Dividend Changes and Future Profitability:
A Revisit based on Earnings Volatility

A Thesis Submitted to the College of

Graduate Studies and Research

In partial fulfillment of the requirements

For the Degree of Master of Science in Finance

In the Department of Finance and Management Science

Edwards School of Business

University of Saskatchewan

Saskatoon, Saskatchewan, Canada

by

Yirong Guo

Permission to Use

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make other use of material in this thesis in whole or part should be addressed to:

Head of the Department of Finance and Management Science
Edwards School of Business
University of Saskatchewan
25 Campus Drive
Saskatoon, Saskatchewan
S7N 5A7

Abstract

We investigate whether dividend changes signal firms' future profitability by considering firms' earnings volatility and examining how earnings volatility affects dividend signaling. In general, we find a positive relation between dividend increases on firms' future earnings. In other words, dividend increases tend to signal positive changes in future earnings. However, the effect largely depends on the firms' earnings volatility such that higher earnings volatility tends to mitigate the signaling effect of dividend increases on future earnings. Specifically, for firms that have high earnings volatility, dividend increases seem to signal a reduction in future earnings volatility rather than an increase in future earnings. On the other hand, we find no consistent results for dividend decreases. Our findings have three main implications: 1) The traditional dividend signaling theory is valid; 2) the effect of signaling depends on a firm's earnings volatility; 3) for high-volatility firms, positive dividend changes signal earnings volatility reductions rather than earnings increases.

JEL Classification: G17, G30, G35

Key Words: dividend changes, signaling, earnings, profitability

Acknowledgements

I would like to express my sincere appreciation and thanks to my supervisors, Dr. Min Maung and Dr. Craig Wilson, for their exceptional guidance, support and advice throughout my research. I would also like to thank Dr. Marie Racine, the Graduate Chair in Finance, for her kindness, encouragement, and genuine care during my study in the program.

I must express my gratitude to Ms. Brenda Oriskchuk, Ms. Wanda Gonda, and all the other supporting staff for their consistent and untiring help and support. I also thank my fellow classmates, as completing this work would have been much more difficult without their friendship and encouragement.

Special thanks go to my family. I cannot express enough how grateful I am to my parents, my parents-in-law, and my grandfather-in-law for all their love, prayers and support. I would also like to mention my Grandmother, who passed away on December 15, 2013. She was the strongest and most inspirational person in my life. She would be very proud of my accomplishment. Finally, I would like to thank my beloved husband, Joshua Crosby, for his continued patience and unfailing love for me.

Table of Contents

List of Tables

1 Introduction

Positive market reactions to dividend changes are well documented in the literature. When dividends are initiated or increased, stock prices typically go up, and conversely, when dividends are omitted or cut, prices fall, as documented by Pettit (1972), Charest (1978), Aharony and Swary (1980), Brickley (1983), Healy and Palepu (1988), and Michaely, Thaler, and Womack (1995). It is therefore proposed that changes in dividend policy could act as a signaling device to the general market regarding firms' future prospects (Bhattacharya, 1979; John and Williams, 1985; and Miller and Rock, 1985). This is also called the traditional dividend signaling hypothesis. However, whether dividend changes have longer term effects on firms' future profitability, generally measured by changes in earnings, is still unclear.

In fact, the existence of dividend signaling on firms' future profitability, or whether dividend changes convey new information about future earnings, has been controversial in academic finance for decades. Many studies regarding this issue have been conducted, but no consensus has been reached. In particular, Nissim and Ziv (2001), by developing a linear model of earnings expectations, find that positive dividend changes are positively associated with firms' future earnings. However, after constructing a similar model that incorporates nonlinearity in earnings expectations, Grullon, Michaely and Thaler (2005) find no evidence that dividend increases could signal increases in future earnings. Because of these mixed results in the finance literature, the question of whether dividend changes signal future earnings still remains somewhat a mystery. This research is an attempt to resolve this controversy by revisiting the subject matter based on firms' earnings volatility.

We notice that most prior studies look into the direct relation between dividend changes and changes in future earnings; they overlook the possibility that the effect of dividend changes on future profitability could depend on a third factor that moderates the relation. The omission of this term could lead to ambiguous empirical results. Inspired by the signaling model developed by Lintner (1956) and Bhattacharya (1979), we hypothesize that earnings volatility could be one such factor that distorts the direct relation between dividend changes and future profitability. We thereby hypothesize that there is a positive association between changes in dividends and future profitability; however, this association is conditional on a firm's specific earnings volatility. Specifically, we propose that the positive association between dividend increases and future earnings changes is mitigated by higher current earnings volatility, ceteris paribus. Accordingly, we hypothesize that for firms with high earnings volatility, a dividend increase signals a reduction in future earnings volatility rather than an increase in future earnings; for firms with low volatility, a dividend increase signals higher future earnings. We have no conclusive prediction regarding dividend decreases as a dividend decrease could signal either lower future earnings or higher future earnings volatility regardless of current volatility levels.

We first adopt similar methodologies as in Nissim and Ziv (2001) and Grullon et al. (2005) to verify that their results hold in our sample. We then modify their regression models by considering current earnings volatility. We use both linear and nonlinear models in order to test whether our results are subject to different assumptions of earnings expectations. We obtain our data from the Centre for Research in Security Prices (CRSP) monthly event files and Compustat Monthly updates database. Our results provide strong evidence that changes in dividends, increases in particular, have positive association with firms' future earnings profitability. However, earnings volatility mitigates this signaling effect. Specifically, we find that for firms with low earnings volatility, a dividend increase signals an increase in future earnings; whereas for firms with high earnings volatility, a dividend increase signals a reduction in future earnings volatility rather than changes in earnings. As expected, we do not find any conclusive result regarding dividend decreases. Our evidence suggests that firms might change their dividend policies due to an expected change in future earnings volatility. The higher current earnings volatility is, the more likely a dividend increase is a result of an expected volatility change. Our findings provide an explanation of the inconsistent results in the literature regarding the information content of dividend changes. They can also help investors better interpret dividend changes and adjust their investments accordingly. As such, this research is not only of academic significance, but it is also of great practical value.

We make at least three contributions to the finance literature. First, we find new and consistent evidence that supports the traditional dividend signaling theory based on two previous models that generate contradictory results. Thus, our results are robust to different earnings expectations model and specifications. Second, we are the first to investigate the interaction effect of earnings volatility on the signaling of dividend changes. Third, our findings imply that dividend changes signal not only the future expected level of earnings but also the expected volatility of earnings; we show that changes in dividends, especially dividend increases, could signal an expected volatility reduction for high-volatility firms.

The rest of the paper is organized as follows. Section 2 reviews the previous literature and presents our hypotheses development. Section 3 describes data and methodology. Empirical results are discussed in section 4. Section 5 presents robustness checks. Finally, section 6 concludes the paper.

2 Literature Review and Hypotheses Development

2.1 Literature Review

2.1.1 The Traditional Dividend Signaling Hypothesis

Miller and Modigliani (1961) first suggest that dividends could possibly contain information about firms' future profitability. They contend that in perfect and complete capital markets, a firm's dividend policy should be irrelevant to firm value and investors' positions as investors can create homemade dividends from the sale of a portion of their shares. Furthermore, prior to the Tax Reform Act of 1986, individual stockholders with at least six months holding history paid a higher tax rate on ordinary dividends (50%) than on capital gains (20%) (Bolster and Janjigian, 1991). The Act removed the tax benefit for capital gains over dividends. However, as taxes on capital gains can be easily deferred, a tax disadvantage for dividend payout still exists. As a result, it seems that the optimal strategy for corporations should have been to minimize dividend payments. In spite of this, firms still pay dividends to this day. Since Miller and Modigliani's dividend irrelevance theory, many hypotheses have been raised to rationalize firms' dividend paying behavior.

Some researchers propose that firms pay dividends as a signaling device to outside investors. Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985) maintain that changes in dividends, acting as costly signaling tools, could be sent intentionally by insiders to convey information on firms' future prospects. They believe management is likely to have more information about the current status and future prospects of their firm than general investors. Their decisions to increase or decrease dividends might convey some inside information that investors do not know. Outsiders, who lack the capacity to obtain full information of a firm, tend to consider dividend change announcements to be critical for the valuation of the firm. Therefore, management can provide signals to the market through dividend policies.

In order to be considered as credible signals of quality, dividend changes should be costly to mimic for low quality firms. Bhattacharya (1979) views the signaling cost as a transaction cost of having to resort to relatively expensive outside financing when new capital has to be raised as a result of the increased dividend payment, whereas Miller and Rock (1985) maintain that the opportunity cost associated with the cash outflows of dividend payment is the major signaling cost. The signaling model developed by John and Williams (1985) considers taxes as the primary cost for dividend signaling. Nevertheless, they all believe dividend signaling, as costly as it is, is only logical for firms with good future prospects so that the cost might be worth bearing. Additionally, according to the signaling hypothesis, the market reactions to dividend increases are expected to be more favorable when dividends are taxed higher than capital gains and vice versa, as the credibility of a signal is associated with its cost. The research conducted by Bernheim and Wantz (1995) confirms this prediction, which in turn supports dividend signaling hypothesis.

Based on interviews of 28 firms, Lintner (1956) suggests that earnings are the key factor in determining changes in dividends. He observes that most firms have a target payout ratio, and they adjust their dividends to earnings only when management believes earnings have increased permanently. As a result, investors would expect dividend increases to be accompanied by permanent and positive shifts in future profits. Lintner (1956) further states that most firms take a slow process to adjust their dividends as they believe the market favors a stable dividend policy. He implies that dividend change decisions are a function of firms' target payout ratios and the speed of adjustment of current dividends to the target ratio. Since firms are reluctant to change their dividend policies, a dividend increase (decrease) indicates managements' belief of a favorable (unfavorable) prospect of firms' future earnings. His theory was later confirmed by Fama and Babiak (1968), among others. However, by surveying financial executives in 2002, Brav, Graham, Harvey and Michaely (2005) find that the relation between dividend payments and earnings has weakened and that target payout ratios and the speed of adjustment have become less important. Skinner (2008) contends that Lintner's model still works if the model is fitted to total payout that includes both dividends and repurchases.

Bhattacharya (1979) suggests that in an imperfect information setting, dividend changes reflect expected future cash flows and expected future cash flow volatility. Bradley, Capozza and Seguin (1998) propose the same. They argue that, "given the existence of a stock-price penalty associated with dividend cuts, managers rationally pay out lower levels of dividends when future cash flows are less certain" (p.555). Moreover, firms with higher expected cash flow volatility have lower payout ratios compared to firms with lower expected volatility (Capozza and Seguin, 1998). Chay and Suh (2008) also document the significance of cash-flow uncertainty in determining corporate payout policy across countries.

There are two strands of literature that empirically investigate the signaling content of dividends. The first looks at stock price reaction. It is well documented that market reacts positively to dividend increases and negatively to dividend decreases (Pettit (1972), Charest (1978), Aharony and Swary (1980), Brickley (1983), Healy and Palepu (1988), and Michaely, Thaler, and Womack (1995)). The second strand looks at future profitability, which is our focus.

To empirically test the relation between dividends and profitability, many quantitative studies have been conducted. However, there is no consensus. Watts (1973) is among the first to investigate this issue. He finds a positive coefficient of dividend changes on next year's earnings, but the coefficient fails the t-test, which implies that the information content of dividend is trivial. Gonedes (1978) also finds an insignificant coefficient for dividend changes. Similarly, Penman (1983) finds that dividend changes contain little information and many firms do not adjust their dividend policy even though improved future earnings are expected. His findings suggest that expected future profitability might not be the only gauge firms consider when it comes to dividend policy changes.

Even though previous studies fail to find evidence that supports dividend signaling, Brickley (1983), using a small and restricted sample, finds earnings would increase significantly in the same year as dividends increase, as well as in the following year. Focusing on extreme situations of dividend initiations and omissions, Healy and Palepu (1988) find that dividend initiations are generally followed by rapidly increasing earnings for the two years after dividend announcements. For dividend omissions, they find that earnings would decline in the year of the announcement but then increases in later years, which is against the prediction of dividend signaling. Similarly, Bulan, Subramanian and Tanlu (2007) find that a great number of omissions signal favorable future prospects given they have solid fundamentals and low debt overhang. DeAngelo, DeAngelo, and Skinner (1996), on the other hand, investigate dividend-changing firms which experienced an earnings decline in the dividend-changing year following years of earnings growth and find little evidence that supports dividend signaling.

In addition, Benartzi, Michaely, and Thaler (1997), by conducting both categorical and regression analyses, find a strong association between dividend changes and contemporaneous earnings changes, but fail to find evidence of any relation between dividend changes and future earnings changes. They therefore maintain that the predictive value of dividend changes is minimal, and that dividends signal the past rather than the future. Their findings were later confirmed by Grullon, Michaely and Swaminathan (2002). They find that in the years following dividend-increasing announcements, the future profitability of firms, which changed their dividends by more than 10%, decreased rather than increased as predicted by the dividend signaling hypothesis.

By developing a linear model that incorporates the ratio of earnings to the book value of equity (ROE), Nissim and Ziv (2001) find a positive relation between dividend increases and future earnings changes, future abnormal earnings and future probability levels in each of the two years following dividend change. They further argue that dividend changes have predictive content on the level of firm's future profitability, which is why dividend changes would trigger stock returns. They, however, find no affirmative relation between dividend decreases and future profitability. They attribute this to the accounting concept of conservatism that "losses should be recognized in earnings when anticipated whereas profits should be recognized only when earned" (p.2126). Their findings were later opposed by Grullon et al. (2005) who argue that dividend changes are uncorrelated with future earnings and that only incorrectly specified models would result in misleading conclusions. They claim that Nissim and Ziv's assumption of linearity in earnings expectations is inappropriate and the results obtained under this false assumption are biased. They further develop a model using the Fama and French (2000) modified partial adjustment model that assumes non-linearity in earnings expectations and find no relation between dividend changes and future profitability.

Recent publications that adopt indirect approaches do find some evidence for dividend signaling. Joos and Plesko (2004) re-examines the dividend signaling hypothesis for firms with negative cash flows where dividend increases are particularly costly. Their findings indicate that dividend increases have a greater predictive potential for firms with negative cash flows, as opposed to firms with positive cash flows. These findings are consistent with dividend signaling theory. Lee and Rui (2007), adopting time-series techniques, find that dividend changes do contain additional information on firms' future profitability. In his later papers, Lee (2010a and 2010b) investigates information content of dividend changes on future profits in Singapore and Australian markets respectively and finds evidence that supports the signaling effects of dividends.

2.1.2 Other Dividend Theories

Apart from the traditional dividend signaling theories, the free cash flow hypothesis and the maturity hypothesis can explain firms' dividend-paying behavior. Although they are not our focus, we give a brief account of their arguments in order to provide a relatively whole picture of different theories about dividend changes.

The free cash flow hypothesis suggests that firms decrease dividends when free cash flow has fallen and increase dividends when free cash flow has risen, and the increase in free cash flow indicates a lack of investment opportunities (Litzenberger and Ramaswamy, 1979; Jensen, 1986). In this case, an increase in dividend serves no function in signaling firms' profitability but rather it is a channel to dispense excess free cash so that less is available to be wasted on negative NPV projects (Easterbrook, 1984; Jensen, 1986; Lang and Litzenberger, 1989). This suggests that dividend policies can be used to address agency problems between corporate insiders and outside shareholders. As extra free cash may be diverted by insiders for self-interest purposes, outside shareholders may prefer dividend payments over retained earnings, to reduce excess free cash firms hold. In support of this, Lie (2000) finds that firms that increase dividends have more free cash compared to industry counterparts. However, Yoon and Starks (1995) find no evidence that supports the free cash flow hypothesis after more variables are controlled.

The maturity hypothesis (Grullon, Michaely, and Swaminathan, 2002) argues that dividend changes signal firms' transitions in life cycles from a higher growth phase to a lower growth phase, or what they refer to as a mature phase. Specifically, firms increase dividends when investment opportunities decline as they become more mature. During the maturity process, an increase in excess cash and a decrease in systematic risk, return on assets, reinvestment rate, and growth rate can be observed. Grullon et al (2002) maintain that dividend increases are signs of firms' maturation process, and they are used as a channel to dispense excess cash that results from declining investment opportunities. They also find that profitability declines in the years following a dividend increase.

Both the cash flow hypothesis and the maturity hypothesis imply that firms allot extra free cash by increasing their dividend payments. There, however, exists a better channel to dispense excess free cash. Share repurchases, where a firm buys back its own shares from the market, are a more reasonable method to deal with the free cash problem. As dividends were taxed much heavier than capital gains and taxes on capital gains can be easily deferred, a significant tax advantage could be achieved by share repurchases compared to dividends payments. Dividend signaling models developed by Bhattacharya (1979) and Miller and Rock (1985) make no distinction between dividends and share repurchases, which suggests share repurchases can be a substitute for dividend.

Following Lintner (1956)'s model, Grullon and Michaely (2002) investigate the interaction between dividends and share repurchases. They find that firms that pay dividends have been substituting dividends with share repurchases gradually, but they are not perfect substitutes as the rate of substitution does not equal one. Lee and Rui (2007) also find similar results by using time-series techniques. These findings suggest that share repurchases cannot replace dividends. The reason might be dividends have more information content than repurchases. This is intuitively sound as dividend policy change is a long-term commitment whereas share purchase could just be a one-time event that only affects firms temporarily.

A few other theories competing with signaling hypotheses besides the free cash flow and maturity hypotheses have also gained their grounds. The catering theory developed by Baker and Wurgler (2004) state that the decisions on dividend payout policy are driven by investor demand. Their findings suggest that firms increase dividends when the demand for more dividends is high and decrease dividends when the demand is low. The theory was later tested by Ferris, Narayanan, and Sabherwal (2009) using international samples from 23 countries. They find evidence that supports dividend catering in firms which are incorporated in common law countries. However, for civil law firms, there is little evidence. Hoberg and Prabhala (2008) examine the disappearing dividends phenomenon and find no catering effect once firm risk is controlled. They also argue that risk, especially idiosyncratic risk, explains a large portion of firms' dividend paying behaviors. Except for the catering theory, earnings management is another competing theory in this area. As firms could manipulate their earnings to smooth income or to meet a predetermined target by maneuvering cash from "cookie jar" accounts, earnings might not be as they appear. Daniel, Denis, and Naveen (2008) find that firms manage earnings to meet dividend needs even when no cash flow consequences are involved. If firms pay dividends out of discretionary accruals which depend solely on management choices, dividend changes would have little information relating to future profitability.

2.2 Hypotheses Development

In spite of other dividend hypotheses, we believe the classical dividend signaling theory that dividend changes signal firms' future profitability is still valid if the changes are made as a result of firms' expected profitability updates. Therefore, we again propose the classical dividend signaling hypothesis: dividend change is positively associated with firm's expected future profitability, often measured by changes in future earnings. The market, however, cannot always observe a persuasive future earnings increase (decrease) after a dividend increase (decrease). If the dividend signaling hypothesis is valid, then what could possibly go wrong?

The signaling model developed by Lintner (1956) suggests that dividend payments depend largely on stable and sustainable earnings and firms would change their dividend policy in response to changes in the predictability of future earnings. Firms may increase their dividend only when they are confident that future increased earnings will be able to support not only the current rate of payment but also the additional portion; they may decrease their dividend when they are no longer confident that future earnings will support the current payment. The confidence of future earnings relies on not only the magnitude of expected earnings but also the volatility of these earnings. Bhattacharya (1979) proposes a similar effect that dividend changes are a function of expected cash flows and expected cash flow volatility. Furthermore, concentrating on dividend initiations, Dyl and Weigand (1998) argue that, "it is unlikely that managers will establish a regular payout policy until they have observed a permanent increase in both the level and stability of their firm's earnings" (p.28). They also find that future earnings volatility decreases following dividend initiation announcements.

By focusing on dividend omissions, Sant and Cowan (1994) suggest that managers would omit dividend payments when future earnings become more volatile and thus less predictable. Besides, they find that the volatility of future earnings increases after dividend omissions. They therefore argue that managers may omit dividends when there is an expected decline in earnings, or an expected increase in the variance of earnings increases, or both. Although these authors focus on dividend initiations and omissions, the same logic applies to dividend increases and decreases.

As a result, we propose that the current dividend change depends not only on the expected future earnings but also on the expected volatility of these earnings. For some firms, dividend changes signal not only future earnings but also earnings volatility.

Consider the following example of two dividend-paying firms, Firm A and Firm B. Suppose the two firms have exactly the same payout ratios (50%), current dividend per share ($0.5), current EPS ($1), and expected EPS in the next period ($2). The only difference between Firm A and Firm B is their expected earnings volatilities. Firm A has 50% probability of having zero earnings and another 50% probability of obtaining $4 per share in the following period, which makes its expected EPS $2. Firm B, on the other hand, has no uncertainty when it comes to future earnings. Its EPS is $2 (same as Firm A's) with 100% probability. Now assume both firms tend to signal the market on future earnings by adjusting their dividend payments based on their payout ratios and expected earnings. If we neglect the difference in their expected earnings volatilities, it may appear that both firm A and firm B should increase their dividends from $0.5 to $1. However, because Firm A has 50% probability of having zero earnings, it probably will postpone its dividend adjustment, in order to avoid readjustment if the less favorable scenario occurs, as Lintner (1956) suggests that firms may partially adjust their dividends to earnings, in order to shield them from future uncertainty.

Now suppose for the period following the next, firm A's EPS is expected to stay the same at $2. However, this time, there is no uncertainty associated with it. Firm A will earn $2 per share with 100% probability. In other words, its earnings volatility is expected to reduce after the first period with no change in its expected earnings. Firm A will probably adjust its dividend from $0.5 to $1 then, even though the expected earnings stay the same as the previous period. This example implies that two firms with same expected earnings can have different dividend policies if they have different expectations about the volatilities of future earnings. Firms might adjust their dividend policy as a result of a change in expected earnings volatility rather than in expected earnings. As a result, earnings changes alone might not be sufficient enough to trigger dividend changes. It is the combination of expected earnings and expected earnings volatility that drives the changes in dividend. This could be why the previous empirical studies that only look at the direct relation between dividend changes and future earnings changes fail to find solid evidence to support the signaling hypothesis. When only future earnings changes are investigated, the dividend signaling hypothesis could appear insufficient in predicting firms' future profitability.

Suggested by Lintner (1956) and Bhattacharya (1979), firms with higher earnings volatility are more reluctant to increases dividends, ceteris paribus. For those firms, an increase in dividend could be resulted from a decrease in expected earnings volatility rather than an increase in future profitability levels. Consequently, we cannot observe future profits to increase after current dividend increases, as the dividend increases are resulted from firms being comfortable with their reduced future earnings volatility. On the other hand, for firms with low earnings volatility, dividend increases would signal future profitability. In addition, a dividend decrease does not necessarily indicate a decrease in future earnings. It is possible that the dividend decrease is a result of expected rise in future earnings volatility.

To conclude, dividend changes can be resulted from an expected change in future earnings and/or an expected change in future earnings volatility. Firms would increase (decrease) their dividends if : (1) there is no change in expected earnings but a decrease (increase) in expected earnings volatility; (2) there is an increase (decrease) in expected earnings and no change in expected earnings volatility; or (3) there is a combination of both changes in expected future earnings and future earnings volatility. Expected earnings and expected earnings volatility interact with each other and they simultaneously influence dividend changes set by management. Reversely, the interaction suggests that the effect of dividend changes on predicting future profitability has been moderated or modified by expected volatilities.

We use current earnings volatility levels as a surrogate to measure the interference effect of expected earnings volatility change on traditional dividend signals.[1] We think this bridge between current volatility levels and expected changes in earnings volatility is sound. For firms with

[1] The perfect interaction term for our models would be expected changes in earnings volatility. Unfortunately, inside information such as management's expectations on volatilities changes are nearly impossible to obtain. We could use realized future volatility changes as a proxy for expected volatilities. However, as we attempt to investigate whether

relatively low current earnings volatility, it is unlikely that those firms would increase dividends as a result of expected volatility reduction seeing their earnings volatility is already low; for firms with high volatility, it is fairly likely the case because high-volatility firms without an expected volatility reduction would be very reluctant to increase dividends and involve themselves into a long-term commitment of cash outflows.

Hence, we hypothesize the following:

Hypothesis 1a: *Dividend increases are positively associated with firm's future earnings changes, ceteris paribus.*

Hypothesis 1b: *The positive association between dividend increases and future earnings changes is mitigated by higher current earnings volatility, ceteris paribus.*

As we have discussed, dividend changes do not necessarily signal future profitability alone. The dividend change policy may convey as much information about the risk of expected future earnings as it does about the magnitude of future earnings. Specially, for low-volatility firms, dividend increases should signal future earnings increases; however, for high-volatility firms, dividend increases may not signal any change in earnings but signal future volatility reduction.

Furthermore, we hypothesize the following addendums:

---

predictions on future earnings by analyzing published information is possible, using changes in future earnings volatility would suffer from a look-ahead bias as the information on future volatility is unknown in the dividend event year. Instead, we use current earnings volatility levels as a surrogate.

Hypothesis 2a: *For high-volatility firms, dividend increases signal lower future earnings volatility, ceteris paribus.*

Hypothesis 2b: *For low-volatility firms, dividend increases signal higher future earnings, ceteris paribus.*

For dividend decreasing firms, we do not expect any solid finding because firms could reduce their dividends as a result of an increase in future earnings volatility regardless of current volatility levels. As a result, negative dividend changes can signal either lower future earnings or higher future earnings volatility in all cases. This could be the reason why previous studies failed to find any result regarding dividend decreases. Although we do not have a conclusive prediction for dividend decreases, following the literature we still include those observations in our tests.[2]

3 Data and Methodology

3.1 Data and Sample Selection[3]

Using the Centre for Research in Security Prices (CRSP) monthly event files, we identify dividend events of non-financial firms that trade on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX) or the NASDAQ Stock Market (NASDAQ) for at least two years during

[2] In unreported regressions, we also test our models using only dividend increases and no-change events. The regression results are similar to those obtained when dividend decreases are included.

[3] We winsorize, throughout the paper, the dependent and independent variables at the 1st and 99th percentiles of the empirical distribution. We find similar results with trimming instead of winsorizing.

the period of 1975 to 2005 inclusive.[4,5] We do not investigate the cases of dividend initiations and omissions as these extreme and sudden changes in payout policies have different links to future profitability compared to those of dividend increases or decreases. Events like special dividends, stock dividends, and stock repurchases are also not studied in this paper. We concentrate our research on regular (quarterly) cash dividends (code No. 1232) which are of recurring commitment. To remain in the sample, a dividend event must further satisfy the following criteria:[6]

1. The firm's annual fundamentals are available on Compustat Monthly updates database;
2. The firm paid four quarterly dividends in at least two consecutive years;
3. No other distribution announcements were made between the declaration of the previous dividend and four days after the declaration of the current dividend;
4. There were no ex-distribution dates between the ex-distribution dates of the previous and current dividends.

---

[4] Due to quarterly data insufficiency and the rolling nature of earnings volatility, the earliest earnings volatility we can compute from Compustat database is in 1975. However, to verify our sample construction, we collect dividend change events from 1960-2013. In addition, we do not include the observations from the period of 2006-2013 (the global financial crisis and post crisis period) for the following reason. Dividend signals are supposed to signal expected changes. However, wide spread shocks disconnect actual earnings and volatility changes from expected ones, therefore distort the signaling effects.

[5] To be consistent with previous studies, only financial firms are eliminated from our sample (SIC 6000-6999). However, our results are robust when both financial firms and utility firms (SIC 4900-4999) are excluded.

[6] We adopt the same sample selection criteria as those of Nissim and Ziv (2001) and Grullon et al. (2005) so that our results are comparable to theirs.

Following Grullon et al. (2005), we calculate the annual dividend change $R\Delta Div_t$ of a specific fiscal year t as the annualized rate of quarterly dividend changes $\Delta Div_{t,q}$.[7]

$$R\Delta Div_t = (1+\Delta Div_{t,1})(1+\Delta Div_{t,2})(1+\Delta Div_{t,3})(1+\Delta Div_{t,4}) - 1 \quad (1)$$

The resulting sample contains 36,742 firm-year observations: 1,307 dividend decreases, 15,207 dividend increases, and 20,228 no-change observations. The difference in numbers suggest that firms are more reluctant to decrease their dividends as such change in dividend policy would be considered as a bad signal by investors, as what dividend signaling theory would suggest. Our data also show that average dividend increases (16.3%) are less significant in magnitude than average decreases (-39.8%). This is consistent with prior studies.

3.2 Methodology[8]

3.2.1 H1: Dividend Signaling and Earnings Volatility

To establish a baseline and verify the validity of our sample construction, we first adopt two well-acknowledged models in the literature which have different perspectives towards earnings expectations: 1) the linear model proposed by Nissim and Ziv (2001) and 2) the nonlinear model proposed by Grullon et al. (2005). For simplicity, we note them as base models. Our models which incorporate the effect of earnings volatility are termed modified models.

[7] Quarterly dividend change $\Delta Div_{t,q}$ is calculated as $(Div_{t,q} - Div_{t,q-1})/Div_{t,q-1}$ with $Div_{t,0}$ equals $Div_{t-1,4}$.

[8] Besides the explanation of variables in the text, a list of variable definitions is also provided in the appendix section.

Base Models

As literature suggests that the relation between dividend changes and earnings changes are asymmetrical for dividend increases and decreases, Nissim and Ziv (2001) develop the following model to enable the separate estimations of the coefficients for dividend increases and decreases:

Linear Model of Earnings Expectations

$$\Delta E_{\tau} = \beta_0 + \beta_{1P}\, DPC_0 \times R\Delta Div_0 + \beta_{1N}\, DNC_0 \times R\Delta Div_0 + \beta_4\, ROE_{\tau-1} + \beta_5\, \Delta E_0 + \epsilon_{\tau}, \qquad (2)$$

ΔE_{τ} is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity at the beginning of announcement year (year -1). As management's estimates of future earnings are not observable, actual future earnings are used as proxies for their estimates. DPC (DNC) is a dummy variable that takes one for dividend increases (decrease) and zero otherwise. $R\Delta Div_0$, as previously defined, is the annual dividend change of year τ. The linear model of earnings expectations includes return-on-equity $ROE_{\tau-1}$ as an independent variable to account for expected changes in earnings (mean reversion). It also controls for previous earnings change ΔE_0 to account for possible autocorrelation in earnings change series. We note that the above regression assumes that mean reversion and autocorrelation follow a linear pattern. From the regression equation (1), Nissim and Ziv (2001) find a positive and significant β_{1P} which suggests that there is a positive relation between dividend increases and future earnings increases.

However, Grullon et al. (2005) contend that Nissim and Ziv's (2001) assumption of linearity in future earnings expectations is inappropriate. By adopting the modified partial adjusted model developed by Fama and French (2000), they propose the following model that controls for the nonlinearity in earnings expectations:

Nonlinear Model of Earnings Expectations

$$\Delta E_{\tau} = \beta_0 + \beta_{1P}\, DPC_0 \times R\Delta Div_0 + \beta_{1N}\, DNC_0 \times R\Delta Div_0$$
$$+ (\gamma_1 + \gamma_2\, NDFED_0 + \gamma_3\, NDFED_0 \times DFE_0 + \gamma_4\, PDFED_0 \times DFE_0) \times DFE_0$$
$$+ (\lambda_1 + \lambda_2\, NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4\, PCED_0 \times CE_0) \times CE_0 + \epsilon_{\tau}, \quad (3)$$

ΔE_{τ}, DPC (DNC), and $R\Delta Div_0$ are the same as those previously defined in the linear model. Other variables in the model are proposed by Fama and French (2000) to capture the nonlinearities in earnings expectations and autocorrelation process. DFE_0 denotes ROE_0 – $E[ROE_0]$, where $E[ROE_0]$is calculated as the fitted value from the annual cross-sectional regressions of ROE_0 on the natural logarithm of the book value of total assets in year -1, the nature logarithm of the market-to-book ratio in year -1, and firms' return-on-equity in year -1 relative to the dividend event year. $NDFED_0$ ($PDFED_0$) is a dummy variable that takes one if DFE_0 is negative (positive). CE_0 is the earnings change in the dividend event year deflated by the book value of common equity in year -1. $NCED_0$ ($PCED_0$) is a dummy variable that takes one if CE_0 is negative (positive). The dummy variables and squared terms are an attempt to reflect the nonlinearity in mean reversion and autocorrelation in earnings, as explained in Fama and French (2000). To be more specific, these variables are designed, "to capture the fact that large changes in earnings revert faster than small changes and negative changes revert faster than positive changes (Grullon et al., 2005, p.1667)". From equation (2), Grullon et al. (2005) find no evidence that would support the traditional dividend signaling hypothesis. The positive relation found in the linear model between dividend increases and future earnings changes disappears in the nonlinear model.

Modified Models

To test whether firms' earnings volatility affects dividend signaling, we introduce industry-adjusted earnings volatility to be an interaction between dividend changes and earnings changes. Following Dichev and Tang (2008), earnings volatility is constructed as the standard deviation of quarterly earnings before extraordinary items on the book value of total assets over a five-year rolling period. That is, for example, our measure for earnings volatility of a firm for the year 2000 is the standard deviations of quarterly earnings before extraordinary items on the book value of total assets over the 20 quarterly observations between 1996 and 2000. We adjust them to their particular industries by calculating the ratio of earnings volatilities to industry averages based on

2-digit SIC code. We thus propose our starter model that incorporates earnings volatilities: [9]

$$\Delta E_{\tau} = \alpha_0 + \alpha_1 R\Delta Div_0 + \alpha_2 EV_0 + \alpha_{12} R\Delta Div_0 \times EV_0 + \epsilon_\tau \quad (4)$$

EV_0 is the industry-adjusted earnings volatility. Other variables are the same as defined earlier.

We then enhance our model based on the two base models discussed in section 4.2.1, namely the linear model and the nonlinear model. We include both models in order to be prudent with the inclusion of earnings volatility and its effects on the relation between dividend changes and earnings changes. To account for the asymmetric reactions of earnings changes for dividend increases and decreases, we also allow for the separation of coefficients for positive and negative dividend changes. Our modified models are presented below. All variables are the same as previously defined.

Modified Linear Model of Earnings Expectations

$$\begin{aligned}\Delta E_{\tau} = \beta_0 &+ DPC_0 (\beta_{1P} R\Delta Div_0 + \beta_{2P} EV_0 + \beta_{3P} R\Delta Div_0 \times EV_0)\\ &+ DNC_0 (\beta_{1N} R\Delta Div_0 + \beta_{2N} EV_0 + \beta_{3N} R\Delta Div_0 \times EV_0)\\ &+ \beta_4 ROE_{\tau-1} + \beta_5 \Delta E_0 + \epsilon_\tau, \end{aligned} \quad (5)$$

[9] There might be a concern of having current earnings volatility as an independent variable when the dependent variable is future earnings changes, since a historically highly volatile firm might have high future earnings changes regardless of dividend changes. To address this concern, we calculate the correlations between the absolute values of future earnings changes and current earnings volatility. For the two years following dividend changes, the correlations are 0.31 and 0.19, which are not highly correlated.

Modified Nonlinear Model of Earnings Expectations

$$\Delta E_{\tau} = \beta_0 + DPC_0\,(\beta_{1P}\, R\Delta Div_0 + \beta_{2P}\, EV_0 + \beta_{3P}\, R\Delta Div_0 \times EV_0)$$

$$+ DNC_0\,(\beta_{1N}\, R\Delta Div_0 + \beta_{2N}\, EV_0 + \beta_{3N}\, R\Delta Div_0 \times EV_0)$$

$$+ (\gamma_1 + \gamma_2\, NDFED_0 + \gamma_3\, NDFED_0 \times DFE_0 + \gamma_4\, PDFED_0 \times DFE_0) \times DFE_0$$

$$+ (\lambda_1 + \lambda_2\, NCED_0 + \lambda_3 NCED_0 \times CE_0 + \lambda_4\, PCED_0 \times CE_0) \times CE_0 + \epsilon_{\tau}, \qquad (6)$$

In both equation (5) and (6), we expect β_{1P} to be positive and β_{3P} to be negative. A positive β_{1P} value indicates that dividend increases are positively associated with earnings changes, while a negative β_{3P} value shows that the positive relation is mitigated by earnings volatility. For dividend decreases, we do not have strong expectations regarding the signs of the coefficients.

In order to verify that Nissim and Ziv's (2001) and Grullon et al.'s (2005) results still hold in our sample and to make our results comparable to theirs, we first test all four models by using the two-stage procedure proposed by Fama-MacBeth (1973) which is adopted by both of the two mentioned studies. To apply Fama-MacBeth two-stage procedure, we estimate the coefficients using annual cross-sectional regressions. We then calculate the mean coefficients of the cross-sectional regressions and compute the test statistics respectively. Designed to address time effects, the Fama-MacBeth procedure is unbiased with the presence of an "unobserved time effect"; it is, however, biased when an "unobserved firm effect" exists (Petersen, 2009).[10] Therefore, apart from Fama-MacBeth's two-stage procedure, we also use Rogers standard errors clustered by firms to account for the residual dependence generated by firm effects and control possible time effects by including year dummies.

3.2.2 H2: Dividend Signaling for High/Low-Volatility Firms

To test the signaling effect of dividend changes on future earnings changes for high/low-volatility firms, we modify models (5) and (6) and replace earnings volatility EV_0 with a high-volatility dummy ($DHEV_0$) or a low-volatility dummy ($DLEV_0$). $DHEV_0$ ($DLEV_0$) is a dummy variable that takes 1 if a firm's current volatility level belongs to the top (bottom) 25% of the entire sample volatilities.[11] To be cautious, we test both linear and nonlinear models.

To investigate the behavior of future earnings volatilities following dividend changes in high/low-volatility firms, we examine the changes in earnings volatility, pre- and post- dividend.

[10] According to Petersen (2009), an unobserved firm effect occurs when "the residuals of a given firm may be correlated across years (time series dependence)" and a time effect occurs when "the residuals of a given year may be correlated cross different firms (cross-sectional dependence)".

[11] We could also define $DHEV_0$ ($DLEV_0$) as a dummy variable that takes 1 if a firm's current volatility level belongs to the top (bottom) 25% of the sample in its specific year. The regression results are fairly consistent with those when $DHEV_0$ ($DLEV_0$) are defined as what is stated in the text. However, as there are some years with generally low volatilities for most firms, even a 0.7 volatility (lower than industry average) would be considered as a high volatility (top 25%) if we adopt this alternative measure. As a results, we define DHEV0 ($DLEV_0$) as a dummy variable that takes 1 if a firm's current volatility level belongs to the top (bottom) 25% of the entire sample volatilities.

We therefore test the following model: [12]

$$\Delta EV_5 = \beta_0 + DPC_0\,(\beta_{1P}\, R\Delta Div_0 + \beta_{2P} DHEV_0 + \beta_{3P}\, R\Delta Div_0 \times DHEV_0)$$

$$+ DNC_0\,(\beta_{1N}\, R\Delta Div_0 + \beta_{2N}\, DHEV_0 + \beta_{3N}\, R\Delta Div_0 \times DHEV_0)$$

$$+ \varphi_1 EV_0 + \varphi_2 MB_{-1} + \varphi_3\, SIZE\text{-}1 + \varphi_4\, LEV_{-1} + \epsilon_\tau, \quad (7)$$

ΔEV_5 is the five year change in adjusted earnings volatility following the dividend event.[13] It is calculated as EV_5 - EV_0, where EV_τ is the industry-adjusted earnings volatility in the $_\tau{}^{th}$ year following the dividend event. We include current earnings volatility EV_0 to control for the inter-temporal persistence of earnings volatility. Following Campbell, Lettau, Malkiel and Xu (2001) and Pastor and Veronesi (2003), we also include several variables of firm characteristics to control for the expected volatility change. We control for firms' performance and growth stage, measured by MB_{-1}. We expect its coefficient to be positive as future earnings of growth firms are expected to have more volatile earnings. We include firm size $SIZE_{-1}$ in the model. Since large firms are normally more stable than small firms in terms of future earnings, we expect its coefficient to be negative. We also control for leverage LEV_{-1}, defined as the ratio of total long term debt to book value of total assets. We expect the coefficient for LEV_{-1} to be negative as higher leverage restrains firms from taking more risky projects and thus lead to more stable future earnings. Other variables

[12] We replace $DHEV_0$ with $DLEV_0$ for the model that investigates low volatility firms.

[13] As an alternative, we also test three-year changes in adjusted earnings volatility, ΔEV_3 (calculated as EV_3 - EV_0). The findings are consistent as those of the five year change.

are the same as previously defined.

4 Empirical Results

4.1 Summary Statistics and Sample Verification

We present the summary statistics of major dependent and independent variables in Table I. From the table, we see that for firms that increase their dividends, the average changes in earnings are 1.0% and 1.3% for each of the two years following dividend event years. Firms that have no change in policy show earnings changes of 0.7% and 1.0%, which are smaller than firms that increase their dividends. For firms that have negative dividend changes, their earnings on average grow at 2.4% and 1.5% following the dividend event. This result contradicts the predictions of the traditional dividend signaling theory as negative dividend changes are supposed to signal unfavorable future prospects. Additionally, the average earnings volatility for dividend increasing firms is 0.858, whereas it is 1.234 and 1.062 for dividend decreasing firms and no-change firms respectively. This result implies that firms with negative dividend changes have the most volatile earnings, while firms with positive dividend changes have the smallest earnings volatility. The average five-year changes in adjusted earnings volatility following a dividend change event for the three groups are 0.128 (increase), -0.120 (decreases) and 0.088 (no-change), which indicates that future earnings volatility of firms which have positive or zero dividend changes increases on average, while that of dividend decreasing firms decreases. It should be noted that the average earnings volatility for dividend increasing firms is still lower than the industry average after the five year increase.

[Insert TABLE I here]

Table II illustrates the differences in average earnings changes in the first and second years following positive dividend changes and also the differences in average earnings volatility changes during the five years following dividend increases and decreases. We create 16 portfolios for dividend increases based on four quartiles of current earnings volatility and four quartiles of dividend increases. Similarly, for dividend decreases, we create 9 portfolios.[14]

[Insert TABLE II here]

We see from Table II Panel I-A that in firms with low current earnings volatility (EV1), as positive dividend changes increase from small scale (PC1) to large scale (PC4), the average earnings change in the first year after the event increases monotonically. The difference in the average first year earnings change between small dividend changes and large dividend changes is significantly different from zero. No such pattern can be observed for other volatility levels. This implies that for firms with low current volatility, higher dividend increases indicate higher future earnings changes in the first year following dividend change events. Panel I-B of Table II shows the average earnings change in the second year following the dividend changes. It can be seen that for firms

[14] Here we combine the first two quartiles of dividend decreases because more than 25% dividend decreases are -0.5. Pleas also note that DC12 indicates large-scale dividend decreases while DC4 is for small-scale decreases.

with high current earnings volatility (EV4), a higher dividend increase does not necessarily signal a higher average future earnings change in year 2, which contradicts what the traditional dividend signaling theory would predict. From Panel I-C, we can see that for firms with high current volatility (EV4), the average future earnings volatility decreases as firms pay higher dividends. Besides, regardless of the level of dividend increases, average earnings volatility decreases for firms with high current volatility following positive dividend events. These findings are in line with our hypotheses.

Table II Panel II-A shows the average first year earnings changes for dividend decreases. From Panel II-A shows that for high volatility firms (EV4) the average year 1 earnings changes increase as firms cut more dividend payments (from NC4 to NC12). This contradicts with what we expect. For firms with relatively high dividend cuts (NC12), the higher the current volatility the higher the first year earnings. We cannot observe anything significant in Panel II-B. However, Panel II-C shows that for firms with higher current volatility, dividend decreases are associated with future volatility reductions. This finding is also different from our expectations.

To verify our sample construction, we first run the base models using the same time period (1963-1997) and same procedural method (Fama-Macbeth) as Nissim and Ziv (2001) and Grullon et al. (2005)'s. We also extend their sample period to 2005 to test whether their results would be affected by the change of time period. In unreported regressions, we find consistent results as those of Nissim and Ziv (2001)'s and Grullon et al. (2005)'s. To summarize, regression results of linear base models suggest that dividend increases are positively associated with future profitability in both the first and second years following the dividend event year. All of the coefficients are significantly different from zero at conventional confidence levels. However, no significant positive or negative relationship between dividend decreases and future prospects is found. These findings are consistent despite of different sampling periods. However, under the nonlinear models, we cannot find any relation between dividend changes and future profitability, implying that dividend changes do not signal firms' prospects. The nonlinear model generally explains a larger fraction of cross-sectional variations than the linear model, which suggests the assumption of the nonlinearity in earnings expectations might be more accurate than the linear one. The consistency in the regression results proves the validity of our sample construction.

4.2 H1: Dividend Signaling and Earnings Volatility

We first test our regression models by using the two-stage procedure proposed by Fama-MacBeth (1973) which is adopted by both of the previous studies. We test both the linear models and the nonlinear models with and without considering earnings volatility. To be consistent with the literature, we examine the association between dividend changes and the changes in earnings in each of the two years following the dividend change.

Table III shows the regression results of future earnings changes on dividend changes from the linear models using Fama-Macbeth (1973) procedure. To better observe the effect of earnings volatility on the relation between dividend changes and earnings changes, we present both the results of base model (Column I) and those of the modified model (Colum II).

[Insert TABLE III here]

Column I of Table III shows that, under the base model, the coefficients for dividend increases are positive and significant for both year 1 and 2. The coefficients are equal to 0.039 and 0.041 when τ =1 and 2 respectively, implying a positive association between dividend increases and future earnings changes. However, no such conclusion can be reached for dividend decreases. From the modified models (Column II), we find the coefficients for dividend increases are 0.077 and 0.070 for the two year horizon, which are larger than those of the base model. The interaction between positive dividend changes and earnings volatility, which test the effect of earnings volatility on dividend signaling is expected to have a negative coefficient. Consistent with our expectation, the coefficients are -0.052 and -0.069 for both horizons. Both coefficients are significantly different from zero. In addition, the coefficients for earnings volatility levels are also positive and significant, implying a positive relation between volatility and future earnings changes. However, the coefficients for volatility levels are approximately 0.01, which are much smaller than those for dividend increases and the interaction term. This indicates that positive dividend changes are the main drive for future earnings increases and that the interaction between dividends increases and expected volatility levels play a significant role in the overall signaling effect. For dividend decreases, although the coefficients for dividend changes are insignificant for both years, the interaction between dividend decreases and earnings volatility is 0.156, which is significantly different from zero.

Furthermore, it is also found that return-on-equity $ROE_{\tau-1}$ is negatively related to earnings changes. This is more or less expected as $ROE_{\tau-1}$ is documented to be mean- reverting (Freeman, Ohlson, and Penman, 1982). A high ROE indicates an expected earnings decrease, while a low ROE indicates an expected earnings increases. The negative coefficient for previous earnings change ΔE_0 implies a negative autocorrelation in earnings change series. In addition, the modified model has a larger R^2 than the base model. This again shows that the inclusion of earnings volatility largely improves the base model and its power to capture the relation between dividend changes and earnings changes.

Table IV reports the results based on the nonlinear models using Fama-MacBeth procedure. The results of the base model (Column I) show no relation between dividend changes and earnings changes. All the coefficients associated with dividend increases and decreases are insignificant, suggesting that no information content can be found in dividend change announcements regarding to future earnings. However, the results change drastically once earning volatility is considered.

[Insert TABLE IV here]

Under the modified model (Column II), we observe a positive relation between dividend increases and earnings changes for the first year following the dividend event year with a coefficient for dividend increases that equals to 0.068. We should note that this relationship cannot be found by the base model that neglects the effect of earnings volatility on dividend signaling. Moreover, the coefficient for the interaction between dividend increases and earnings volatility for year 1 is -0.053, which is significantly different from zero. The negative coefficient implies that earnings volatility negatively affects the relation between dividend increases and future earnings changes. Consequently, the inclusion of earnings volatility is not only necessary but also meaningful. For the second year following the dividend increase year, however, the coefficients for dividend increases and the interaction term are insignificant, suggesting that dividend increases convey little information regarding profitability in year 2. In addition, no evidence of dividend signaling is found for dividend decreases for the first year. For the second year following the dividend decrease year, there seems to be a positive relation between the interaction term and earnings changes, which is similar to what we find with the modified linear model. The minor relation between earnings volatility levels and future earnings changes can also be found for both year 1 and year 2. Moreover, the modified model improves the average adjusted R^2 from 11.6% to 14.3% for the first year following the dividend change year.

After having tested our models by using Fama-Macbeth (1973) procedure, we now rerun all the above regressions using Rogers standard errors clustered by firms to control fixed firm effects. We also use year dummies as a control for possible time effects. In Table V, we present the regression estimates of future earnings changes on dividend changes based on the linear model. The results for dividend increases are consistent with those that are found when we use the Fama-MacBeth procedure. For the base model, the coefficients for positive dividend changes are positive and significantly different from zero, which supports the traditional dividend signaling theory. In particular, the coefficients for dividend increases are 0.042 and 0.028 for the two years following the dividend event year. However, a significant negative relationship is shown between dividend decreases and the first year earnings change. This indicates that, contradicting with what the signaling theory would predict, firms that decrease dividend in year 0 show significant earnings increases in year 1. Benartzi et al. (1997) also find similar results for earnings decreases. For the second year, however, a significant positive relation between dividend decreases and earnings changes can be found, which is consistent with the traditional dividend signaling hypothesis.

[Insert TABLE V here]

Column II presents the estimates after we include the effect of earnings volatility on dividend signaling. The regression results are very similar to those obtained from the Fama-MacBeth Procedure. The coefficients for positive dividend increases are 0.065 and 0.053 for the first and second year following the dividend change. Both of them are positive and significant, indicating that the positive relationship between dividend increases and futures earnings increases does exist. However, that relation is negatively affected by current earnings volatility levels, as seen from the negative coefficients for the interaction between dividend increases and earnings volatility. Furthermore, current volatility levels seem to have slight but positive effects on future earnings changes as well. The coefficients for dividend decreases are 0.035 and 0.013 for the two years following dividend changes. Although the second year coefficient is insignificant, the results are generally consistent with what dividend signaling predicts. The interaction between dividend decreases and earnings volatility is positive and significant for the second year following dividend change events, suggesting the association between dividend decreases and year 2 earnings is positively affected by earnings volatility levels. In addition, the modified model has a larger R^2 and larger coefficients for dividend increases than the base model. This again shows that the inclusion of earnings volatility largely improves the base model and its power to capture the relation between dividend changes and earnings changes.

Table VI shows the regression results of future earnings changes on dividend changes based on nonlinear models. For the base model (Column I), unlike the results obtained from the Fama-Macbeth (1973) procedure, the coefficient for dividend increases by using clustered standard errors is positive and significant for the first year following the dividend event year, suggesting a positive association between dividend increases and earnings changes. This implies that the results of the nonlinear models might change once unobserved firm effects are controlled. The regression results, however, show no relation between dividend decreases and earnings changes.

[Insert TABLE VI here]

Column II shows the regression estimates of the modified model. Similar to the results obtained from the Fama-Macbeth (1973) procedure, we find a significant relation between dividend increases and first-year earnings changes. The coefficient for dividend increases is 0.055. This relationship is subject to earnings volatility, which can be seen from the negative and significant coefficient for the interaction between dividend increases and earnings volatility. For the second year following dividend increases, the direct relation between changes in dividends and changes in earnings disappears. The interaction, however, still plays some role in predicting future earnings. The minor relation between earnings volatility levels and future earnings changes can also be found for both year 1 and year 2. No evidence of dividend signaling is found for dividend decreases. Like the modified linear model, the modified nonlinear model improves the adjusted R^2 from 8.9% to 10.5% in the first year following the dividend change year.

To conclude, The Fama-MacBeth procedure and the clustered standard errors produce very similar results regarding the relation between dividend changes and earnings changes. Our findings from the base models are consistent with those of Nissim and Ziv (2001) and Grullon et al. (2005).

Under the linear model by Nissim and Ziv (2001), the signaling effect of dividend increases on firms' future earnings changes can be found. Consistent with Grullon et al. (2005), the relation no longer exists under the non-linear model. However, after we include earnings volatility as an interaction between dividend changes and earnings changes, we find evidence that supports the existence of not only the signaling effect of dividend increases on earnings changes but also the interaction effect of earnings volatility on dividend signaling for both years under the linear model and for the first year under the nonlinear model. The results support our hypotheses H1a and H1b for the first year following the dividend event year regardless of which earnings expectations is used, linear or nonlinear. These findings add new evidence to the traditional dividend signaling theory and show the importance of the recognition of earnings volatility and its role in dividend signaling. Besides, the modified model significantly improves the explanation power and generates larger coefficients for dividend increases.

4.3 H2: Dividend Signaling for High/Low-Volatility Firms

Change in Future Earnings

Hypothesis 2 attempts to test the effects of dividend signaling specifically for high and low volatility firms. We investigate changes in earnings and changes in earnings volatility following dividend event changes.

Table VII presents the regression results of the linear models to help evaluate the signals of dividend changes on future earnings for high and low volatility firms. Column I of Table VII shows the regression results in the presence of high earnings volatility; whereas Column II shows those in the presence of low volatility. Consistent with previous findings, the coefficients for dividend increases are positive in both high and low-volatility firms. Even though the coefficient for dividend increases is not significant for the second year in low-volatility firms, the findings are generally consistent with the traditional dividend signaling theory that there is a positive association between dividend increases and future earnings changes. However, the interaction between dividend changes and high volatility has a significantly negative coefficient with a value of -0.046. The sum of the coefficients of dividend increases and the interaction term for the first year is 0.007. We test the sum of the two coefficients using an F test and find that it is not significantly different from zero. This implies that dividend increases do not effectively signal first year future earnings changes for high-volatility firms. Besides, the sum of the two coefficients for the second year is -0.044, which is significantly different from zero under an F test. This contradicts the traditional signaling hypothesis.

[Insert TABLE VII here]

For low-volatility firms, dividend increases signal first year future earnings changes as the coefficient for the interaction between dividend changes and low volatility is insignificant. However, no similar conclusion can be reached for negative dividend changes. Our findings do not change even if we include both high-volatility dummy and low-volatility dummy in the same model. The regression results are presented in Column III. Similar to previous findings, we find positive coefficients for dividend increases and negative coefficients for the interaction between dividend increases and high volatility for the first year following dividend change events. The sum of the two is tested to be insignificant, implying that a dividend increase does not signal an increase in earnings for high-volatility firms. For low-volatility firms, dividend increases do have some information content regarding future earnings, suggested by the insignificant coefficient for the interaction term.

Table VIII shows the regression estimates of modified nonlinear models. We cannot find evidence of dividend signaling on future earnings for the second year following dividend event year. However, the findings are similar to those of the linear models for the first year. We note that, for nonlinear models, the sum of coefficients for dividend increases and the interaction is negative in high-volatility firms for the first year. We test the sum of the coefficients using an F test and we find that the sum is not significantly different from zero, which suggests that there is no relation between dividend changes and future earnings changes in the presence of high earnings volatility. For firms with low current volatility, the coefficient for the interaction between dividend increases and earnings volatility is insignificant. Yet, no result can be found for dividend decreases.

[Insert TABLE VIII here]

To conclude, for positive dividend changes, our findings are consistent with our expectation that traditional dividend signaling amplifies in low-volatility firms and diminishes in high-volatility firms. For negative dividend changes, no conclusion can be reached.

Change in Future Earnings Volatility

In Table IX, we present the regression results of future volatility changes on dividend changes for high and low volatility firms respectively. Column I shows the regression results of five-year changes in earnings volatility in the presence of high earnings volatility; whereas Column II shows those in the presence of low volatility. In general, dividend increases are negatively associated with future volatility changes as the coefficients for dividend increases are -0.354 and -0.328 for both high volatility and low volatility models. However, for high-volatility firms, the effect is much stronger, as suggested by the negative coefficient for the interaction between dividend increases and high volatility dummy that takes on the value -0.562. The total effect of dividend increases on earnings volatility changes for high-volatility firms is the sum of the two coefficients, which is -0.916. It is significantly different from zero under an F test. This finding suggests that dividend increases signal lower future volatility in high-volatility firms.

For low-volatility firms, the coefficient for the interaction between dividend increases and low volatility dummy, although insignificant, is positive. We test the sum of coefficients for the interaction and dividend increases and find that the sum is not significantly different from zero, implying that dividend increases do not signal future earnings volatility reduction for low volatility firms. For dividend decreases, there seems to be a positive association between dividend changes and future earnings volatility changes. However, for low-volatility firms, this effect is eliminated by the negative coefficient for the interaction between dividend decreases and low volatility dummy. The coefficient is -1.349, resulting a total effect of dividend decreases on earnings volatility changes equals to -0.994. This effect is significantly different from zero under an F test. In other words, in low-volatility firms, the larger the decrease in dividend, the larger the increase in earnings volatility. Furthermore, the signs of the coefficients for MB_{-1}, SIZE-1, and LEV_{-1} are the same as previously expected. In sum, in high-volatility firms, dividend increases signal a reduction in earnings volatility rather than an increase in future earnings, which is consistent with our hypotheses. Interestingly, in low-volatility firms, dividend decreases mainly signal future increase in earnings volatility.

[Insert TABLE IX here]

We also test a similar model in which both high-volatility dummy and low-volatility dummy are controlled in the same regression, shown in Colum III of Table IX. The results regarding dividend increases are consistent as those of the previous regression. We find a negative coefficient (-0.313) for dividend increases, which suggests a negative association between dividend increases and future volatility changes. This negative association is much stronger for high-volatility firms, as can be seen by the negative coefficient for the interaction between dividend increases and high volatility dummy that takes -0.607. The combined effect of dividend increases on earnings volatility changes for high-volatility firms is -0.92, which is tested to be significantly different from zero. For low volatility firms, there is no additional effect on volatility changes from dividend increases. For dividend decreases, a positive association between dividend changes and future earnings volatility changes can be found. It also shows that in low-volatility firms the larger the decrease in dividend, the larger the earning volatility would increase.

Except for the five-year changes, we furthermore test three-year changes in earnings volatility as an alternative. Column IV of Table IX shows the regression results when both high-volatility dummy and low-volatility dummy are included. Even though the coefficient for dividend increases is not significant, the coefficient for the interaction between dividend increases and high-volatility is negative and significant. The combined coefficient of the two is also tested to be negative and significant, suggesting that for high-volatility firms there is a negative association between dividend increases and future earnings volatility changes. This finding is consistent with that of the five-year changes. Moreover, the regression results also suggest that for low-volatility firms, the bigger the dividend decrease is, the higher the three-year future earnings volatility would be. This result cannot be found with the five year change.

5 Robustness Tests

To evaluate the robustness of our results, we first repeat our analyses using alternative measures of earnings changes and dividend changes and/or include additional control variables, and test whether our results are subject to the above changes: 1) we redefine dividend changes by deflating quarterly dividend changes by stock prices instead of scaling by previous dividend payment; 2) we recalculate earnings changes as the difference in earnings divided by book value of assets rather than book value of common equities; 3) in model (7), we control for firm age, defined as the natural logarithm of the number years since the firm appears on CRSP, as another variable to account for the uncertainty embedded in firms' operation . We find that in all of these cases, our findings are similar to what we have obtained.

As earnings change is not the only indicator for firms' future prospects, to examine the relation between dividend changes and firms' future profitability, both Nissim and Ziv (2001) and Grullon et al. (2005) also use other proxies as alternative measures for future profitability. Using both the linear and nonlinear models, Grullon et al. (2005) find that dividend increases and decreases are negatively related to ROA changes in the year following the dividend event year, which is inconsistent with what the dividend signaling theory predicts. In addition, using a linear model, Nissim and Ziv (2001) find that dividend changes, specifically dividend increases, are positively associated with future earnings levels. However, Grullon et al. (2005) argue that this relation disappears after controlling for nonlinearities. For robustness, we also use ROA changes and earnings levels as additional proxies for firms' future profitability and test their relations with dividend changes. We believe, as it is for earnings changes, there is a positive relationship between dividend changes and ROA changes or earnings levels. This relation, however, is subject to the level of firms' current earnings volatility.

5.1 Dividend Changes and ROA Changes

Grullon et al. (2005) defines ROA as the ratio of operating income before depreciation to the book value of total assets (oibdp/at). To ensure our results are comparable to theirs, we first use the same definition of ROA. We also estimate the four models using ROA defined as the ratio of income before extraordinary items to the book value of total assets (ib/at), which is a more common definition of ROA. We replace earning changes ΔE_τ in models (2), (3), (5), and (6) with ΔROA_τ (calculated as ROA_τ - $ROA_{\tau-1}$) as the dependent variable. The linear and nonlinear control variables are also adjusted accordingly.[15] Table X presents the coefficient estimates from the regressions of changes in ROA (defined as oibdp/at or ib/at) on dividend changes based on linear models.

---

[15] In the linear models, the control variables are $ROA_{\tau-1}$ and ΔROA_τ. In the nonlinear models, DFE_0 is ROA_0 – $E[ROA_0]$, where $E[ROA_0]$ is the fitted value from the annual cross-sectional regressions of ROA_0 on the logarithm of the book value of total assets in year -1, the logarithm of the market-to-book ratio in year -1 and ROA_{-1}. $NDFED_0$ ($PDFED_0$) takes one if DFE_0 is negative (positive) and zero otherwise. CE_0 is ROA_0 – ROA_{-1}. $NCED_0$ ($PCED_0$) takes one if CE_0 is positive (negative) and zero otherwise.

[Insert TABLE X here]

Consistent with Grullon et al. (2005), under base model (Panel A Column I), we find no significant relationship between positive dividend changes and ROA (oibdp/at) changes for either year. Besides, the coefficient for dividend decreases is negative for the first year, which contradicts the signaling theory. We modify the base models by including earnings volatility. Column II of Table X reports the regression results from the modified linear model. Unlike what we find in the base model, the coefficients for positive dividend changes become positive and significant for both years, suggesting a positive relation between dividend increases and future ROA changes. Besides, the coefficients for interaction terms are -0.010 and -0.021 for both horizons, which are negative and significantly different from zero as what we would expect. These results show that once earnings volatility is controlled, the relation between dividend increases and ROA changes would appear. However, no such conclusion can be prudently reached for dividend decreases.

Additionally, if we define ROA as the ratio of income before extraordinary items to the book value of total assets, the results would vary. Panel B of Table X shows the coefficient estimates from the regression of changes in ROA (defined as ib/at) on dividend changes based on linear models. From Column I of Panel B, we can see that the coefficients for dividend increases are positive and significant for both years, indicating a positive relation between dividend increases and ROA changes. For the modified model, the relation is even stronger, with significant coefficients of 0.021 and 0.022 for the first and second years following dividend event year. The coefficients for the interaction terms are -0.015 and -0.023 for the two years respectively, suggesting the existence of a mitigating effect of earnings volatility on dividend signaling

Table XI shows the results when nonlinear models are used. Under base model (Panel A Column I), negative relationship between dividend increases and ROA (oibdp/at) changes for both years following the dividend change event can be seen. The coefficients are -0.008 and -0.010 for year 1 and year 2. This shows that an increase in dividends indicates a decrease in future ROA, which is contradictory to what dividend signaling theory would predict. The coefficients for dividend decreases also have wrong signs. Under the base model, it seems that dividend changes are negatively associated with ROA changes. For the modified model (Panel A Column II), the significant negative relationship between dividend changes and ROA changes that was found from the base model disappears. Moreover, though insignificant, the coefficients for positive divided changes become positive for both horizons. No significant relation, either positive or negative, can be found between negative dividend changes and ROA changes. Panel B reports the results of nonlinear models when ROA is defined as the ratio of income before extraordinary items to the book value of total assets (ib/at). We find no significant result for negative dividend changes for both base and modified models. However, a negative significant relation can be found between dividend changes and second year ROA changes. This contradicts with the traditional dividend signaling hypothesis. However, this negative relation does not exist when earnings volatility is controlled. Furthermore, a positive relation between dividend increases and first year ROA changes can be found under modified model. The mitigating effect of earnings volatility can also be seen from the negative coefficient for the interaction.

[Insert TABLE XI here]

To summarize, under the base models, we find that changes in future ROA, defined as the ratio of operating income before depreciation to the book value of total assets, are not positively correlated with past dividend changes. In fact, it seems that there is a negative relationship between changes in dividends and changes in future ROAs, which is contrary to the traditional dividend signaling theory. However, once we control for earnings volatility, the results change dramatically. Under the modified linear model, we find a positive relation between dividend increases and ROA changes in both year 1 and year 2. For the modified nonlinear model, even though no certain conclusion regarding signaling can be reached, the negative relation between dividend changes and ROA changes, as observed from the base model, disappears. Moreover, if ROA is defined as the ratio of income before extraordinary items to the book value of total assets, the signaling effect between dividend increases and first-year ROA can be detected under the nonlinear model.

5.2 Dividend Changes and Earnings Levels

In both Nissim and Ziv (2001) and Grullon et al. (2005), authors also examine the relationship between dividend changes and future earnings levels. However, using models of different earnings expectations, they end up with very different results. Following Grullon et al. (2005), we define earnings levels as earnings before extraordinary items scaled by book values of total equity. We replace the earning changes ΔE_{τ} in models (2), (3), (5) and (6) with ROE $_{\tau}$ as the dependent variable. The linear and nonlinear control variables are also adjusted accordingly.[16] Following Nissim and Ziv (2001) and Grullon et al. (2005), we also control for firm size ($SIZE_{-1}$) and market-to-book ratio (MB_{-1}) for both linear and nonlinear models.[17] We first replicate their analyses. Then we test our hypothesis using the modified models which consider firms' earnings volatility levels.

In Table XII, we present the regression estimates from the linear models. Consistent with the findings of Nissim and Ziv (2001), from the base model, a significant positive relation can be found between dividend increases and future earnings levels. From the modified model, the positive relation between dividend increases and future earnings levels can also be found with the

[16] In the linear models, the adjusted control variables are $ROE_{\tau-1}$ and ROE_0 – ROE $_{-1}$. In the nonlinear models, DFE_0 is replaced by ROE_{τ}, which is earnings before extraordinary items in year τ deflated by the book value of equity in year τ. NDFED0 (PDFED0) takes one if ROE0 is negative (positive) and zero otherwise. CE0 is equal to ROE0 – ROE -1. NCED0 (PCED0) takes one if CE0 is negative (positive) and zero otherwise.

[17] Definitions of $SIZE_{-1}$ and MB_{-1} can be found in the appendix.

coefficients being 0.041 and 0.028. Furthermore, the interaction effect can be observed as the coefficients for the interaction between earnings volatility and dividend increases are negative and significant. The coefficients for the interaction terms are -0.029 and -0.043 for the two years. The minor influence of earnings volatility on future earnings levels can be seen as well for positive dividend changes. However, no significant result can be evidenced for negative dividend changes. The findings suggest that dividend increases are positively associated with future earnings levels, but this relation is mitigated by earnings volatility.

[Insert TABLE XII here]

Table XIII shows regression results of future earnings levels on dividend changes from the nonlinear models. From the base model (Column I), a significant positive relation between positive dividend changes and first-year earnings levels can be found. It also seems that dividend decreases are positively associated with first-year earnings levels, which is consistent with the dividend signaling hypothesis. We then rerun the test using the modified nonlinear model that controls for the interaction between dividend changes and earnings volatility. Column II shows the results. A significant relation between positive dividend changes and both first and second year future earnings can be seen. The coefficients are 0.044 when $\tau = 1$ and 0.044 when $\tau = 2$. The coefficients for the interaction term are significant at -0.041 and -0.068, which suggests the existence of a mitigating effect between earnings volatility and the signaling power of dividend increases. These findings are hidden under the base models, indicating the importance of the inclusion of earnings volatility. However, like most prior tests, no similar evidence is found for dividend decreases.

[Insert TABLE XIII here]

Overall, the results in this section indicate that, after considering the effect of earnings volatility on dividend signaling, earnings levels are positively related to dividend increases, regardless of which assumption of earnings expectations is used. Furthermore, we also find evidence that supports the existence of the effect of earnings volatility on the signaling of dividend increases.

6 Conclusion

The traditional dividend signaling theory suggests that dividend changes have information content on firms' future profitability. Using a liner model of earnings expectations, Nissim and Ziv (2001) find evidence that dividend increases are positively associated with future earnings changes. However, Grullon et al. (2005), after controlling for the nonlinearities of earnings expectations, do not find a similar result. They therefore contend that only incorrectly specified models could possibly show evidence that supports the information content of changes in dividend.

In this paper, we show that regardless of which model of earnings expectations is used, there is a positive association between dividend increases and firms' future profitability. However, this positive effect is mitigated by higher current earnings volatility. Specifically, we find that for firms with high earnings volatility, a dividend increase signals a reduction in future earnings volatility rather than an increase in future earnings. For firms with low earnings volatility, a dividend increase signals a favorable prospect in firms' profitability. This explains why previous research papers cannot find consistent evidence for dividend signaling when earnings volatility is ignored. Additionally, consistent with previous literature, we cannot reach any solid conclusion for dividend decreases.

Our study has important implications for corporate finance discipline. First, we revalidate the traditional dividend signaling theory that there is a positive association between dividend increases and future profitability. We show that this relation holds regardless of which assumption of linear expectation is used, linear or non-linear. Second, we find that earnings volatility has a negative impact on the relation between dividend increases and future prospects; specifically, the signaling effect on future earnings amplifies in low-volatility firms and diminishes in high-volatility firms. Third, we propose that dividend changes could signal earnings volatility rather than earnings; for high-volatility firms, a dividend increase signals a reduction in earnings volatility. We provide strong evidence in support of dividend signaling and we believe our findings shed new light on the controversy on the subject of the information content of dividend changes.

Appendix

Definitions of Variables

ΔE_τ	The annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1.
$R\Delta Div_0$	The annual dividend change in a fiscal year, calculated as the annualized rate of quarterly dividend changes $\Delta Div_{t,q}$.
DPC (DNC)	A dummy variable that takes one for dividend increases (decrease) and zero otherwise.
EV_τ	The industry-adjusted earnings volatility in year τ relative to the dividend event year (year 0), measured as the standard deviation of quarterly earnings before extraordinary items on the book value of total assets over a five-year rolling period, adjusted by its industry average based on 2-digit SIC code.
ΔEV_5	The five year change in adjusted earnings volatility following the dividend event, calculated as EV_5 - EV_0.
$DHEV_0$ ($DLEV_0$)	A dummy variable that takes 1 if a firm's current volatility level belongs to the top (bottom) 25% of the entire sample volatilities.
DFE_0	ROE_0 – $E[ROE_0]$, where $E[ROE_0]$is calculated as the fitted value from the annual cross-sectional regressions of ROE_0 on the natural logarithm of the book value of total assets in year -1, the nature logarithm of the market-to-book ratio in year -1, and firms' return-on-equity in year -1 relative to the dividend event year.
$NDFED_0$ ($PDFED_0$)	A dummy variable that takes one if DFE_0 is negative (positive).
CE_0	The earnings change in the dividend event year deflated by the book value of common equity in year -1
$NCED_0$ ($PCED_0$)	A dummy variable that takes one if CE_0 is negative (positive).
ROE_τ	Return-on-equity, measured as the earnings before extraordinary items in year τ deflated by the book value of equity in year τ.
ROA_τ	Return-on-asset, defined either as the ratio of operating income before depreciation to the book value of total assets in year τ, or the ratio of income before extraordinary items to the book value of total assets in year τ.
MB_{-1}	Market-to-book ratio, measured as the natural logarithm of the market-to-book ratio in year -1.
SIZE-1	Firm size, measured as the natural logarithm of the book value of total assets in year -1.
LEV_{-1}	Leverage, defined as the ratio of total long term debt to book value of total assets.

References

Aharony, J., and Swary, I. 1980. Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis. *The Journal of Finance* 35, 1-12.

Baker, M., and Wurgler, J. 2004. A Catering Theory of Dividends. The Journal of Finance 59, 1125-1165.

Benartzi, S., Michaely, R., and Thaler, R. 1997. Do Changes in Dividends Signal the Future or the Past? *The Journal of Finance* 53 (3), 1007-1034.

Bernheim, B., and Wantz, A. 1995. A Tax-Based Test of the Dividend Signaling Hypothesis. *The American Economic Review* 85 (3), 532-551.

Bhattacharya, S. 1979. Imperfect Information, Dividend Policy, and "the Bird in the Hand" Fallacy. *The Bell Journal of Economics* 10 (1) spring, 259-270.

Bolster, P., Janjigian, V. 1991. Dividend Policy and Valuation Effects of The Tax Reform Act of 1986. *National Tax Journal* 44 (4), 511-518

Bradley, M., Capozza, D., and Seguin, P. 1998. Dividend Policy and Cash-Flow Uncertainty. *Real Estate Economics* 26, 555-580.

Brav, A., Harvey, C., Graham, J., and Michaely, R. 2005. Payout Policy in the 21st Century. *Journal of Financial Economics* 77, 483-528

Brickley, J. 1983. Shareholder Wealth, Information Signaling and the Specially Designed Dividend. *Journal of Financial Economics* 12, 187-209.

Bulan, L.T., Subramanian, N., Tanlu, L. 2007. When are Dividend Omissions Good News? Available at SSRN: http://ssrn.com/abstract=997427.

Campbell, J., Lettau, M., Malkiel, B., and Xu, Y. 2001. Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk. *The Journal of Finance* 56, 1-43.

Charest, G. 1978. Dividend Information, Stock Returns and Market Efficiency II. *Journal of Financial Economics* 6, 297-330.

Chay, J. B., Suh, J. 2008. Payout Policy and Cash-Flow Uncertainty. *Journal of Financial Economic*, Forthcoming.

Daniel, N., Denis, D., and Naveen, L. 2008. Do Firms Manage Earnings to Meet Dividend Shresholds? *Journal of Accounting and Economics* 45, 2-26.

DeAngelo, H., DeAngelo, L., and Skinner, D. 1996. Reversal of fortune: Dividend Signaling and the Disappearance of sustained Earnings Growth. *Journal of Financial Economics* 40 (March), 341-371.

Dichev, I.D.,Tang, V.W. 2008. Earnings Volatility and Earnings Predictability. *Journal of Accounting and Economics,* Forthcoming

Dyl, E.A., Weigand, R.A.1998. The Information Content of Dividend Initiations: Additional Evidence. *Financial Management*, Vol. 27, No. 3, Autumn 1998, Special Issue: Dividends.

Easterbrook, F. 1984. Two Agency-cost Explanations of Dividends. *The American Economic Review* 74, 650-659.

Fama, E., and Babiak, H.1968. Dividend Policy of Individual Firms: An Empirical Analysis. *Journal of the American Statistical Association* 63, 1132-1161.

Fama, E., and French, K. 2000. Forecasting Profitability and Earnings. *The Journal of Business* 73 (April), 161-175.

Fama, E., and MacBeth, J. 1973. Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy* 81 (May-June), 607-636.

Ferris, P., Narayanan, J., and Sabherwal, S. 2009. Catering Effects in Corporate Dividend Policy: The International Evidence. *Journal of Banking and Finance* 33, 1730-1738.

Freeman, R., Ohlson, J., and Penman, S. 1982. Book Rate-of-Return and Prediction of Earnings Changes: An Empirical Investigation. *Journal of Accounting Research* 20, 639-653.

Gonedes, N.1978. Corporate Signaling, External Accounting, and Capital Market Equilibrium: Evidence on Dividends, Income, and Extraordinary items. *Journal of Accounting Research* 16 (spring), 26-79.

Grullon, G., and Michaely, R. 2001. Asymmetric Information, Agency Conflicts and the Impact of Taxation on the Market Reaction to Dividend Changes. *Cornell University Working Paper*, Ithaca NY.

Grullon, G., and Michaely, R. 2002. Dividends, Share Repurchase and the Substitution Hypothesis. *The Journal of Finance* 62 (4), 1649-1684.

Grullon, G., Michaely, R., Benartzi, S., and Thaler, R. H. 2005. Dividend Changes Do Not Signal Changes in Future Profitability. *The Journal of Business* 78 (5), 1659-1682.

Grullon, G., Michaely, R., and Swaminathan, B. 2002. Are Dividend Changes a Sign of Firm Maturity? *The Journal of Business* 75 (July), 387-424.

Healy, P., and Palepu, K. 1988. Earnings Information Conveyed by Dividend Initiations and Omissions. *Journal of Financial Economics* 21, 149-175.

Hoberg, G., and Prabhala, N.R. 2009. Disappearing Dividends, Catering, and Risk. *Review of Financial Studies* 22:79–116.

Jensen, M. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeover. *The American Economic Review* 76, 323-329.

John, K., and Williams, J. 1985. Dividends, Dilution, and Taxes: A Signaling Equilibrium. *The Journal of Finance* 40 (September), 1053-1070.

Joos, P. and Plesko, G. 2004. Costly Dividend Signaling: The Case of Loss Firms with Negative Cash Flows. *MIT Sloan Working Paper* 4474-04.

Lang, L., and Litzenberger, R. 1989. Dividend Announcements: Cash Flow Signaling vs. Free Cash Flow Hypothesis. *Journal of Financial Economics* 24, 181-192.

Lee, K. 2010a. An Empirical Study of Dividend Payout and Future Earnings in Singapore. *Review of Pacific Basin Financial Markets and Policies* 13, 267-286.

Lee, K. 2010b. The Information Content of Dividend Policy on Future Earnings in Australia: A VECM Approach. *International Research Journal of Finance and Economics* 49, 68-86.

Lee, B., and Rui, O. 2007. Time-Series Behavior of Share Repurchases and Dividends. *Journal of Financial and Quantitative Analysis* 42 (01), 119-142.

Lie, E. 2000. Excess Funds and the Agency Problems: An Empirical Study on Incremental Disbursements. *Review of Financial Studies* 13, 219-248.

Lintner, J.1956. Distributions of Incomes of Corporations among Dividends, Retained Earnings, and Taxes. *American Economic Review* 46, 97-113.

Litzenberger, R., and Ramaswamy, K. 1979. The Effects of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence. *Journal of Financial Economics* 7, 163-195.

Michaely, R., Thaler, R., and Womack, K. 1995. Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift? *The Journal of Finance* 50 (June), 573-608.

Miller, M., and Modigliani, F.1961. Dividend Policy, Growth and the Valuation of Shares. *The Journal of Business* 34, 411-433.

Miller, M., and Rock, K. 1985. Dividend Policy under Asymmetric Information. *The Journal of Finance* 40 (September), 1031-1051.

Nissim, D., and Ziv, A. 2001. Dividend Changes and Future Profitability. *The Journal of Finance* 56 (6), 2111-2133.

Pastor, L., and Veronesi, P. 2003.Stock Valuation and Learning about Profitability. *The Journal of Finance* 58, 1749-1789.

Penman, S. H. 1983. The Predictive Content of Earnings Forecasts and Dividends. *The Journal of Finance* 38, 1181-1199.

Petersen, M. 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. *Review of Financial Studies* 22, 435-480.

Pettit, R. 1972. Dividend Announcements, Security Performance, and Capital Market Efficiency. *The Journal of Finance* 27 (5), 993-1007.

Sant, R., Cowan, A.R. 1994. Do Dividend Signal Earnings? The Case of Omitted Dividends. *Journal of Banking and Finance,* 1994, v18 #6, 1113-1133.

Skinner, D. 2008. The Evolving Relation between Earnings, Dividends, and Stock Repurchases. *Journal of Financial Economics* 87. 582-609.

Watts, R. 1973. The Information Content of Dividends. *The Journal of Business* 46, 191-211.

Yoon, P., and Starks, L. 1995. Signaling, Investment Opportunities, and Dividend Announcements. *Review of Financial Studies* 8 (4), 995-1018.

TABLE I

Variable Statistics

This table presents summary statistics of major dependent and independent variables. The annual dividend change $R\Delta Div_t$ of a specific fiscal year t is defined as the annualized rate of quarterly dividend changes. ΔE_τ is the annual change in earnings before extraordinary items in year τ deflated by the book value of equity in year -1. EV_0 in the industry-adjusted cash flow volatility. ΔEV_5 is the five year change in adjusted earnings volatility following the dividend event. All variables have been winsorized at 1^{st} and 99^{th} of the empirical distribution.

	Mean	SD	Min	25%	50%	75%	Max	N
A. Dividend Increases								
$R\Delta DIV$	0.163	0.149	0.001	0.068	0.118	0.2	0.750	15,207
ΔE_1	0.010	0.081	-0.481	-0.011	0.015	0.040	0.420	14,493
ΔE_2	0.013	0.095	-0.549	-0.012	0.017	0.046	0.474	14,040
EV_0	0.848	0.698	0.093	0.415	0.639	1.028	7.195	8,648
ΔEV_5	0.128	0.721	-5.122	-0.156	0.047	0.311	5.638	5,555
B. Dividend Decreases								
$R\Delta DIV$	-0.398	0.119	-0.5	-0.5	-0.444	-0.333	-0.001	1,307
ΔE_1	0.024	0.115	-0.481	-0.016	0.022	0.071	0.420	1,226
ΔE_2	0.015	0.125	-0.548	-0.021	0.019	0.062	0.474	1,174
EV_0	1.234	0.898	0.113	0.630	0.983	1.525	5.757	694
ΔEV_5	-0.120	0.911	-4.939	-0.427	-0.070	0.274	3.281	361
C. No Changes								
$R\Delta DIV$	0	0	0	0	0	0	0	20,228
ΔE_1	0.007	0.111	-0.481	-0.024	0.014	0.047	0.420	18,736
ΔE_2	0.010	0.125	-0.548	-0.024	0.016	0.054	0.474	17,963
EV_0	1.062	0.815	0.116	0.548	0.830	1.310	8.460	10,488
ΔEV_5	0.088	0.901	-4.937	-0.284	0.012	0.376	7.028	5,320

TABLE II

Portfolios of Changes in Earnings and Earnings Volatility Based on Four Quartiles of Dividend Increases/Decreases and Four Quartiles of Adjusted EV

ΔE_{τ} is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1. ΔEV is the change in earnings volatility in the 5 years following dividend increases. PC1, PC2, PC3 and PC4 represent 1st, 2nd, 3rd, and 4th quartiles of dividend increases respectively. NC12, NC3 and NC4 represent 1st and 2nd, 3rd, and 4th quartiles of dividend increases respectively. EV1, EV2, EV3 and EV4 represent 1st, 2nd, 3rd, and 4th quartiles of industry adjusted cash flow volatility for all dividend increase/decrease firm-year observations. Differences between 1st and 4th quartiles (extremes) are calculated. *, ** and *** represent statistical significance from 0 at the 10%, 5% and 1% levels.

(I) Dividend Increases

			I-A: Average ΔE_1		
EV	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
PC1	0.003	0.009	0.004	0.006	0.003
PC2	0.005	-0.003	0.004	0.015	-
PC3	0.007	0.004	0.007	0.014	-
PC4	0.013	-0.0002	0.014	0.002	-0.011
Difference between PC1 and PC4	0.010**	-	-	-0.004	
			I-B: Average ΔE_2		
	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
PC1	0.010	0.009	0.016	0.015	0.005
PC2	0.014	0.002	0.007	0.005	-
PC3	0.011	0.006	0.006	0.008	-
PC4	0.011	0.007	-0.00001	-0.004	-0.015
Difference between PC1 and PC4	0.001	-	-	-0.019**	
			I-C: Average ΔEV		
	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
PC1	0.357	0.204	0.117	-0.195	-0.552***
PC2	0.298	0.303	0.198	-0.294	-
PC3	0.322	0.295	0.074	-0.281	-
PC4	0.368	0.319	0.139	-0.390	-0.758***
Difference between PC1 and PC4	0.011	-	-	-0.195***	

(II) Dividend Decreases

II-A: Average ΔE_1					
	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
NC12	-0.003	0.021	0.030	0.083	0.086***
NC3	0.007	0.018	0.002	0.046	-
NC4	0.005	0.023	0.024	0.014	0.009
Difference between NC12 and NC4	0.008	-	-	-0.069*	

II-B: Average ΔE_2					
	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
NC12	0.021	0.018	-0.006	-0.008	-0.029
NC3	0.010	-0.010	0.016	0.034	-
NC4	0.012	-0.010	-0.005	0.023	0.011
Difference between NC12 and NC4	-0.009	-	-	0.031	

II-C: Average ΔEV					
	EV1	EV2	EV3	EV4	Difference between EV1 and EV4
NC12	0.464	0.082	-0.238	-0.935	-1.399***
NC3	0.277	0.143	-0.121	-1.008	-
NC4	0.206	0.246	-0.00002	-1.016	-1.222***
Difference between NC12 and NC4	-0.258**	-	-	-0.081	

TABLE III

Regressions of Future Earnings Changes on Dividend Changes Using Fama-Macbeth Procedure (Linear Models)

E_r is the incomes before extraordinary items in year r with year 0 as the event year. B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. $EVadj_0$ is the industry adjusted earnings volatility in year 0. $ROE_{\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity in year τ-1. Average R^2 is the average adjusted R^2 of the cross sectional-regressions. We use the Fama-MacBeth (1973) two-stage procedure to estimate the coefficients. We first run the annual cross-sectional regressions using observations only in that year; we then compute the mean coefficients and t-statistics. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ				
	I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2
Constant	0.018***	0.024***	0.019***	0.025***
	(3.27)	(5.34)	(3.20)	(5.25)
$DPC_0*R\Delta Div_0$	0.039***	0.041***	0.077***	0.070***
	(4.02)	(3.62)	(4.10)	(2.91)
DPC_0*EV_0			0.008***	0.013***
			(2.84)	(5.66)
$DPC_0*R\Delta Div_0*EV_0$			-0.052***	-0.069***
			(-2.81)	(-3.20)
$DNC_0*R\Delta Div_0$	-0.013	0.029*	0.011	0.005
	(-0.92)	(1.92)	(0.38)	(0.19)
DNC_0*EV_0			0.025	0.062**
			(1.09)	(2.77)
$DNC_0*R\Delta Div_0*EV_0$			0.050	0.156***
			(0.84)	(2.92)
$ROE_{\tau-1}$	-0.131***	-0.172***	-0.151***	-0.191***
	(-5.26)	(-8.72)	(-5.42)	(-9.53)
ΔE_0	-0.095**	0.118	-0.078*	-0.023
	(-2.55)	(-0.94)	(-1.82)	(-0.94)
Average Adjusted R^2	0.063	0.054	0.084	0.069

TABLE IV

Regressions of Future Earnings Changes on Dividend Changes

Using Fama-MacBeth Procedure (Nonlinear Models)

E_r is the earnings before extraordinary items in year r with year 0 as the event year. B_{-1} is the book value of equity at the end of year -1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. $EVadj_0$ is the industry adjusted earnings volatility in year 0. DFE_0 is equal to $ROE_0 - E[ROE_0]$, where ROE_0 is the ratio of income before extraordinary items to total common/ordinary equity in year 0 and $E[ROE_0]$ is the fitted value form the cross-sectional regressions of ROE_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio of equity in tear -1, and ROE_{-1}. $NDFED_0$ ($PDFED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive). CE_0 is equal to $(E_0\text{-}E_{-1})/B_{-1}$. $NCED_0$ ($PCED_0$) is a dummy variable that takes the value of 1 if CE_0 is negative (positive). Average R^2 is the average adjusted R^2 of the cross sectional-regressions. We use the Fama-MacBeth (1973) two-stage procedure to estimate the coefficients. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ				
	I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2
Constant	-0.008***	0.008**	-0.009***	0.0076*
	(-2.78)	(2.38)	(-2.95)	(1.97)
$DPC_0 * R\Delta Div_0$	0.010	0.009	0.068***	0.006
	(0.98)	(0.94)	(3.41)	(0.31)
$DPC_0 * EV_0$			0.005*	0.007***
			(1.74)	(3.02)
$DPC_0 * R\Delta Div_0 * EV_0$			-0.053**	-0.032
			(-2.77)	(-1.54)
$DNC_0 * R\Delta Div_0$	-0.004	0.019	-0.0068	-0.0026
	(-0.25)	(1.28)	(-0.30)	(-0.09)
$DNC_0 * EV_0$			0.021	0.042*
			(0.96)	(2.00)
$DNC_0 * R\Delta Div_0 * EV_0$			0.055	0.112**
			(1.14)	(2.16)
DFE_0	-0.113	-0.146*	-0.126	-0.181**
	(-1.51)	(-1.84)	(-1.70)	(-2.14)
$NDFED_0 * DFE_0$	-0.364***	-0.019	-0.410***	-0.022
	(-2.90)	(-0.15)	(-2.98)	(-0.16)
$NDFED_0 * DFE_0^2$	0.007	-0.127	-0.026	-0.405
	(0.03)	(-0.54)	(-0.11)	(-1.23)
$PDFED_0 * DFE_0^2$	0.063	0.378	0.259	0.420
	(0.16)	(0.99)	(0.65)	(1.05)
CE_0	0.276***	0.079	0.287***	0.120
	(3.96)	(1.00)	(4.79)	(1.67)
$NCED_0 * CE_0$	-0.124	0.011	-0.098	0.012

TABLE IV CONT.

	(-1.06)	(0.08)	(-0.81)	(0.08)
$NCED_0*CE_0^2$	0.450	0.200	0.720**	0.642
	(1.36)	(0.59)	(2.10)	(1.27)
$PCED_0*CE_0^2$	-0.829***	-0.517*	-0.959***	-0.596**
	(-3.78)	(-1.96)	(-4.51)	(-2.47)
Average Adjusted R^2	0.116	0.033	0.143	0.043

TABLE V

Regressions of Future Earnings Changes on Dividend Changes

Using Rogers Standard Errors (Linear Models)

ΔE_τ is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. EV_0 is the industry adjusted earnings volatility in year 0. $ROE_{\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity in year τ-1.*, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ				
	I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2
Constant	0.034***	0.019***	0.035***	0.022***
	(6.84)	(3.26)	(6.92)	(3.69)
DPC_0*$R\Delta Div_0$	0.042***	0.028***	0.065***	0.053***
	(6.54)	(3.82)	(5.04)	(3.41)
DPC_0*EV_0			0.007***	0.013***
			(3.07)	(5.39)
DPC_0*$R\Delta Div_0$*EV_0			-0.033***	-0.062***
			(-2.6)	(-3.94)
DNC_0*$R\Delta Div_0$	-0.019*	0.023*	0.035*	0.013
	(-1.80)	(1.90)	(1.69)	(0.5)
DNC_0*EV_0			-0.005	0.035**
			(-0.27)	(2.54)
DNC_0*$R\Delta Div_0$*EV_0			-0.058	0.085**
			(-1.27)	(2.3)
$ROE_{\tau-1}$	-0.127***	-0.177***	-0.152***	-0.206***
	(-7.70)	(-13.25)	(-8.14)	(-13.2)
ΔE_0	-0.090***	0.000	-0.103***	-0.005
	(-5.52)	(0.00)	(-5.37)	(-0.33)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.057	0.059	0.070	0.074
Firm-year Observations	27,308	26,098	19,135	18,364

TABLE VI

Regressions of Future Earnings Changes on Dividend Changes Using Rogers Standard Errors (Nonlinear Models)

$\Delta E\tau$ is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. EV_0 is the industry adjusted earnings volatility in year 0. DFE_0 is equal to ROE_0 – $E[ROE_0]$, where ROE_0 is the ratio of income before extraordinary items to total common/ordinary equity in year 0 and $E[ROE_0]$ is the fitted value form the cross-sectional regressions of ROE_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio of equity in tear -1, and ROE_{-1}. $NDFED_0$ ($PDFED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive). CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NCED_0$ ($PCED_0$) is a dummy variable that takes the value of 1 if CE_0 is negative (positive). *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ				
	I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2
Constant	0.002	-0.002	-0.002	-0.002
	(0.48)	(-0.39)	(-0.32)	(-0.35)
$DPC_0*R\Delta Div_0$	0.019***	0.006	0.055***	0.009
	(2.97)	(0.89)	(4.55)	(0.6)
DPC_0*EV_0			0.005***	0.007***
			(2.8)	(3.36)
$DPC_0*R\Delta Div_0*EV_0$			-0.045***	-0.037**
			(-3.87)	(-2.38)
$DNC_0*R\Delta Div_0$	-0.007	0.010	0.009	0.010
	(-0.69)	(0.81)	(0.44)	(0.39)
$DNC_0* EV_0$			-0.012	0.021*
			(-0.6)	(1.66)
$DNC_0*R\Delta Div_0*EV_0$			-0.043	0.049
			(-0.96)	(1.43)
DFE_0	-0.109*	-0.142**	-0.099	-0.168**
	(-1.77)	(-2.09)	(-1.46)	(-2.21)
$NDFED_0*DFE_0$	-0.410***	-0.035	-0.452***	-0.026
	(-3.81)	(-0.31)	(-3.63)	(-0.19)
$NDFED_0*DFE_0^2$	-0.378*	-0.116	-0.318	-0.211
	(-1.76)	(-0.57)	(-1.29)	(-0.89)
$PDFED_0*DFE_0^2$	0.152	0.157	0.277	0.172
	(0.56)	(0.58)	(0.96)	(0.57)
CE_0	0.332***	0.053	0.309***	0.085
	(6.58)	(0.92)	(5.62)	(1.25)
$NCED_0*CE_0$	-0.109	0.070	-0.133	0.026
	(-1.24)	(0.69)	(-1.27)	(0.21)

TABLE VI CONT.

$NCED_0*CE_0^2$	1.014***	0.166	0.821***	0.230
	(3.74)	(0.57)	(2.67)	(0.74)
$PCED_0*CE_0^2$	-0.977***	-0.216	-1.001***	-0.306
	(-5.05)	(-1.07)	(-4.94)	(-1.29)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.089	0.031	0.105	0.034
Firm-year Observations	26,885	25,698	18,969	18,204

TABLE VII

Regressions of Future Earnings Changes on Dividend Changes

In the Presence of High and/or Low-Volatility Firms (Modified Linear Models)

$DHEV_0$ is a dummy variable that takes 1 if EV_0 is larger than 75% of all EV_0 and 0 otherwise. $DLEV_0$ is a dummy variable that takes 1 if EV_0 is smaller than 25% of all EV_0 and 0 otherwise. ΔEτ is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. $ROE_{\tau-1}$ is equal to the earnings before extraordinary items in year τ-1 scaled by the book value of equity in year τ-1. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ						
	I: $DHEV_0$		II: $DLEV_0$		III: Both $DHEV_{adj0}$ and $DLEV_{adj0}$	
	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2
Constant	0.036***	0.024***	0.036***	0.024***	0.036***	0.017***
	(7.06)	(3.95)	(7.14)	(3.98)	(7.01)	(2.85)
$DPC_0*R\Delta Div_0$	0.053***	0.032***	0.044***	0.014	0.049***	0.009
	(5.79)	(2.79)	(4.44)	(1.10)	(4.67)	(0.66)
DPC_0*DHEV_0	0.012***	0.017***			0.013***	0.015***
	(2.75)	(3.52)			(2.87)	(2.98)
DPC_0*DLEV_0			0.005*	0.011***	0.005**	0.009***
			(1.78)	(4.01)	(2.08)	(3.01)
$DPC_0*R\Delta Div_0*DHEV_0$	-0.046*	-0.076***			-0.042*	-0.054*
	(-1.90)	(-2.80)			(-1.67)	(-1.77)
$DPC_0*R\Delta Div_0*DLEV_0$			0.0002	-0.005	-0.005	0.001
			(-0.01)	(-0.24)	(-0.26)	(0.03)
$DNC_0*R\Delta Div_0$	-0.007	0.003	-0.020	0.036**	-0.003	0.001
	(-0.65)	(0.21)	(-1.56)	(2.26)	(-0.26)	(0.04)
DNC_0*DHEV_0	-0.004	0.093			-0.003	0.071**
	(-0.10)	(3.52)			(-0.07)	(2.42)
DNC_0*DLEV_0			0.020	-0.035	0.021	-0.037
			(0.88)	(-1.25)	(0.92)	(-1.26)
$DNC_0*R\Delta Div_0*DHEV_0$	-0.045	0.266***			-0.048	0.190**
	(-0.52)	(3.73)			(-0.55)	(2.48)
$DNC_0*R\Delta Div_0*DLEV_0$			0.041	-0.158**	0.024	-0.134*
			(0.57)	(-2.10)	(0.34)	(-1.73)
$ROE_{\tau-1}$	-0.151***	-0.203***	-0.151***	-0.201***	-0.152***	-0.118***
	(-8.17)	(-13.10)	(-8.13)	(-12.93)	(-8.17)	(-6.45)
ΔE_0	-0.105***	-0.007	-0.106***	-0.008	-0.105***	-0.259***
	(-5.48)	(-0.41)	(-5.53)	(-0.47)	(-5.44)	(15.37)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.069	0.073	0.069	0.072	0.070	0.079
Firm-year Observations	19,135	18,364	19,135	18,364	19,135	18,367

TABLE VIII

Regressions of Future Earnings Changes on Dividend Changes

In the Presence of High and/or Low-Volatility Firms (Modified Nonlinear Models)

$DHEV_0$ is a dummy variable that takes 1 if EV_0 is larger than 75% of all EV_0 and 0 otherwise. $DLEV_0$ is a dummy variable that takes 1 if EV_0 is smaller than 75% of all EV_0 and 0 otherwise. EV_0 is the industry adjusted earnings volatility in year 0. $\Delta E\tau$ is the annual change in earnings before extraordinary items in year τ relative to the dividend event year (year 0) deflated by the book value of equity in year-1. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. DFE_0 is equal to $ROE_0 - E[ROE_0]$, where ROE_0 is the ratio of income before extraordinary items to total common/ordinary equity in year 0 and $E[ROE_0]$ is the fitted value form the cross-sectional regressions of ROE_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio of equity in tear -1, and ROE_{-1}. $NDFED_0$ ($PDFED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive). CE_0 is equal to $(E_0-E_{-1})/B_{-1}$. $NCED_0$ ($PCED_0$) is a dummy variable that takes the value of 1 if CE_0 is negative (positive). *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔE_τ						
	I: $DHEV_0$		II: $DLEV_0$		III: Both $DHEV_{adj0}$ and $DLEV_{adj0}$	
	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2
Constant	-0.0003	-0.001	-0.001	-0.0005	-0.002	-0.001
	(-0.06)	(-0.09)	(-0.21)	(-0.09)	(-0.37)	(-0.23)
$DPC_0*R\Delta Div_0$	0.031***	-0.007	0.016*	-0.017	0.027***	-0.013
	(3.67)	(-0.61)	(1.74)	(-1.48)	(2.77)	(-1.02)
DPC_0*DHEV_0	0.008**	0.009**			0.009**	0.010**
	(1.98)	(2.20)			(2.22)	(2.31)
DPC_0*DLEV_0			0.009***	0.004*	0.010***	0.005*
			(3.87)	(1.68)	(4.11)	(1.96)
$DPC_0*R\Delta Div_0*DHEV_0$	-0.052**	-0.039			-0.049**	-0.032
	(-2.32)	(-1.50)			(-2.09)	(-1.18)
$DPC_0*R\Delta Div_0*DLEV_0$			-0.011	0.009	-0.022	0.004
			(-0.59)	(0.40)	(-1.12)	(0.19)
$DNC_0*R\Delta Div_0$	-0.010	-0.004	-0.006	0.020	-0.006	0.002
	(-0.92)	(-0.23)	(-0.52)	(1.29)	(-0.54)	(0.1)
DNC_0*DHEV_0	-0.012	0.062**			-0.011	0.062**
	(-0.33)	(2.29)			(-0.31)	(2.29)
DNC_0*DLEV_0			0.015	-0.047	0.016	-0.046
			(0.70)	(-1.50)	(0.74)	(-1.47)
$DNC_0*R\Delta Div_0*DHEV_0$	-0.024	0.181**			-0.027	0.177**
	(-0.29)	(2.53)			(-0.33)	(2.45)
$DNC_0*R\Delta Div_0*DLEV_0$			0.011	-0.165**	0.012	-0.146*
			(0.16)	(-1.97)	(0.17)	(-1.74)
DFE_0	-0.102	-0.168**	-0.097	-0.158**	-0.098	-0.164**
	(-1.50)	(-2.21)	(-1.42)	(-2.06)	(-1.44)	(-2.15)
$NDFED_0*DFE_0$	-0.451***	-0.026	-0.456***	-0.029	-0.458***	-0.031
	(-3.62)	(-0.19)	(-3.65)	(-0.21)	(-3.67)	(-0.23)

TABLE VIII CONT.

$NDFED_0*DFE_0^2$	-0.323	-0.212	-0.323	-0.205	-0.326	-0.212
	(-1.31)	(-0.90)	(-1.31)	(-0.87)	(-1.33)	(-0.9)
$PDFED_0*DFE_0^2$	0.274	0.166	0.263	0.143	0.270	0.159
	(0.94)	(0.55)	(0.90)	(0.47)	(0.93)	(0.52)
CE_0	0.305***	0.079	0.316***	0.084	0.317***	0.086
	(5.56)	(1.16)	(5.76)	(1.24)	(5.76)	(1.27)
$NCED_0*CE_0$	-0.113	0.046	-0.140	0.021	-0.144	0.024
	(-1.07)	(0.38)	(-1.34)	(0.18)	(-1.37)	(0.2)
$NCED_0*CE_0^2$	0.870***	0.272	0.833***	0.232	0.822***	0.238
	(2.83)	(0.88)	(2.71)	(0.74)	(2.67)	(0.76)
$PCED_0*CE_0^2$	-0.997***	-0.296	-1.026***	-0.315	-1.021***	-0.312
	(-4.95)	(-1.26)	(-5.08)	(-1.33)	(-5.06)	(-1.32)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.104	0.033	0.104	0.033	0.105	0.034
Firm-year Observations	18,969	18,204	18,969	18,204	18,969	18,204

TABLE IX

Regressions of Future Volatility Changes on Dividend Changes In the Presence of High and/or Low-Volatility Firms

$DHEV_0$ is a dummy variable that takes 1 if EV_0 is larger than 75% of all EV_0 and 0 otherwise. $DLEV_0$ is a dummy variable that takes 1 if EV_0 is smaller than 75% of all EV_0 and 0 otherwise. EV_0 is the industry adjusted earnings volatility in year 0. ΔEV_5 is the five year change in adjusted earnings volatility following the dividend event. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. MB_{-1} is the natural logarithm of the market-to-book ratio in year -1. $SIZE_{-1}$ is the natural logarithm of the book value of total assets in year -1. LEV_{-1} is the ratio of total long term debt to book value of total assets. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ΔEV_5				
	5 -Year			3-Year
	I: $DHEV_0$	II: $DLEV_0$	III: Both $DHEV_{adj0}$ and $DLEV_{adj0}$	IV: Both $DHEV_{adj0}$ and $DLEV_{adj0}$
Constant	0.854***	0.882***	0.892***	0.376***
	(7.85)	(8.23)	(8.10)	(6.32)
$DPC_0 * R\Delta Div_0$	-0.354***	-0.328***	-0.313***	-0.092
	(-3.85)	(-3.81)	(-3.28)	(-1.21)
$DPC_0 * DHEV_0$	0.230***		0.235***	0.084*
	(3.22)		(3.25)	(1.82)
$DPC_0 * DLEV_0$		-0.122***	-0.123***	-0.064**
		(-2.85)	(-2.77)	(-2.23)
$DPC_0 * R\Delta Div_0 * DHEV_0$	-0.562**		-0.607**	-0.450**
	(-2.14)		(-2.27)	(-2.40)
$DPC_0 * R\Delta Div_0 * DLEV_0$		0.283	0.267	0.040
		(1.46)	(1.34)	(0.30)
$DNC_0 * R\Delta Div_0$	0.138	0.355***	0.216**	-0.014
	(1.59)	(3.26)	(2.31)	(-0.16)
$DNC_0 * DHEV_0$	-0.386		-0.382	-0.488***
	(-1.55)		(-1.54)	(-2.77)
$DNC_0 * DLEV_0$		-0.419**	-0.423**	-0.275*
		(-2.12)	(-2.15)	(-1.67)
$DNC_0 * R\Delta Div_0 * DHEV_0$	-0.563		-0.650	-1.295***
	(-0.90)		(-1.04)	(-2.88)
$DNC_0 * R\Delta Div_0 * DLEV_0$		-1.349**	-1.217**	-0.686
		(-2.37)	(-2.15)	(-1.51)
EV_0	-0.583***	-0.572***	-0.601***	-0.333***
	(-12.65)	(-12.73)	(-11.77)	(-11.24)
MB_{-1}	0.053**	0.059**	0.055**	0.012
	(2.28)	(2.56)	(-1.96)	(0.72)
SIZE-1	-0.016**	-0.013	-0.015***	-0.008*
	(-2.15)	(-1.78*)	(-1.96)	(-1.71)
LEV_{-1}	-0.258***	-0.236**	-0.257***	-0.165**
	(-2.66)	(-2.44)	(-2.66)	(-2.53)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.22	0.22	0.22	0.13
Firm-year Observations	11,153	11,153	11,153	13,998

TABLE X

Regressions of Changes in ROA on Dividend Changes

(Linear Models)

ROA_τ is defined either as the ratio of operating income before depreciation to the book value of total assets in year τ, or the ratio of income before extraordinary items to the book value of total assets in year τ. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. EV_0 is the industry adjusted earnings volatility in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

	Dependent Variable - ROA_τ - $ROA_{\tau-1}$							
	A: Linear Models - ROA (oibdp/at)				B: Linear Models - ROA (ib/at)			
	I: Base Model		II: Modified Model		I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2
Constant	0.019***	0.014***	0.018***	0.015***	0.012***	0.007***	0.011***	0.007***
	(11.86)	(8.01)	(10.21)	(7.77)	(7.88)	(3.89)	(6.72)	(3.93)
$DPC_0*R\Delta Div_0$	0.001	-0.0015	0.010**	0.012**	0.010***	0.007***	0.021***	0.022***
	(0.49)	(-0.59)	(2.18)	(2.49)	(4.75)	(3.22)	(5.18)	(4.89)
DPC_0*EV_0			0.001*	0.002***			0.003***	0.004***
			(1.91)	(3.78)			(4.24)	(5.64)
$DPC_0*R\Delta Div_0*EV_0$			-0.010**	-0.021***			-0.015***	-0.023***
			(-2.46)	(-4.55)			(-3.58)	(-4.77)
$DNC_0*R\Delta Div_0$	-0.012***	-0.0027	-0.005	0.013*	-0.005	0.005	0.009	0.009
	(-3.02)	(-0.67)	(-0.62)	(1.68)	(-1.36)	(1.09)	(1.14)	(1.09)
DNC_0*EV_0			-0.002	0.010**			0.001	0.010*
			(-0.23)	(2.22)			(0.1)	(1.87)
$DNC_0*R\Delta Div_0*EV_0$			-0.009	0.010			-0.010	0.019
			(-0.58)	(0.97)			(-0.6)	(1.42)
$ROA_{\tau-1}$	-0.136***	-0.137***	-0.139***	-0.143***	-0.186***	-0.224***	-0.199***	-0.252***
	(-21.52)	(-22.68)	(-18.02)	(-19.22)	(-21.52)	(-23.68)	(-19.35)	(-22.79)
$(ROA_0 - ROA_{-1})$	0.001	-0.043***	-0.015	-0.048***	-0.095***	-0.0002	-0.118***	-0.006
	(0.12)	(-4.81)	(-1.28)	(-4.48)	(-8.66)	(-0.02)	(-9.45)	(-0.5)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.040	0.040	0.090	0.101	0.104	0.106	0.119	0.123
Firm-year Observations	27,215	26,003	19,071	18,295	27,310	26,099	19,133	18,361

TABLE XI

Regressions of Changes in ROA on Dividend Changes

(Nonlinear Models)

ROA_τ is defined either as the ratio of operating income before depreciation to the book value of total assets in year τ, or the ratio of income before extraordinary items to the book value of total assets in year τ. $R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. EV_0 is the industry adjusted earnings volatility in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. Where DFE_0 is $ROA_0 – E[ROA_0]$, the fitted value of from the annual cross-sectional regressions of ROA_0 on the logarithm of the book value of total assets in year -1, the logarithm of the market-to-book ratio in year -1 and ROA_{-1}. $NDFED_0$ ($PDFED_0$) takes one if DFE_0 is negative (positive) and zero otherwise. CE_0 is $ROA_0 – ROA_{-1}$. $NCED_0$ ($PCED_0$) takes one if CE_0 is positive (negative) and zero otherwise. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

	Dependent Variable - ROA_τ - $ROA_{\tau-1}$							
	A: Nonlinear Models - ROA (oibdp/at)				B: Nonlinear Models - ROA (ib/at)			
	I: Base Model		II: Modified Model		I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2	τ=1	τ=2
Constant	-0.003*	-0.005***	-0.003**	-0.005***	-0.002	-0.005***	-0.003**	-0.006***
	(-1.86)	(-2.78)	(-2.02)	(-2.69)	(-1.35)	(-2.86)	(-1.97)	(-3.07)
$DPC_0*R\Delta Div_0$	-0.008***	-0.010***	0.001	0.0005	-0.0009	-0.006***	0.011***	-0.001
	(-3.13)	(-3.79)	(0.19)	(0.1)	(-0.45)	(-2.86)	(2.61)	(-0.26)
DPC_0*EV_0			0.000	0.001			0.001	0.001
			(-0.47)	(1.03)			1.56	(1.56)
$DPC_0*R\Delta Div_0*EV_0$			-0.008*	-0.015***			-0.013***	-0.012**
			(-1.8)	(-2.97)			(-2.84)	(-2.02)
$DNC_0*R\Delta Div_0$	-0.012***	-0.003	-0.008	0.011	-0.005	-0.0002	-0.007	0.003
	(-3.18)	(-0.81)	(-1.15)	(1.36)	(-1.24)	(-0.05)	(-0.89)	(0.39)
DNC_0*EV_0			-0.007	0.005			-0.003	0.005
			(-1.01)	(1.33)			(-0.49)	(1.07)
$DNC_0*R\Delta Div_0*EV_0$			-0.019	0.002			-0.005	0.009
			(-1.16)	(0.26)			(-0.33)	(0.73)
DFE_0	-0.423***	-0.419***	-0.425***	-0.418***	-0.259***	-0.256***	-0.266***	-0.247***
	(-11.91)	(-11.67)	(-10.02)	(-10.2)	(-4.85)	(-4.88)	(-4.23)	(-4.24)
$NDFED_0*DFE_0$	-0.124**	0.126**	-0.087	0.093	-0.318***	-0.007	-0.411***	-0.005
	(-2.24)	(2.35)	(-1.4)	(1.54)	(-3.86)	(-0.09)	(-4.16)	(-0.05)
$NDFED_0*DFE_0^2$	-0.837***	-0.093	-0.707***	-0.152	0.024	-0.701	-0.920	-0.577
	(-3.01)	(-0.41)	(-2.87)	(-0.73)	(0.05)	(-1.35)	(-1.52)	(-1.01)
$PDFED_0*DFE_0^2$	0.614***	0.760***	0.694***	0.778***	-1.909***	-0.075	-1.535*	-0.285
	(3.96)	(4.12)	(3.83)	(3.65)	(-2.87)	(-0.11)	(-1.91)	(-0.38)
CE_0	0.365***	0.206***	0.338***	0.228***	0.293***	0.057	0.256***	0.122*
	(12.60)	(7.24)	(9.63)	(7.16)	(5.48)	(0.96)	(4.18)	(1.78)
$NCED_0*CE_0$	-0.069**	-0.004	-0.053	-0.002	0.164**	0.209**	0.250***	0.102
	(-2.35)	(-0.12)	(-1.55)	(-0.06)	(2.15)	(2.55)	(2.83)	(1.05)
$NCED_0*CE_0^2$	0.021	0.276	0.324	0.658**	2.687***	1.410***	3.599***	1.239**
	(0.07)	(1.05)	(0.96)	(2.2)	(5.07)	(2.60)	(6.15)	(1.99)
$PCED_0*CE_0^2$	-0.744**	-0.419	-0.656*	-0.524	-1.215*	0.577	-0.994	-0.240
	(-2.34)	(-1.25)	(-1.82)	(-1.39)	(-1.89)	(0.77)	(-1.4)	(-0.29)

TABLE XI CONT.

Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.068	0.058	0.072	0.068	0.110	0.039	0.126	0.044
Firm-year Observations	26,791	25,602	18,905	18,136	26,883	25,694	18,967	18,201

TABLE XII

Regressions of Future Earnings Levels on Dividend Changes

(Linear Models)

ROE_τ is earnings before extraordinary items in year τ deflated by the book value of equity in year τ.$R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. EV_0 is the industry adjusted earnings volatility in year 0. MB_{-1} is the natural logarithm of the market-to-book ratio in year -1. $SIZE_{-1}$ is the natural logarithm of the book value of total assets in year -1. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

	Dependent Variable - ROE_τ			
	I: Base Model		II: Modified Model	
	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$
Constant	0.015***	0.002	0.010**	-0.001
	(2.92)	(0.36)	(1.94)	(-0.09)
DPC_0*$R\Delta Div_0$	0.027***	0.021***	0.041***	0.028*
	(5.19)	(3.22)	(3.34)	(1.64)
DPC_0*EV_0			0.008***	0.012***
			(4.44)	(5.58)
DPC_0*$R\Delta Div_0$*EV_0			-0.029**	-0.043**
			(-2.25)	(-2.47)
DNC_0*$R\Delta Div_0$	0.020*	0.004	0.013	0.018
	(1.69)	(0.25)	(0.56)	(0.58)
DNC_0*EV_0			0.014	0.031*
			(0.66)	(1.85)
DNC_0*$R\Delta Div_0$*EV_0			0.030	0.058
			(0.6)	(1.29)
$ROE_{\tau-1}$	0.620***	0.507***	0.601***	0.489***
	(32.83)	(28.11)	(27.66)	(23.43)
$(ROE_0 - ROE_{-1})$	-0.099***	0.037**	-0.106***	0.028
	(-6.61)	(2.16)	(-6.38)	(1.45)
MB_{-1}	0.023***	0.031***	0.028***	0.036***
	(11.34)	(13.76)	(10.65)	(12.47)
$SIZE_{-1}$	0.002***	0.003***	0.002***	0.003***
	(5.64)	(5.76)	(4.85)	(4.92)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.336	0.286	0.341	0.289
Firm-year Observations	26,879	25,689	18,963	18,197

TABLE XIII

Regressions of Future Earnings Levels on Dividend Changes

(Nonlinear Models)

ROE_τ is earnings before extraordinary items in year τ deflated by the book value of equity in year τ.$R\Delta DIV_0$ is the annualized rate of quarterly dividend changes in year 0. DPC (DNC) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. $NDFED_0$ ($PDFED_0$) takes one if ROE_0 is negative (positive) and zero otherwise. CE_0 is equal to $ROE_0 - ROE_{-1}$. $NCED_0$ ($PCED_0$) takes one if CE_0 is negative (positive) and zero otherwise. MB_{-1} is the natural logarithm of the market-to-book ratio in year -1. $SIZE_{-1}$ is the natural logarithm of the book value of total assets in year -1. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels.

Dependent Variable - ROE_τ				
	I: Base Model		II: Modified Model	
	τ=1	τ=2	τ=1	τ=2
Constant	0.004	0.002	0.001	0.003
	(0.68)	(0.23)	(0.21)	(0.3)
$DPC_0 * R\Delta Div_0$	0.013***	0.012	0.044***	0.044**
	(2.66)	(1.55)	(3.82)	(2.2)
$DPC_0 * EV_0$			0.008***	0.013***
			(4.36)	(6.01)
$DPC_0 * R\Delta Div_0 * EV_0$			-0.041***	-0.068***
			(-3.49)	(-3.27)
$DNC_0 * R\Delta Div_0$	0.031***	0.016	-0.022	-0.003
	(2.72)	(1.06)	(-0.91)	(-0.1)
$DNC_0 * EV_0$			0.013	0.026
			(0.62)	(1.08)
$DNC_0 * R\Delta Div_0 * EV_0$			0.072	0.076
			(1.41)	(1.32)
ROE_0	0.733***	0.458***	0.702***	0.399***
	(20.06)	(8.82)	(16.78)	(6.81)
$NDFED_0 * ROE_0$	-0.466***	-0.488***	-0.450***	-0.495***
	(-3.59)	(-3.12)	(-3.11)	(-2.89)
$NDFED_0 * ROE_0^2$	0.499	-0.111	0.572	-0.522
	(1.03)	(-0.19)	(1.07)	(-0.82)
$PDFED_0 * ROE_0^2$	0.112	0.406***	0.209**	0.525***
	(1.14)	(2.76)	(2.06)	(3.42)
CE_0	0.034	-0.107*	0.041	-0.094
	(0.81)	(-1.84)	(0.83)	(-1.39)
$NCED_0 * CE_0$	0.088	0.367***	0.023	0.337***
	(1.31)	(4.08)	(0.29)	(3.24)
$NCED_0 * CE_0^2$	0.486***	0.767***	0.315*	0.793***
	(3.06)	(3.44)	(1.81)	(3.23)
$PCED_0 * CE_0^2$	-0.457**	-0.015	-0.445**	-0.065
	(-2.37)	(-0.05)	(-2.08)	(-0.22)
MB_{-1}	0.014***	0.021***	0.016***	0.026***

TABLE XIII CONT.

	(6.84)	(7.16)	(6.15)	(6.7)
$SIZE_{-1}$	0.002***	0.004***	0.002***	0.004***
	(5.34)	(6.97)	(4.06)	(5.57)
Year Dummy	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Adjusted R^2	0.363	0.205	0.369	0.214
Firm-year Observations	26,879	25,701	18,963	18,206