	0.1270	0.0526	2.1154	0.0515	0.0561	0.1866	0.2313	0.4206	0.2145	0.1428
t-value	5.3391*	4.6513*	-0.0274	-2.1607**	-2.2053**	-2.4715**	0.4184	-2.2176**	-1.3262	0.0506
p-value	0.0000	0.0000	0.9781	0.0308	0.0275	0.0136	0.6758	0.0276	0.1853	0.9596
α_3	-0.9135	-0.6518	0.2184	-0.2532	-0.3522	-0.3105	-0.4847	-0.1594	-0.2513	-0.4004

Table 3 (continued)

SD	0.0204	0.0135	0.5978	0.0159	0.0158	0.0413	0.0548	0.0952	0.0450	0.0365
t-value	-44.8075*	-48.1959*	0.3653	-15.9736*	-22.3096*	-7.5094*	-8.8412*	-1.6742***	-5.5860*	-10.9614*
p-value	0.0000	0.0000	0.7149	0.0000	0.0000	0.0000	0.0000	0.0955	0.0000	0.0000
α_4	-0.0051	0.0006	-0.0016	-0.0010	-0.0005	0.0002	0.0031	0.0016	0.0007	-0.0021
SD	0.0003	0.0002	0.0047	0.0001	0.0001	0.0003	0.0007	0.0009	0.0005	0.0114
t-value	-17.6990*	3.0703*	-0.3343	-8.7946*	-3.6489*	0.7503	4.4470*	1.7268***	1.3615	-0.1849
p-value	0.0000	0.0021	0.7381	0.0000	0.0003	0.4533	0.0000	0.0856	0.1739	0.8534
R^2	0.4222	0.3180	-0.0009	0.0841	0.0907	0.0919	0.0907	0.0250	0.0679	0.1698
Panel C: Whole sample										
α_0	-0.1484	0.1305	1.6544	0.1214	0.2247	0.2545	-0.0038	0.1790	0.0465	0.0188
SD	0.0363	0.0256	0.5706	0.0168	0.0238	0.0613	0.1207	0.1304	0.0704	0.0653
t-value	-4.0891*	5.0895*	2.8992*	7.2155*	9.4286*	4.1548*	-0.0313	1.3728	0.6598	0.2875
p-value	0.0000	0.0000	0.0038	0.0000	0.0000	0.0000	0.9750	0.1711	0.5096	0.7738
α_1	0.0011	0.0295	-0.0050	-0.0003	-0.0041	-0.0033	0.2476	0.0052	-0.0053	0.0049
SD	0.0014	0.0095	0.0249	0.0011	0.0033	0.0083	0.0287	0.0189	0.0066	0.0094
t-value	0.7522	3.1002*	-0.1992	-0.2251	-1.2543	-0.3907	8.6196*	0.2753	-0.8036	0.5184
p-value	0.4520	0.0019	0.8421	0.8219	0.2098	0.6961	0.0000	0.7833	0.4220	0.6043
α_2	0.6740	0.2417	-0.0688	-0.1085	-0.1227	-0.3822	-0.1225	-0.9452	-0.2829	0.0073
SD	0.1249	0.0518	2.0812	0.0508	0.0555	0.1745	0.2046	0.4083	0.2117	0.1425
t-value	5.3947*	4.6694*	-0.0331	-2.1374**	-2.2129 **	-2.1896**	-0.5985	-2.3151**	-1.3361	0.0509
p-value	0.0000	0.0000	0.9736	0.0326	0.0269	0.0288	0.5496	0.0215	0.1821	0.9594
α_3	-0.9096	-0.6513	0.2224	-0.2536	-0.3517	-0.3099	-0.4936	-0.1553	-0.2513	-0.4004
SD	0.0201	0.0134	0.5921	0.0157	0.0157	0.0401	0.0526	0.0929	0.0448	0.0365
t-value	-45.2733*	-48.5675*	0.3756	-16.1263*	-22.4382*	-7.7253*	-9.3798*	-1.6721***	-5.6091*	-10.9816*

Table 3 (continued)

p-value	0.0000	0.0000	0.7073	0.0000	0.0000	0.0000	0.0000	0.0958	0.0000	0.0000
α_4	-0.0050	0.0006	-0.0016	-0.0010	-0.0005	0.0002	0.0032	0.0017	0.0007	-0.0020
SD	0.0003	0.0002	0.0046	0.0001	0.0001	0.0003	0.0006	0.0009	0.0005	0.0113
t-value	-17.8966*	3.1928*	-0.3378	-8.8332*	-3.6403*	0.7852	4.9940*	1.8278 *	1.4571	-0.1755
p-value	0.0000	0.0014	0.7355	0.0000	0.0003	0.4325	0.0000	0.0688	0.1457	0.8608
R^2	0.4224	0.3174	-0.0008	0.0840	0.0904	0.0862	0.1350	0.0265	0.0674	0.1698

Table 4

Annual statistics from asymmetric regression of future earnings change, deflated by the book value, on the dividend change and control variables (t=2)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t denotes the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} denotes the book value of equity at the end of year -1. $R\Delta DIV_0$ denotes the annual percentage change in the cash dividend payment in year 0. ROE_{t-1} equals the earnings before extraordinary items in year t = 1 scaled by the book value of equity at the end of year t = 1. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC(R\Delta DIV_0) + \alpha_2 DNC(R\Delta DIV_0) + \alpha_3 (E_0 - E_{-1})/B_{-1} + \alpha_4 ROE_{t-1} + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007
α_0	0.1148	0.0515	0.3867	0.0294	0.0729	0.3730	-0.3805	-0.2212	0.1913
SD	0.0872	0.1070	0.1719	0.0388	0.0542	0.1540	0.5919	NA	NA
t-value	1.3162	0.4812	2.2489**	0.7568	1.3456	2.4227**	-0.6428	NA	NA
p-value	0.1932	0.6320	0.0292	0.4515	0.1844	0.0192	0.5441	NA	NA
α_1	0.0004	-0.0296	-0.0369	0.0044	-0.0256	-0.2682	0.5371	0.8386	-0.4936
SD	0.0005	0.0966	0.0517	0.0135	0.0297	0.1664	1.3599	NA	NA
t-value	0.8675	-0.3067	-0.7128	0.3293	-0.8620	-1.6120	0.3949	NA	NA
p-value	0.3892	0.7600	0.4795	0.7429	0.3927	0.1135	0.7065	NA	NA
α_2	-0.5264	-0.2138	-0.8755	-0.0732	-0.0521	0.2024	-2.1632	-7.5711	0.2340
SD	0.3023	0.3219	0.6220	0.1182	0.1571	0.3636	1.7036	NA	NA
t-value	-1.7415***	-0.6641	-1.4074	-0.6191	-0.3314	0.5567	-1.2698	NA	NA

Table 4 (continued)

p-value	0.0868	0.5090	0.1659	0.5378	0.7417	0.5803	0.2512	NA	NA
α_3	1.1169	0.4765	2.7762	0.0262	0.3139	0.1152	0.3451	-1.1472	NA
SD	0.2331	0.1970	0.5541	0.0973	0.0784	0.2171	0.7973	NA	NA
t-value	4.7911*	2.4182**	5.0103*	0.2692	4.0037*	0.5306	0.4328	NA	NA
p-value	0.0000	0.0184	0.0000	0.7885	0.0002	0.5981	0.6803	NA	NA
α_4	0.0051	-0.0019	0.0002	-0.0002	-0.0016	-0.0045	0.0042	0.0009	NA
SD	0.0010	0.0010	0.0011	0.0005	0.0005	0.0010	0.0038	NA	NA
t-value	4.9077*	-1.9228***	0.1412	-0.3110	-3.2615*	-4.4084*	1.0876	NA	NA
p-value	0.0000	0.0589	0.8883	0.7567	0.0020	0.0001	0.3185	NA	NA
R^2	0.6483	0.0359	0.3022	-0.0453	0.2535	0.2437	-0.0645	NA	NA
Panel B: Large firms									
α_0	0.3449	0.2252	-1.5558	0.2478	0.3840	0.0875	0.6000	0.6771	-0.0982
SD	0.0401	0.0272	0.6942	0.0228	0.0826	0.1027	0.2788	0.2320	0.1016
t-value	8.6060*	8.2715*	-2.2412**	10.8627*	4.6511*	0.8516	2.1519**	2.9183*	-0.9668
p-value	0.0000	0.0000	0.0251	0.0000	0.0000	0.3947	0.0325	0.0044	0.3342
α_1	-0.0089	0.0042	0.0118	0.0010	-0.0489	0.0000	0.0507	-0.0496	0.0026
SD	0.0085	0.0123	0.0468	0.0014	0.0303	0.0121	0.1207	0.0953	0.0068
t-value	-1.0447	0.3445	0.2512	0.7022	-1.6147	0.0000	0.4201	-0.5208	0.3825
p-value	0.2962	0.7305	0.8017	0.4826	0.1068	1.0000	0.6749	0.6037	0.7023
α_2	-0.0082	0.1422	-1.3303	-0.1380	-0.0289	0.2262	0.1178	1.4674	-0.4765
SD	0.1379	0.0557	2.7636	0.0709	0.2097	0.3089	0.4606	0.6932	0.2641
t-value	-0.0593	2.5499*	-0.4814	-1.9461***	-0.1378	0.7322	0.2557	2.1167**	-1.8041***
p-value	0.9527	0.0108	0.6303	0.0517	0.8904	0.4643	0.7984	0.0369	0.0720
α_3	0.3225	-0.0669	0.3034	0.0795	0.1396	0.0696	-0.0818	-0.3271	0.0012

Table 4 (continued)

SD	0.0215	0.0141	0.7604	0.0209	0.0568	0.0588	0.1225	0.1621	0.0327
t-value	14.9704*	-4.7586*	0.3990	3.8058*	2.4593**	1.1839	-0.6677	-2.0177**	0.0361
p-value	0.0000	0.0000	0.6899	0.0001	0.0142	0.2369	0.5050	0.0465	0.9712
α_4	0.0070	-0.0021	-0.0054	-0.0016	-0.0007	0.0014	0.0005	-0.0039	-0.0062
SD	0.0003	0.0002	0.0055	0.0001	0.0003	0.0006	0.0015	0.0013	0.0183
t-value	20.9524*	-12.2010*	-0.9729	-11.2755*	-1.9471***	2.3131**	0.3401	-2.9032*	-0.3393
p-value	0.0000	0.0000	0.3307	0.0000	0.0519	0.0210	0.7341	0.0046	0.7346
R^2	0.1677	0.0403	-0.0008	0.0223	0.0100	0.0097	-0.0156	0.1486	-0.0014
Panel C: Whole sample									
α_0	0.3312	0.2220	-1.5284	0.2440	0.3436	0.0853	0.5352	0.6266	-0.0978
SD	0.0383	0.0268	0.6843	0.0225	0.0755	0.0957	0.2592	0.2191	0.1009
t-value	8.6528*	8.2886*	-2.2337**	10.8603*	4.5509*	0.8912	2.0650**	2.8595*	-0.9691
p-value	0.0000	0.0000	0.0256	0.0000	0.0000	0.3731	0.0401	0.0052	0.3331
α_1	-0.0001	0.0041	0.0110	0.0010	-0.0460	0.0000	0.0549	-0.0435	0.0026
SD	0.0016	0.0122	0.0465	0.0014	0.0286	0.0117	0.1178	0.0930	0.0067
t-value	-0.0554	0.3375	0.2372	0.7222	-1.6108	0.0039	0.4657	-0.4677	0.3787
p-value	0.9558	0.7358	0.8125	0.4702	0.1076	0.9969	0.6419	0.6410	0.7051
α_2	-0.0284	0.1394	-1.2976	-0.1371	-0.0487	0.1826	0.0322	1.3881	-0.4732
SD	0.1348	0.0551	2.7202	0.0700	0.1948	0.2841	0.4372	0.6762	0.2629
t-value	-0.2110	2.5301**	-0.4770	-1.9603***	-0.2498	0.6429	0.0736	2.0529**	-1.8000***
p-value	0.8329	0.0114	0.6334	0.0500	0.8028	0.5205	0.9414	0.0427	0.0726
α_3	0.3165	-0.0660	0.2999	0.0796	0.1432	0.0776	-0.0751	-0.3409	0.0012
SD	0.0204	0.0140	0.7539	0.0207	0.0540	0.0565	0.1187	0.1593	0.0326
t-value	15.4825*	-4.7294*	0.3979	3.8395*	2.6493*	1.3730	-0.6327	-2.1404**	0.0378

Table 4 (continued)

p-value	0.0000	0.0000	0.6908	0.0001	0.0082	0.1702	0.5276	0.0348	0.9698
α_4	0.0070	-0.0021	-0.0052	-0.0016	-0.0006	0.0012	0.0007	-0.0035	-0.0060
SD	0.0003	0.0002	0.0054	0.0001	0.0003	0.0006	0.0014	0.0013	0.0182
t-value	21.2567*	-12.2337*	-0.9494	-11.2738*	-1.7964***	2.1256**	0.4728	-2.7271*	-0.3269
p-value	0.0000	0.0000	0.3425	0.0000	0.0728	0.0339	0.6368	0.0076	0.7439
R^2	0.1692	0.0399	-0.0008	0.0220	0.0097	0.0085	-0.0148	0.1388	-0.0014

Table 5

Annual statistics from regression of earnings changes on dividend changes using the nonlinear model approach (t=1)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t is the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annual percentage change in the cash dividend payment in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. ROE_t is equal to the earnings before extraordinary items in year t scaled by the book value of equity at the end of year t. 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 logarithm of the total assets in year -1, the logarithm of the market-to-book ratio of equity in year-1, and ROE_{-1}. CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative; it is 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0 + (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0) \times DFE_0 + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
$\boldsymbol{\alpha_0}$	-0.1306	-0.0460	-0.1464	-0.1786	0.0077	-0.4021	0.0703	NA	NA	NA
SD	0.0642	0.0645	0.1258	0.0630	0.0616	0.1875	0.1062	NA	NA	NA
t-value	-2.0360**	-0.7133	-1.1637	-2.8351*	0.1253	-2.1445**	0.6615	NA	NA	NA
p-value	0.0460	0.4785	0.2494	0.0056	0.9005	0.0364	0.5109	NA	NA	NA
$\boldsymbol{\alpha_1}$	-0.0001	0.0014	0.0261	-0.0003	-0.0027	0.1137	0.0334	NA	NA	NA
SD	0.0002	0.0607	0.0148	0.0137	0.0043	0.1783	0.0360	NA	NA	NA

Table 5 (continued)

t-value	-0.4451	0.0230	1.7653***	-0.0241	-0.6210	0.6377	0.9268	NA	NA	NA
p-value	0.6578	0.9817	0.0829	0.9808	0.5362	0.5263	0.3578	NA	NA	NA
α_2	-0.3166	0.1311	0.2798	0.0462	-0.0372	-0.0540	-0.0281	NA	NA	NA
SD	0.1552	0.1368	0.4117	0.1254	0.1365	0.3727	0.1698	NA	NA	NA
t-value	-2.0402**	0.9577	0.6796	0.3684	-0.2721	-0.1450	-0.1655	NA	NA	NA
p-value	0.0456	0.3422	0.4995	0.7135	0.7862	0.8853	0.8691	NA	NA	NA
γ_1	-0.0005	0.0078	-0.0139	0.0145	0.0083	0.0388	0.0314	NA	NA	NA
SD	0.0034	0.0026	0.0091	0.0033	0.0031	0.0119	0.0043	NA	NA	NA
t-value	-0.1511	3.0486*	-1.5237	4.3840*	2.6805*	3.2546*	7.3285*	NA	NA	NA
p-value	0.8804	0.0035	0.1331	0.0000	0.0087	0.0019	0.0000	NA	NA	NA
γ_2	-0.0088	-0.0100	-0.0035	-0.0224	-0.0127	-0.0616	-0.0458	NA	NA	NA
SD	0.0132	0.0101	0.0322	0.0066	0.0058	0.0203	0.0098	NA	NA	NA
t-value	-0.6716	-0.9952	-0.1099	-3.4067*	-2.1784**	-3.0279*	-4.6881*	NA	NA	NA
p-value	0.5043	0.3238	0.9128	0.0010	0.0320	0.0037	0.0000	NA	NA	NA
γ_3	-0.0002	0.0001	-0.0006	-0.0001	0.0000	-0.0002	-0.0002	NA	NA	NA
SD	0.0004	0.0002	0.0008	0.0001	0.0000	0.0002	0.0001	NA	NA	NA
t-value	-0.5653	0.7220	-0.7235	-1.5639	-0.6812	-1.1364	-1.4606	NA	NA	NA
p-value	0.5739	0.4732	0.4723	0.1213	0.4975	0.2607	0.1494	NA	NA	NA
γ_4	0.0000	-0.0001	-0.0001	-0.0002	-0.0001	-0.0003	-0.0003	NA	NA	NA
SD	0.0000	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000	NA	NA	NA
t-value	-1.0655	-5.2058*	-1.3678	-5.5828*	-3.4640*	-2.9397*	-8.5007*	NA	NA	NA
p-value	0.2908	0.0000	0.1768	0.0000	0.0008	0.0048	0.0000	NA	NA	NA
λ_1	-2.0066	-0.7031	-1.3180	0.6099	-0.5483	1.0462	-1.8686	NA	NA	NA
SD	0.3704	0.5373	1.4297	0.3413	0.3574	1.0833	0.2399	NA	NA	NA

Table 5 (continued)

t-value	-5.4168*	-1.3085	-0.9219	1.7869***	-1.5341	0.9657	-7.7900*	NA	NA	NA
p-value	0.0000	0.1959	0.3605	0.0773	0.1285	0.3384	0.0000	NA	NA	NA
λ_2	5.4425	0.1692	2.3868	-1.9148	0.7553	0.2515	3.7976	NA	NA	NA
SD	1.3033	0.9503	2.4185	0.6687	0.5749	2.2181	0.9272	NA	NA	NA
t-value	4.1758*	0.1780	0.9869	-2.8635*	1.3137	0.1134	4.0957*	NA	NA	NA
p-value	0.0001	0.8593	0.3279	0.0052	0.1923	0.9102	0.0001	NA	NA	NA
λ_3	5.9524	-0.8633	2.3042	-0.6906	0.0624	1.1803	1.1503	NA	NA	NA
SD	2.8585	0.5885	3.0562	0.3726	0.1869	1.5019	0.9551	NA	NA	NA
t-value	2.0823**	-1.4670	0.7539	-1.8534***	0.3338	0.7859	1.2043	NA	NA	NA
p-value	0.0414	0.1478	0.4540	0.0671	0.7393	0.4353	0.2333	NA	NA	NA
λ_4	0.4004	1.3317	1.9879	-0.4337	0.2729	-1.9408	0.9604	NA	NA	NA
SD	0.2079	0.5604	1.7858	0.2448	0.2562	0.9194	0.0912	NA	NA	NA
t-value	1.9262***	2.3762**	1.1132	-1.7719***	1.0652	-2.1110**	10.5305*	NA	NA	NA
p-value	0.0587	0.0208	0.2703	0.0798	0.2896	0.0393	0.0000	NA	NA	NA
R^2	0.8386	0.3716	0.5296	0.4051	0.1189	0.1192	0.9638	NA	NA	NA

Panel B: Large firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
α_0	-0.3879	0.0292	0.8637	0.0415	0.0699	0.0838	0.2064	0.2631	0.0999	0.0420
SD	0.0433	0.0278	0.7160	0.0209	0.0257	0.0739	0.1144	0.1610	0.0864	0.0990
t-value	-8.9599*	1.0523	1.2063	1.9854**	2.7201*	1.1349	1.8049***	1.6340	1.1554	0.4243
p-value	0.0000	0.2927	0.2278	0.0471	0.0065	0.2567	0.0715	0.1037	0.2484	0.6715
α_1	0.0071	-0.0014	-0.0050	0.0001	-0.0029	-0.0044	0.0169	-0.0011	-0.0053	0.0065
SD	0.0030	0.0100	0.0252	0.0012	0.0034	0.0081	0.0557	0.0192	0.0066	0.0093
t-value	2.3415**	-0.1360	-0.1999	0.1236	-0.8556	-0.5408	0.3024	-0.0593	-0.8064	0.7002

Table 5 (continued)

p-value	0.0193	0.8918	0.8415	0.9017	0.3922	0.5888	0.7625	0.9528	0.4204	0.4841
α_2	-0.6809	0.0400	2.9441	-0.0703	-0.1621	-0.5083	-0.0507	-0.4925	-0.0561	-0.2240
SD	0.1570	0.0615	2.5335	0.0580	0.0611	0.2140	0.2151	0.4686	0.2591	0.1532
t-value	-4.3363*	0.6503	1.1621	-1.2125	-2.6533*	-2.3750**	-0.2358	-1.0509	-0.2166	-1.4617
p-value	0.0000	0.5156	0.2453	0.2254	0.0080	0.0178	0.8136	0.2945	0.8286	0.1443
γ_1	0.0000	0.0016	0.0068	0.0004	0.0012	-0.0006	0.0012	0.0046	0.0002	-0.0958
SD	0.0007	0.0007	0.0202	0.0004	0.0006	0.0011	0.0021	0.0063	0.0036	0.0883
t-value	-0.0472	2.1306**	0.3386	0.8964	2.1259**	-0.5389	0.5450	0.7381	0.0549	-1.0845
p-value	0.9624	0.0332	0.7349	0.3701	0.0335	0.5901	0.5859	0.4613	0.9563	0.2786
γ_2	-0.0031	-0.0051	-0.0758	-0.0013	-0.0039	-0.0016	0.0102	0.0008	-0.0037	0.1834
SD	0.0023	0.0013	0.0445	0.0009	0.0010	0.0032	0.0041	0.0108	0.0070	0.1676
t-value	-1.3322	-3.9053*	-1.7019***	-1.4614	-3.9360*	-0.5205	2.5112**	0.0710	-0.5311	1.0942
p-value	0.1829	0.0001	0.0888	0.1440	0.0001	0.6028	0.0122	0.9435	0.5956	0.2743
γ_3	0.0000	0.0000	-0.0002	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0158
SD	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0228
t-value	-1.6028	-4.9186*	-1.3378	0.0375	-1.9270***	-0.8971	13.1041*	1.6962***	-0.0638	0.6950
p-value	0.1090	0.0000	0.1810	0.9701	0.0540	0.3699	0.0000	0.0913	0.9492	0.4873
γ_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0155
SD	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0170
t-value	0.3434	-1.6446	-0.5861	-2.9151*	-3.2842*	0.3928	0.1110	-0.2366	0.8399	0.9110
p-value	0.7313	0.1001	0.5579	0.0036	0.0010	0.6946	0.9116	0.8132	0.4013	0.3627
λ_1	-1.2625	-0.3076	-0.0749	-0.3817	-0.1685	0.2781	0.2239	-0.2862	-0.4243	-0.1147
SD	0.0428	0.0287	1.3991	0.0381	0.0353	0.0886	0.0976	0.2535	0.1315	0.0752
t-value	-29.5230*	-10.7207*	-0.0535	-10.0167*	-4.7688*	3.1386*	2.2953*	-1.1292	-3.2270*	-1.5248

Table 5 (continued)

p-value	0.0000	0.0000	0.9573	0.0000	0.0000	0.0018	0.0220	0.2601	0.0013	0.1278
λ_2	1.9699	-0.0562	0.9647	0.0926	-0.0367	-0.1080	-0.9258	-1.6546	0.1385	-0.0536
SD	0.2022	0.0927	3.1844	0.0947	0.0811	0.3094	0.2984	0.9992	0.4834	0.2267
t-value	9.7424*	-0.6066	0.3029	0.9783	-0.4530	-0.3492	-3.1019*	-1.6559***	0.2865	-0.2365
p-value	0.0000	0.5442	0.7619	0.3279	0.6506	0.7270	0.0020	0.0992	0.7746	0.8131
λ_3	0.1379	-0.0845	0.1555	-0.0200	0.0444	0.4312	-0.1808	-0.8378	-0.1687	0.0532
SD	0.0687	0.0269	0.6238	0.0316	0.0195	0.1383	0.0938	0.6745	0.2956	0.0835
t-value	2.0071**	-3.1407*	0.2492	-0.6328	2.2737**	3.1168*	-1.9262***	-1.2421	-0.5706	0.6374
p-value	0.0448	0.0017	0.8032	0.5269	0.0230	0.0019	0.0544	0.2155	0.5685	0.5241
λ_4	0.0032	-0.0134	0.1599	0.0260	-0.0232	-0.0737	-0.0846	0.0362	0.0195	-0.0531
SD	0.0007	0.0007	0.1832	0.0062	0.0031	0.0086	0.0082	0.0439	0.0176	0.0101
t-value	4.6510*	-18.6927*	0.8728	4.1949*	-7.4065*	-8.5554*	-10.3282*	0.8238	1.1084	-5.2763*
p-value	0.0000	0.0000	0.3828	0.0000	0.0000	0.0000	0.0000	0.4109	0.2682	0.0000
R^2	0.4157	0.3882	-0.0005	0.0777	0.1008	0.1781	0.3825	0.0560	0.0750	0.2067

Panel C: Whole sample

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
α_0	-0.3818	0.0287	0.8275	0.0409	0.0689	0.0713	0.1038	0.2457	0.0960	0.0420
SD	0.0424	0.0273	0.7014	0.0205	0.0253	0.0688	0.1039	0.1515	0.0854	0.0989
t-value	-8.9996*	1.0507	1.1799	1.9950**	2.7199*	1.0368	0.9991	1.6220	1.1240	0.4246
p-value	0.0000	0.2934	0.2381	0.0461	0.0065	0.3001	0.3180	0.1062	0.2615	0.6713
α_1	0.0017	-0.0013	-0.0048	0.0001	-0.0028	-0.0043	0.2567	-0.0007	-0.0055	0.0065
SD	0.0014	0.0099	0.0250	0.0012	0.0033	0.0079	0.0289	0.0188	0.0066	0.0093
t-value	1.1639	-0.1309	-0.1932	0.1299	-0.8580	-0.5452	8.8710*	-0.0360	-0.8321	0.7003
p-value	0.2445	0.8959	0.8468	0.8966	0.3909	0.5857	0.0000	0.9713	0.4057	0.4840

Table 5 (continued)

α_2	-0.6642	0.0408	2.9483	-0.0680	-0.1592	-0.4106	-0.2590	-0.5008	-0.0513	-0.2236
SD	0.1537	0.0607	2.4879	0.0570	0.0603	0.1963	0.1990	0.4566	0.2569	0.1530
t-value	-4.3211*	0.6723	1.1850	-1.1923	-2.6380*	-2.0912**	-1.3017	-1.0967	-0.1996	-1.4617
p-value	0.0000	0.5014	0.2361	0.2332	0.0084	0.0368	0.1934	0.2739	0.8419	0.1443
γ_1	0.0000	0.0016	0.0065	0.0004	0.0012	-0.0004	-0.0010	0.0050	0.0006	-0.0942
SD	0.0007	0.0007	0.0199	0.0004	0.0006	0.0011	0.0020	0.0061	0.0036	0.0880
t-value	0.0088	2.1820**	0.3275	0.8979	2.1470**	-0.3648	-0.4704	0.8170	0.1562	-1.0701
p-value	0.9930	0.0292	0.7433	0.3693	0.0318	0.7153	0.6382	0.4148	0.8760	0.2850
γ_2	-0.0032	-0.0051	-0.0763	-0.0013	-0.0040	-0.0022	0.0130	0.0002	-0.0042	0.1814
SD	0.0023	0.0013	0.0439	0.0009	0.0010	0.0030	0.0039	0.0105	0.0069	0.1672
t-value	-1.3779	-3.9709*	-1.7373***	-1.4750	-4.0114*	-0.7202	3.3620*	0.0237	-0.6085	1.0851
p-value	0.1683	0.0001	0.0824	0.1402	0.0001	0.4715	0.0008	0.9812	0.5431	0.2783
γ_3	0.0000	0.0000	-0.0002	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0158
SD	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0227
t-value	-1.6382	-4.9609*	-1.3710	0.0429	-1.9635**	-0.9535	13.6463*	1.7172***	-0.0854	0.6935
p-value	0.1015	0.0000	0.1704	0.9658	0.0496	0.3406	0.0000	0.0873	0.9320	0.4883
γ_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0152
SD	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0170
t-value	0.3097	-1.7154***	-0.5801	-2.9440*	-3.3188*	0.2513	1.5261	-0.3128	0.7472	0.8961
p-value	0.7568	0.0863	0.5619	0.0033	0.0009	0.8016	0.1273	0.7547	0.4553	0.3705
λ_1	-1.2559	-0.3065	-0.0383	-0.3809	-0.1681	0.2771	0.1678	-0.2616	-0.4218	-0.1155
SD	0.0423	0.0284	1.3838	0.0377	0.0351	0.0859	0.0946	0.2449	0.1309	0.0750
t-value	-29.7091*	-10.7761*	-0.0277	-10.0939*	-4.7961*	3.2257*	1.7735***	-1.0680	-3.2224*	-1.5392
p-value	0.0000	0.0000	0.9779	0.0000	0.0000	0.0013	0.0765	0.2866	0.0013	0.1242

Table 5 (continued)

λ_2	1.9642	-0.0569	0.9324	0.0910	-0.0342	-0.1143	-0.9009	-1.7106	0.1432	-0.0515
SD	0.2003	0.0920	3.1500	0.0938	0.0805	0.2982	0.2887	0.9734	0.4809	0.2262
t-value	9.8061*	-0.6192	0.2960	0.9704	-0.4244	-0.3834	-3.1210*	-1.7573***	0.2977	-0.2278
p-value	0.0000	0.5358	0.7672	0.3319	0.6713	0.7015	0.0019	0.0802	0.7661	0.8198
λ_3	0.1394	-0.0848	0.1550	-0.0204	0.0442	0.4299	-0.1887	-0.8574	-0.1645	0.0536
SD	0.0681	0.0267	0.6185	0.0313	0.0194	0.1344	0.0916	0.6585	0.2943	0.0833
t-value	2.0457**	-3.1771*	0.2507	-0.6511	2.2804**	3.1989*	-2.0599**	-1.3021	-0.5589	0.6432
p-value	0.0408	0.0015	0.8021	0.5150	0.0226	0.0014	0.0397	0.1942	0.5765	0.5204
λ_4	0.0031	-0.0135	0.1565	0.0259	-0.0232	-0.0739	-0.0787	0.0335	0.0193	-0.0530
SD	0.0007	0.0007	0.1814	0.0061	0.0031	0.0084	0.0080	0.0427	0.0175	0.0100
t-value	4.6237*	-18.8758*	0.8627	4.2163*	-7.4586*	-8.8223*	-9.8733*	0.7857	1.1037	-5.2794*
p-value	0.0000	0.0000	0.3884	0.0000	0.0000	0.0000	0.0000	0.4329	0.2702	0.0000
R^2	0.4157	0.3879	-0.0004	0.0778	0.1007	0.1736	0.3942	0.0584	0.0735	0.2067

Table 6

Annual statistics from regression of earnings changes on dividend changes using the nonlinear model approach (t=2)

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t is the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annual percentage change in the cash dividend payment in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. ROE_t is equal to the earnings before extraordinary items in year t scaled by the book value of equity at the end of year t. 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 logarithm of the total assets in year -1, the logarithm of the market-to-book ratio of equity in year-1, and ROE_{-1}. CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative; it is 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0 + (\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0) \times DFE_0 + (\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0) \times CE_0 + \varepsilon_t$$

Panel A: Small firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007
α_0	0.0124	0.0599	0.1839	0.0277	0.0505	0.1962	NA	NA	NA
SD	0.1623	0.1607	0.1726	0.0570	0.0806	0.2174	NA	NA	NA
t-value	0.0762	0.3730	1.0654	0.4851	0.6265	0.9025	NA	NA	NA
p-value	0.9396	0.7112	0.2929	0.6291	0.5342	0.3721	NA	NA	NA
α_1	0.0005	-0.0586	-0.0302	0.0089	-0.0092	-0.1850	NA	NA	NA
SD	0.0005	0.1423	0.0344	0.0145	0.0291	0.1945	NA	NA	NA

Table 6 (continued)

t-value	1.0380	-0.4120	-0.8785	0.6144	-0.3155	-0.9509	NA	NA	NA
p-value	0.3049	0.6826	0.3848	0.5409	0.7538	0.3472	NA	NA	NA
α_2	0.4046	0.0134	-0.3179	-0.1413	0.0002	0.2979	NA	NA	NA
SD	0.4071	0.4238	0.5237	0.1297	0.1913	0.4646	NA	NA	NA
t-value	0.9938	0.0316	-0.6070	-1.0892	0.0010	0.6413	NA	NA	NA
p-value	0.3258	0.9749	0.5472	0.2799	0.9992	0.5249	NA	NA	NA
γ_1	0.0060	0.0103	0.0658	0.0019	0.0012	-0.0327	NA	NA	NA
SD	0.0140	0.0060	0.0106	0.0031	0.0034	0.0130	NA	NA	NA
t-value	0.4309	1.7080***	6.2093*	0.6250	0.3654	-2.5099**	NA	NA	NA
p-value	0.6686	0.0956	0.0000	0.5340	0.7165	0.0161	NA	NA	NA
γ_2	-0.0246	-0.0180	-0.0596	-0.0010	0.0031	0.0496	NA	NA	NA
SD	0.0333	0.0463	0.0379	0.0066	0.0129	0.0234	NA	NA	NA
t-value	-0.7395	-0.3883	-1.5720	-0.1466	0.2410	2.1193**	NA	NA	NA
p-value	0.4635	0.6999	0.1236	0.8839	0.8106	0.0402	NA	NA	NA
γ_3	-0.0009	0.0000	0.0008	0.0000	0.0001	0.0003	NA	NA	NA
SD	0.0009	0.0020	0.0009	0.0001	0.0003	0.0002	NA	NA	NA
t-value	-0.9976	0.0220	0.8197	-0.0187	0.3524	1.4745	NA	NA	NA
p-value	0.3239	0.9826	0.4171	0.9851	0.7262	0.1480	NA	NA	NA
γ_4	-0.0001	-0.0001	-0.0010	0.0000	0.0000	0.0002	NA	NA	NA
SD	0.0001	0.0000	0.0001	0.0000	0.0000	0.0001	NA	NA	NA
t-value	-0.8648	-3.4413*	-7.3393*	0.0289	-1.1673	1.9788**	NA	NA	NA
p-value	0.3918	0.0014	0.0000	0.9770	0.2492	0.0546	NA	NA	NA
λ_1	1.5084	-1.7794	-5.4994	-0.2208	-0.1761	1.3906	NA	NA	NA
SD	1.7269	1.2941	1.8343	0.3259	0.3556	1.1826	NA	NA	NA

Table 6 (continued)

t-value	0.8735	-1.3750	-2.9982*	-0.6775	-0.4951	1.1759	NA	NA	NA
p-value	0.3871	0.1770	0.0046	0.5004	0.6230	0.2464	NA	NA	NA
λ_2	-7.7274	4.4907	8.0410	1.3645	-0.2233	-3.7886	NA	NA	NA
SD	3.9755	3.0494	4.1732	1.1386	0.8206	2.5860	NA	NA	NA
t-value	-1.9438***	1.4727	1.9268***	1.1984	-0.2721	-1.4650	NA	NA	NA
p-value	0.0583	0.1489	0.0610	0.2349	0.7868	0.1505	NA	NA	NA
λ_3	-12.4205	0.7592	6.6548	3.8982	-0.5166	-3.3319	NA	NA	NA
SD	7.2993	8.2119	9.3893	2.4133	0.3649	1.7936	NA	NA	NA
t-value	-1.7016***	0.0925	0.7088	1.6153	-1.4159	-1.8577***	NA	NA	NA
p-value	0.0959	0.9268	0.4825	0.1108	0.1637	0.0704	NA	NA	NA
λ_4	1.4680	3.3899	13.7715	0.0669	0.3099	-0.4788	NA	NA	NA
SD	1.7707	1.3143	2.4089	0.2247	0.2374	0.9821	NA	NA	NA
t-value	0.8290	2.5791**	5.7170*	0.2979	1.3054	-0.4875	NA	NA	NA
p-value	0.4116	0.0138	0.0000	0.7667	0.1984	0.6285	NA	NA	NA
R^2	0.6692	0.2452	0.6962	-0.0241	0.3270	0.0161	NA	NA	NA

Panel B: Large firms

	1999	2000	2001	2002	2003	2004	2005	2006	2007
α_0	0.3611	0.0177	-0.7936	0.0648	0.2172	0.0353	0.2727	-0.6630	0.0357
SD	0.0502	0.0319	0.8992	0.0278	0.0977	0.1196	0.3130	0.3353	0.0906
t-value	7.1952*	0.5541	-0.8826	2.3305**	2.2234**	0.2949	0.8714	-1.9775**	0.3937
p-value	0.0000	0.5795	0.3775	0.0198	0.0265	0.7682	0.3845	0.0511	0.6940
α_1	-0.0301	0.0057	0.0075	0.0017	-0.0400	-0.0003	0.0097	0.0989	0.0037
SD	0.0090	0.0135	0.0472	0.0015	0.0303	0.0116	0.1192	0.0885	0.0062
t-value	-3.3472*	0.4201	0.1580	1.1873	-1.3185	-0.0269	0.0816	1.1175	0.5979

Table 6 (continued)

p-value	0.0008	0.6744	0.8745	0.2352	0.1878	0.9785	0.9350	0.2669	0.5502
α_2	0.9260	0.1637	-4.1087	-0.0878	0.2544	0.4975	0.4939	0.9967	-0.6583
SD	0.1856	0.0713	3.2856	0.0802	0.2472	0.3623	0.5059	0.7245	0.3037
t-value	4.9892*	2.2969**	-1.2505	-1.0954	1.0295	1.3732	0.9762	1.3758	-2.1678**
p-value	0.0000	0.0217	0.2112	0.2734	0.3036	0.1702	0.3301	0.1724	0.0308
γ_1	0.0026	0.0026	-0.0098	-0.0005	0.0008	-0.0025	-0.0015	0.0237	0.0054
SD	0.0008	0.0008	0.0246	0.0006	0.0026	0.0017	0.0048	0.0143	0.0038
t-value	3.2088*	3.1044*	-0.3989	-0.8629	0.3039	-1.4661	-0.3042	1.6548***	1.4024
p-value	0.0013	0.0019	0.6900	0.3882	0.7613	0.1431	0.7613	0.1016	0.1616
γ_2	-0.0073	-0.0086	0.0927	0.0002	-0.0025	-0.0051	0.0115	-0.0703	0.0035
SD	0.0030	0.0015	0.0591	0.0012	0.0052	0.0055	0.0144	0.0264	0.0075
t-value	-2.4321**	-5.7117*	1.5685	0.1839	-0.4740	-0.9269	0.7986	-2.6662*	0.4637
p-value	0.0151	0.0000	0.1168	0.8541	0.6356	0.3543	0.4254	0.0091	0.6431
γ_3	0.0000	0.0000	0.0003	0.0000	0.0000	-0.0001	0.0002	-0.0004	0.0001
SD	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0001	0.0002	0.0000
t-value	0.2017	-8.3688*	1.1172	0.2629	-0.5644	-2.4624**	1.4901	-1.7925***	3.2252*
p-value	0.8401	0.0000	0.2640	0.7926	0.5727	0.0141	0.1377	0.0765	0.0014
γ_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002	0.0000
SD	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
t-value	-1.8339***	-3.9781*	0.4297	1.9448***	-0.7860	4.7956*	0.1212	-2.1912**	-2.4681**
p-value	0.0668	0.0001	0.6674	0.0518	0.4322	0.0000	0.9037	0.0311	0.0140
λ_1	1.2373	-0.0837	-0.4136	0.1957	0.1390	0.3961	1.0460	0.8807	-0.2688
SD	0.0530	0.0342	1.9654	0.0529	0.1756	0.1377	0.3984	0.5384	0.1421
t-value	23.3528*	-2.4489**	-0.2105	3.7005*	0.7914	2.8773*	2.6257*	1.6357	-1.8915***

Table 6 (continued)

p-value	0.0000	0.0144	0.8333	0.0002	0.4290	0.0041	0.0093	0.1055	0.0593
λ_2	-2.0944	0.2878	-0.1848	-0.2800	-0.6327	-0.9979	-3.7004	1.4394	0.4028
SD	0.2464	0.1111	5.1730	0.1286	0.3763	0.4909	1.3195	1.7450	0.5338
t-value	-8.5012*	2.5917*	-0.0357	-2.1767**	-1.6813***	-2.0327**	-2.8045*	0.8249	0.7545
p-value	0.0000	0.0096	0.9715	0.0295	0.0932	0.0425	0.0055	0.4117	0.4510
λ_3	-0.1885	0.0329	0.1291	-0.0361	-0.2031	0.0357	-1.3685	1.8873	-0.6733
SD	0.1075	0.0332	2.3062	0.0418	0.1117	0.2342	0.7815	1.2093	0.3234
t-value	-1.7535***	0.9884	0.0560	-0.8624	-1.8191***	0.1523	-1.7512***	1.5606	-2.0816**
p-value	0.0796	0.3230	0.9554	0.3885	0.0693	0.8790	0.0814	0.1222	0.0380
λ_4	-0.0150	-0.0004	0.0710	-0.0313	0.0471	-0.0305	-0.2296	-0.1215	0.0298
SD	0.0008	0.0008	0.3096	0.0091	0.0437	0.0126	0.0818	0.0955	0.0204
t-value	-18.8019*	-0.5326	0.2292	-3.4401*	1.0774	-2.4135**	-2.8082*	-1.2724	1.4571
p-value	0.0000	0.5943	0.8187	0.0006	0.2817	0.0161	0.0055	0.2066	0.1459
R^2	0.1923	0.0297	-0.0015	0.0031	0.0127	0.0778	0.0346	0.3187	0.1446

Panel C: Whole sample

	1999	2000	2001	2002	2003	2004	2005	2006	2007
α_0	0.3327	0.0175	-0.7571	0.0633	0.1963	0.0217	0.2327	-0.5731	0.0368
SD	0.0488	0.0315	0.8814	0.0273	0.0893	0.1098	0.2868	0.3151	0.0896
t-value	6.8213*	0.5551	-0.8590	2.3166**	2.1993**	0.1981	0.8114	-1.8185***	0.4113
p-value	0.0000	0.5788	0.3904	0.0206	0.0282	0.8430	0.4180	0.0722	0.6811
α_1	-0.0007	0.0055	0.0069	0.0017	-0.0382	0.0001	0.0114	0.0912	0.0037
SD	0.0016	0.0134	0.0469	0.0014	0.0286	0.0112	0.1163	0.0860	0.0062
t-value	-0.4427	0.4129	0.1476	1.1992	-1.3344	0.0049	0.0983	1.0598	0.5991
p-value	0.6580	0.6797	0.8826	0.2305	0.1825	0.9961	0.9218	0.2920	0.5495

Table 6 (continued)

α_2	0.8595	0.1627	-4.0948	-0.0862	0.2399	0.4419	0.4693	0.9391	-0.6579
SD	0.1816	0.0707	3.2271	0.0790	0.2275	0.3267	0.4868	0.7085	0.3025
t-value	4.7336 *	2.3013**	-1.2689	-1.0919	1.0548	1.3525	0.9640	1.3254	-2.1752 **
p-value	0.0000	0.0214	0.2046	0.2749	0.2919	0.1766	0.3361	0.1883	0.0302
γ_1	0.0024	0.0026	-0.0096	-0.0005	0.0007	-0.0026	-0.0013	0.0269	0.0054
SD	0.0008	0.0008	0.0244	0.0006	0.0025	0.0017	0.0046	0.0137	0.0038
t-value	2.9191*	3.1509*	-0.3960	-0.8412	0.2671	-1.5803	-0.2742	1.9569***	1.4061
p-value	0.0035	0.0016	0.6921	0.4003	0.7895	0.1145	0.7842	0.0534	0.1605
γ_2	-0.0070	-0.0086	0.0932	0.0002	-0.0024	-0.0050	0.0098	-0.0699	0.0035
SD	0.0030	0.0015	0.0583	0.0012	0.0049	0.0052	0.0138	0.0257	0.0075
t-value	-2.3628**	-5.7612*	1.5979	0.1839	-0.4943	-0.9771	0.7095	-2.7227*	0.4708
p-value	0.0182	0.0000	0.1101	0.8541	0.6213	0.3289	0.4788	0.0077	0.6380
γ_3	0.0000	0.0000	0.0003	0.0000	0.0000	-0.0001	0.0001	-0.0004	0.0001
SD	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0001	0.0002	0.0000
t-value	0.1906	-8.4069*	1.1398	0.2629	-0.5529	-2.5912*	1.4412	-1.7026	3.2411*
p-value	0.8488	0.0000	0.2545	0.7926	0.5805	0.0098	0.1510	0.0920	0.0013
γ_4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0003	0.0000
SD	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
t-value	-1.6526***	-4.0625*	0.4265	1.9448***	-0.7900	5.0296*	0.0984	-2.4968**	-2.4764**
p-value	0.0985	0.0000	0.6698	0.0518	0.4298	0.0000	0.9217	0.0143	0.0137
λ_1	1.2127	-0.0815	-0.4373	0.1955	0.1520	0.4030	1.0582	0.6969	-0.2695
SD	0.0520	0.0339	1.9449	0.0524	0.1654	0.1320	0.3841	0.5136	0.1414
t-value	23.3042*	-2.4019**	-0.2248	3.7333*	0.9186	3.0528*	2.7549*	1.3570	-1.9051***
p-value	0.0000	0.0164	0.8221	0.0002	0.3586	0.0024	0.0064	0.1781	0.0575

Table 6 (continued)

λ_2	-2.0759	0.2870	-0.1539	-0.2818	-0.6532	-0.9533	-3.6368	1.5765	0.4028
SD	0.2445	0.1104	5.1245	0.1275	0.3568	0.4678	1.2612	1.7011	0.5317
t-value	-8.4908*	2.6000*	-0.0300	-2.2110**	-1.8309***	-2.0379**	-2.8837*	0.9268	0.7575
p-value	0.0000	0.0094	0.9760	0.0271	0.0675	0.0419	0.0043	0.3565	0.4492
λ_3	-0.1907	0.0329	0.1297	-0.0367	-0.2154	0.0516	-1.3222	1.8251	-0.6735
SD	0.1068	0.0331	2.2869	0.0415	0.1071	0.2250	0.7549	1.1836	0.3222
t-value	-1.7858***	0.9955	0.0567	-0.8836	-2.0118**	0.2293	-1.7514***	1.5419	-2.0903**
p-value	0.0742	0.3195	0.9548	0.3770	0.0446	0.8187	0.0813	0.1265	0.0372
λ_4	-0.0149	-0.0005	0.0735	-0.0313	0.0456	-0.0308	-0.2316	-0.0904	0.0298
SD	0.0008	0.0008	0.3068	0.0090	0.0416	0.0122	0.0791	0.0913	0.0203
t-value	-18.8203*	-0.5892	0.2395	-3.4686*	1.0955	-2.5379**	-2.9279*	-0.9909	1.4662
p-value	0.0000	0.5558	0.8107	0.0005	0.2736	0.0114	0.0038	0.3244	0.1434
R^2	0.1914	0.0297	-0.0014	0.0031	0.0150	0.0785	0.0371	0.3099	0.1444

Table 7

Summary statistics from nonlinear regression of the future earnings change, deflated by the book value, on the dividend change and certain control variables

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t is the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annual percentage change in the cash dividend payment in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. ROE_t is equal to the earnings before extraordinary items in year t scaled by the book value of equity at the end of year t. 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 logarithm of the total assets in year -1, the logarithm of the market-to-book ratio of equity in year-1, and ROE_{-1}. CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative; it is 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$
\begin{aligned}
&(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0 \\
&+ \left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right) \times DFE_0 + \\
&(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \quad) \times CE_0 + \varepsilon_t
\end{aligned}
$$

Panel A: Small firms

t	α_0	α_1	α_2	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	R^2	N
1	-0.1180	0.0245	0.0030	0.0124	-0.0235	-0.0002	-0.0001	-0.6841	1.5554	1.2994	0.3684	0.4781	569
t-value	-2.0305**	1.5469	0.0436	1.8099***	-2.8558*	-1.9134***	-3.8454*	-1.5443	1.6542***	1.4689	0.7593		
2	0.0884	-0.0456	0.0428	0.0088	-0.0084	0.0000	-0.0002	-0.7961	0.3595	-0.8261	3.0879	0.3216	365
t-value	2.6883*	-1.5411	0.3894	0.6728	-0.5691	0.1950	-1.0266	-0.7490	0.1556	-0.3040	1.3977		

Table 7 (continued)

Panel B: Large firms													
1	0.1312	0.0011	0.0739	-0.0080	0.0100	0.0016	0.0015	-0.2518	0.0331	-0.0469	-0.0003	0.1880	31619
t-value	1.3399	0.4704	0.2256	-0.8223	0.4819	0.9902	0.9967	-1.8675***	0.1080	-0.4493	-0.0148		
2	-0.0502	0.0063	-0.1692	0.0023	0.0016	0.0000	0.0000	0.3476	-0.6400	-0.0427	-0.0312	0.0902	18817
t-value	-0.3730	0.4862	-0.3251	0.7620	0.1143	0.1651	-1.0584	1.7698***	-1.2723	-0.1484	-1.0065		
Panel C: Whole sample													
1	0.1143	0.0246	0.0653	-0.0080	0.0098	0.0016	0.0015	-0.2504	0.0262	-0.0494	-0.0004	0.1888	32188
t-value	1.2168	0.9514	0.1991	-0.8355	0.4786	0.9899	0.9969	-1.8875***	0.0853	-0.4651	-0.0175		
2	-0.0477	0.0091	-0.1918	0.0027	0.0015	0.0000	0.0000	0.3256	-0.6098	-0.0443	-0.0279	0.0897	19182
t-value	-0.3874	0.8003	-0.3735	0.7941	0.1106	0.2081	-1.0578	1.7079***	-1.2077	-0.1587	-0.9245		

Table 8

Nonlinear regressions of the future earnings change, deflated by the book value, on the dividend change for two periods 1998-2003 and 2006-2009

This table reports estimates of regressions relating raw earnings changes to dividend changes. E_t is the earnings before extraordinary items in year t (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annual percentage change in the cash dividend payment in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. ROE_t is equal to the earnings before extraordinary items in year t scaled by the book value of equity at the end of year t. 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 logarithm of the total assets in year -1, the logarithm of the market-to-book ratio of equity in year-1, and ROE_{-1}. CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative; it is 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. R^2 is the average (adjusted) R^2 of the cross-sectional regressions. *, ** and *** denote significant difference from zero at the 1%, 5% and 10% levels, respectively.

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 DPC_0 \times R\Delta DIV_0 + \alpha_2 DNC \times R\Delta DIV_0$$
$$+\left(\gamma_1 + \gamma_2 NDFED_0 + \gamma_3 NDFED_0 \times DFE_0 + \gamma_4 PDFED_0 \times DFE_0\right)\times DFE_0 +$$
$$(\lambda_1 + \lambda_2 NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4 PCED \times CE_0 \quad)\times CE_0 + \varepsilon_t$$

Panel A: Small firms

t	α_0	α_1	α_2	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	R^2	N
99-03	-0.0988	0.0049	0.0207	0.0033	-0.0115	-0.0002	-0.0001	-0.7932	1.3678	1.3530	0.7118	0.4528	413
t-value	-2.8648	0.9121	0.2082	0.6642	-3.7107	-1.2773	-3.4649	-1.8235	1.1126	1.0563	1.6744		
06-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
t-value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		

Table 8 (continued)

99-03	0.0669	-0.0177	-0.0082	0.0171	-0.0200	0.0000	-0.0002	-1.2334	1.1891	-0.3250	3.8012	0.3827	293
t-value	2.1974	-1.4604	-0.0688	1.3876	-1.7934	-0.0006	-1.3084	-1.0395	0.4504	-0.0993	1.4844		
06-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
t-value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Panel B: Large firms													
99-03	0.1233	-0.0004	0.4142	0.0020	-0.0178	-0.0001	0.0000	-0.4390	0.5868	0.0467	0.0305	0.1964	28432
t-value	0.6060	-0.1960	0.6427	1.6136	-1.2317	-1.1182	-1.4208	-2.0644**	1.4900	1.0208	0.9129		
06-08	0.1350	0.0000	-0.2575	-0.0303	0.0601	0.0053	0.0052	-0.2751	-0.5232	-0.3177	0.0009	0.1126	1425
t-value	2.0395*	0.0056	-2.0265**	-0.9258	0.9759	1.0036	1.0006	-3.0720*	-0.9205	-1.1865	0.0316		
99-03	-0.0266	-0.0110	-0.5705	-0.0009	0.0149	0.0001	0.0000	0.2149	-0.5808	-0.0532	0.0143	0.0473	17432
t-value	-0.1321	-1.1082	-0.6337	-0.3690	0.7648	0.9291	0.3977	0.7757	-1.4308	-0.8317	0.7402		
06-07	-0.3137	0.0513	0.1692	0.0145	-0.0334	-0.0001	-0.0001	0.3059	0.9211	0.6070	-0.0459	0.2317	504
t-value	-0.8979	1.0780	0.2045	1.5885	-0.9054	-0.5602	-1.4813	0.5323	1.7771***	0.4741	-0.6064		
Panel C: Whole sample													
99-03	0.1169	-0.0014	0.4196	0.0020	-0.0180	-0.0001	0.0000	-0.4300	0.5793	0.0467	0.0298	0.1963	28845
t-value	0.5958	-1.2576	0.6519	1.6564***	-1.2321	-1.1175	-1.4366	-2.0028**	1.4805	1.0172	0.9094		
06-08	0.1279	0.0001	-0.2585	-0.0295	0.0591	0.0053	0.0051	-0.2663	-0.5397	-0.3228	0.0000	0.1129	1444
t-value	2.0992**	0.0341	-1.9747*	-0.9138	0.9673	1.0034	1.0002	-3.0101*	-0.9175	-1.1753	-0.0016		
99-03	-0.0295	-0.0049	-0.5838	-0.0009	0.0151	0.0001	0.0000	0.2083	-0.5756	-0.0560	0.0145	0.0476	17725
t-value	-0.1551	-0.5868	-0.6549	-0.3979	0.7705	0.9318	0.4006	0.7573	-1.4244	-0.8526	0.7417		
06-07	-0.2681	0.0474	0.1406	0.0161	-0.0332	-0.0001	-0.0002	0.2137	0.9897	0.5758	-0.0303	0.2271	512
t-value	-0.8792	1.0846	0.1761	1.4993	-0.9040	-0.5345	-1.4278	0.4423	1.6864***	0.4609	-0.5041		

Dividend Changes and firm performance

1. Introduction

1.1 Research Questions

According to the information content of dividends (ICD) hypothesis (Miller and Modigliani, 1961), dividend changes trigger stock returns since they convey new information about the firm's future profitability and cash flow. Dividend changes are positively correlated with future changes in firm profitability and earnings. Many researchers have done empirical analysis on this issue,

In this paper, we will focus on evaluating ICD hypothesis in Norwegian market to show the relationship between dividend changes and the firm's earnings and profitability in subsequent years in Norwegian firms.

Additionally, there is an important tax reform in Norway which increased dividend taxation during 2004-2006. This reform results in dividend payments changed significantly. We will also look into this interesting thing that the dividend changes following the tax reform.

1.2 Motivation and Practical Implications

The information content of dividends (ICD) hypothesis is one of most important issues in corporate finance. Although the ICD hypothesis appears to have resurged, we believe it still interesting to assess the hypothesis in other markets such as using Norwegian market data. It is worthwhile to conduct a test of the ICD hypothesis using Norwegian market data because of the following reasons. First, past studies on the ICD hypothesis have been conducted principally in the US background. Therefore, it should prove that it's worthwhile to assess this hypothesis in other markets to determine whether the model is universally applicable. Furthermore, Companies operate under different regulatory and different economic and tax policies environments in Norway and the United States. Norwegian managers, in general, may have greater flexibility in setting their dividend payout than do managers of U.S. firms (H. Kent Baker, Tarun K.

Mukherjee and Ohannes George Paskelian, 2006), studying on Norwegian market data to observe the meaning of dividend payment changes is interesting.

2. Literature review

Dividend payment modeling work begins with Lintner's (1956) ground-breaking study, which argued that the main determinants of changes in dividend are current earnings and preceding dividend level. Since Lintner (1956) reported that firms increase their dividends only when managers are confident that increased earnings would be sustained, many researchers and market practitioners agree with the point that dividend changes bear informational content about the firm's earnings.

On the basis of this, Miller and Modigliani (1961) develop a theory called 'the information content of dividends (ICD) hypotheses', which is also the core problem we desire to investigate and check. ICD hypothesis has empirically been widely studied. According to ICD, dividend changes trigger stock returns since they convey new information about the firm's future profitability and cash flow. Similarly, dividend signaling theories by Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) suggest us that changes in dividend policy convey news about future cash flows. Specifically, dividend increases convey good news, and dividend decreases convey bad news. The models also predict a positive relationship between dividend changes and the price reaction to dividend changes. Dividends are seen to be an increasing function of expected cash flow (Brooks et al., 1998, Koch and Shenoy, 1999), they signal of the stability of the firm's future cash flow (Kale and Noe, 1990) or dividend payout ratios (of German firms) are based cash flows rather than published earnings (Goergen et al., 2004). Additionally, Pettit (1972), Aharony and Swary (1980), Asquith and Mullins (1983), Dielman and Oppenheimer (1984) study on assessing the announcements of dividend change and related responses in the stock market also show that dividend change is positively associated with abnormal returns in the stock price of the underlying firm. It indicates that dividend increases can be seen as a positive signal of the firm's future earnings and then also the value of the firm's shares. One of the key implications of these models is that dividend changes should be followed by changes in firm profitability (earnings growth rates or return on assets) in the same direction.

However, recent studies have not supported ICD hypothesized relation between dividend changes and future earnings, studies by Watts (1973), Gonedes (1978), Penman (1983), Healy and Palepu (1988), DeAngelo, DeAngelo and Skinner (1996), Benartzi, Michaely and Thaler (BMT, 1997), and Grullon, Michaely and Swaminathan (2002) find little or no evidence that dividend changes predict abnormal increases in earnings. For example, Watts (1973) finds a positive relationship between the two variables---dividend changes and future earnings, but this is not statistically significant. Thus, he concludes that the ICD is not economically meaningful. DeAngelo, DeAngelo and Skinner (1996) analyze managers tend to increase dividends because of overoptimistic forecasts about future earnings, and therefore the ICD is unreliable. Benartzi, Michaely and Thaler (1997) use a matched-sample approach in which dividend changing firms are matched to non-dividend changing firms based on their attributes such as market capitalization, industry, and past earnings performance and find no evidence of positive abnormal earnings changes after dividend increases. Grullon, Michaely and Swaminathan (2002) find that firms that increase dividends experience significant decline in their systematic risk, profitability, capital expenditures and cash levels, and suggest that dividend increases may be an important element of a firm’s long-term transition from growth to a more mature phase.

Although many papers don’t support ‘the ICD hypothesis’, Nissim and Ziv (2001) provide strong evidence in support of the information content of dividends hypothesis through using different methodologies. They use a particular model of earnings expectations and document that dividend changes are positively related to earnings changes in each of the two years following the dividend change. Nissim and Ziv argue that researchers have been using the wrong model to control for the expected changes in earnings; which result in previous studies have failed to uncover the true relation between dividends and future earnings. Specifically, Nissim and Ziv also show that dividend changes are positively related to the level of future profitability when profitability is measured in terms of future earnings and future abnormal earnings.

The findings in NZ are important, especially because past researchers find either the opposite relation (Penman, 1983), no relation, or a very weak relation (Benartzi, Michaely and Thaler, 1997). Recognizing the potential non-linearity in the relation between dividends and earnings, many of the prior investigators have used methods other than regression analysis and find results opposite to the ones in NZ. These consistent findings across studies and methodologies make the NZ results surprising.

There are also differences in ICD hypothesis across countries with different institutional structures. In Japan, dividends are less sticky and more responsive to changes in earnings than their US counterparts. This is because Japanese firms have less information asymmetry and fewer agency conflicts (Dewenter and Warther, 1998). In Germany, dividends have less of a signaling role than that in the USA and UK (Goergen et al., 2005). In developing countries, dividends are a less viable mechanism for signaling compared to US counterparts (Aivazian et al., 2003). Firms with more diversified shareholdings and lower concentrations of insider shareholdings are more likely to use dividends to signal (Tse, 2005).

3. Data

We will collect the firms listed on the Norwegian Stock Exchange for the years from 1994 to 2009 using the following criteria:

i. The firm had to be nonfinancial.
ii. The firm paid the dividend in two consecutive years.
iii. The firm did not announce other distributions between the announcements of the previous dividend and current dividend.

We will also collect the financial statement data and stock market data.

4. Hypotheses and methodology

There is an important tax reform in Norway which increased dividend taxation during 2004-2006. In order to avoid the influence from the change of dividend taxation, we will divide the whole period to two periods: 1994-2004 and 2005-2009. We will run the regression for each period separately to see the relationship of dividend and firm performance in different period, and at the same time, we will compare the results of these two periods, to see the managers' reaction considering the tax and future profit of firm.

1) Dividend changes cannot predict future earnings in the next three years in Norwegian market.

The initial analysis is to examine the relationship between dividend changes and future earnings for the two periods. First, we will run the basic regression based the model employed by Nissim and Ziv (2001):

$$(E_t - E_{t-1})/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \varepsilon_t \quad (1)$$

E_t is the earning in year t, B_{-1} donates the book value of equity at the end of the previous year, ROE_{t-1} means the return on the book value of equity and $R\Delta DIV_0$ means the rate of dividend change in the year of dividend change, which is equal to $\mathrm{R\Delta DIV_0} = \frac{\mathrm{DIV_0 - DIV_{-1}}}{\mathrm{DIV_{-1}}}$,where $\mathrm{DIV_0}$ is the dividend at year 0 and $\mathrm{DIV_{-1}}$ is the dividend in the previous year. Here we just run the results for t=1, t=2 and t=3, since Nissim and Ziv (2001) reported that dividend changes significantly positive relate to the future earnings in the subsequent two years. For the procedures to get the cross-section regression results, we adopt the Fama and Macbeth (1973) method: estimate cross-sectional regression coefficients and adjusted R^2 for each year, and then calculated the time-series means of the estimate cross-sectional regression coefficients and adjusted R^2.

There is a problem in the equation (1): the earning changes may have probability of autocorrelation (Benartzi et al. (1997)), so we add lagged variables of the dependent variables, and the equation (1) become following equation:

$$\left(E_t - E_{t-1}\right)/B_{-1} = \alpha_0 + \alpha_1 R\Delta DIV_0 + \alpha_2 ROE_{t-1} + \alpha_3 \left(\mathrm{E}_0 - E_{-1}\right)/B_{-1} + \upsilon_t \qquad (2)$$

2) Dividend omissions can signal the future earnings, but dividend initiations cannot signal the future earnings.

Certain previous studied issued that the predictions to earnings of increased dividends and of decreased dividends are symmetric. (e.g., DeAngelo et al. (1990) and Benartzi et al.(1997)). Here, we are interested the results dividend initiations and dividend omissions, so we also do the separate examine for the dividend initiations group and dividend omissions group by employing the dummy variable.

$$\begin{aligned}\left(\mathrm{E}_t - E_{t-1}\right)/\mathrm{B}_{=1} = {} & \alpha_0 + \alpha_1 DPC * R\Delta DIV_0 + \alpha_2 DNC * R\Delta D\mathrm{IV}_0 \\ & + \alpha_3 ROE_{t-1} + \alpha_4 \left(E_0 - E_{-1}\right)/B_{-1} + \varepsilon_t\end{aligned} \qquad (3)$$

When the dividend increases out of zero, the dummy variable DPC equal to 1 and DNC equal to 0; when the dividend payment is canceled, DPC is 0 and DNC is 1.

In the hypothsis 1 and 2, the models used assume that earnings are a uniform mean reversion process and their autocorrection is linear. However, some scholars, such as Elgers and Lo (1994) and Fama and French (2000), pointed out that mean reversion process and level of autocorrelation of earning are nonlinear: the mean reversion is faster for large changes and negative changes rather than for small changes and positive changes. Therefore, Grullon et al. (2005) employ an alternative equation to capture the nonlinearity of earnings. See the following equation (4).

$$\begin{aligned}\left(\mathrm{E}_t - E_{t-1}\right)/B_{-1} = {} & \alpha_0 + \alpha_1 DPC * R\Delta DIV_0 + \alpha_2 DNC * R\Delta DIV_0 \\ & + \left(\gamma_1 + \gamma_2 NDFED + \gamma_3 NDFED * DFE_0 + \gamma_4 PDFED * DFE_0\right) * DFE_0 \\ & + \left(\lambda_1 + \lambda_2 NCED + \lambda_3 NCED * CE_0 + \lambda_4 PCED * CE_0\right) * CE_0 + \varepsilon_t\end{aligned}$$

Where *DFE* equals to $\mathrm{ROE}_0 - \mathrm{E}\left[\mathrm{ROE}_0\right]$ and $E\left[RO\mathrm{E}_0\right]$ is the fitted value from the cross-section regression of ROE_0 on the logarithm of the total asset in previous year, the logarithm of the market-to-book ratio of the equity in previous year and ROE_{-1}. NDFED is a dummy variable which takes the value of 1 if DFE_0 is negative and 0 otherwise, and PNDFED is 1 if DFE_0 is positive and 0 otherwise. For the latter part of equation, CE_0 refers to $(E_0 - E_{-1})/B_{-1}$ and NCED (OCED) is also a dummy variable which takes the value of 1 if CE_0 is negative (positive) and 0 otherwise. When the dividend increases out of zero, the dummy variable DPC equal to 1 and DNC equal to 0; when the dividend payment is canceled, DPC is 0 and DNC is 1.

And we will use this non-linear equation to run the samples for dividend initiations sample and dividend omissions sample, to see the results in different two periods.

3) The relationship between dividend changes and future earnings is positive significant for small Norwegian firms, but not positive significant for large Norwegian firms.

Additionally, we are interested in the ICD hypothesis in the large and small firms. According to the CCGR database which is owned by Centre for Corporate Governance Research (CCGR), we divide the whole sample into two groups, small Norwegian firms and large Norwegian firms.

We use the linear equation (2) and non-linear (4) to run the regressions, testing the ICD hypothesis separately for small Norwegian and large Norwegian firms.

4) The ICD hypothesis is relatively not such significant when dividend taxation increases.

We have divided the whole period into two periods above, considering the tax reform in Norway during 2004-2006. Therefore, in the above analysis and regression, we would obtain the different results for these two different periods. Here we will compare the different outcomes in regressions, and we expect the average coefficient in the second period (2005-2009) won't be such relatively significant compared with that in the first period (1994-2004).

5. Reference

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