STOCK PRICE REACTION TO DIVIDEND CHANGES: AN EMPIRICAL TEST

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the
Faculty
of

Business Administration

Financial Risk Management Program

SIMON FRASER UNIVERSITY

Summer 2010

APPROVAL

Name:	**Luis Lu Zou Shi and Zhou Fang**
Degree:	**Master of Financial Risk Management**
Title of Thesis:	**Stock Price Reactions to Dividend Changes: An Empirical Test**

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ABSTRACT

This paper investigates both long-term and short-term stock price reactions to announcements of dividend changes. We document that short-term abnormal returns surrounding dividend increases are more significant than those surrounding dividend decreases. In the long run, the mean monthly calendar time abnormal returns following dividend increases are positively significant, suggesting underreaction. Yet no long-term post-event abnormal returns are observed for dividend decreases. Examining subsamples sorted by market value of equity and percentage dividend change, respectively, we notice that the magnitude of percentage dividend changes is positively correlated with that of absolute abnormal returns, and firms of smaller size produce more apparent abnormal returns than do those of bigger size.

Keywords: Dividend Changes, Abnormal Returns, Event Study

ACKNOWLEGEMENTS

We would like to pay our sincere gratitude to Dr. Alexander Vedrashko and Dr. Christina Atanasova for their encouragement and guidance. Their intellectual insights are greatly appreciated. Dr. Vedrashko is an incredible mentor and has guided us through the whole process. Dr. Atanasova has provided us with invaluable critique. We are deeply grateful to have them as our supervisor and reader of our Master's thesis.

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1. INTRODUCTION

Event study makes up an important part of finance literature. Introduced by Fama et al. (1969), it is essentially a statistical method assessing how stock prices perform around various corporate events, or, in the context of market efficiency, whether, and to which extent they produce abnormal returns surrounding the announcements of new information. In the general sense, studies on the relations of corporate events and abnormal returns produce valuable information, as they not only contribute to the theoretical framework of market efficiency, but also translate to ways that various funds process information in practice.

In previous literature, it has been demonstrated repeatedly that corporate events are associated with significant long-term abnormal returns.[1] However, despite all these reported anomalies, Fama (1998), one of the introducers of event study, contends that market efficiency is not necessarily undermined, as "apparent overreaction of stock prices to information is about as common as underreaction". In view of the arguments listed above, it is hard to develop an overall perspective on market efficiency from isolated event studies. However, this is not to say that event studies are useless. From the perspective of money management, profitable trading strategies still can be derived from robust abnormal returns. The questions we need to ask are what kinds of events induce anomalies and for how long abnormal returns last.

Changes in dividend payout policy cover several types of commonly investigated events, such as announcements of dividend initiations, omissions, increases and decreases. Among these events, initiations and omissions are relatively more dramatic and have been well studied. Yet increases and decreases are more common and, therefore, more available for trading. This paper focuses particularly on the short-term and long-term impact of announcements of dividend increases and decreases on common stock prices in the U.S..

[1] Michaely et al. (1995) conclude that dividend initiations are followed by positive abnormal returns lasting for three years and dividend omissions induce negative abnormal returns. Desai and Jain (1997) and Ikenberry et al. (1996) report that stock splits bring about 7% positive abnormal returns in the year after. Asquith (1983) and Agrawal et al. (1992) find that mergers are associated with negative abnormal returns.

When a firm increases or decreases its dividend that has been paid in regular fashion, the firm is making a noticeable change in corporate policy. Therefore it is intuitive to conjecture that such change would trigger abnormal returns in certain post-event, even pre-event periods, as long as the change is foreseeable. The relations between dividend changes and stock returns are reported in the empirical tests of Pettit (1972), Aharony and Swary (1980), Brickley (1983), and Kalay and Loewenstein (1986). And a series of theoretical papers, including Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) propose a signaling model for such relations.

This paper examines both short-term and long-term abnormal returns surrounding/following dividend changes, that is, dividend increases and decreases. Also tested is whether increases and decreases of dividend produce abnormal returns of equal magnitude. Supposedly, dividend increases are good news and should be associated with positive price drift, while dividend decreases are bad news and therefore produce negative price drift. However, our results suggest that this is not necessarily the case, as the price reaction to dividend decreases is quite ambiguous and not as significant as that to dividend increases even in a very short horizon.

To test for short-term abnormal returns, we calculate three-day cumulative abnormal returns (CAR) around each event. An event is identified in terms of firm and dividend declaration date when dividend change is announced. For each type of event, we report the mean CAR and test the distribution of CARs for its statistical features. Moreover, we employ both parametric and non-parametric tests to determine whether CARs surrounding dividend increases and dividend decreases, other things being equal, are of the same magnitude. To test for long-term anomalies, as Lyon, Barber and Tsai (1999) and Mitchell and Stafford (2000) suggest, we adopt calendar time portfolio approach, and test the intercept (alpha) for its statistical significance. Examining the period from 1980 to 2009, we document that for a 12-month horizon, excluding the month when dividend changes are declared, the mean monthly calendar time abnormal returns after dividend increases are 0.37 percent ($t = 3.56$). Meanwhile, such figure for dividend decreases is not significant different from zero.

In addition, to determine which factors might help explain anomalies, we divide our sample into 4 quartiles in terms of percentage dividend change and market value. Then we report results for the 2 extreme quartiles, as well as their difference.

Last but not least, we are mindful that the intertwined relationship of dividend changes, earnings changes and abnormal returns adds complexities to our study, as changes in dividends and earnings are both events that potentially affect returns. A number of authors, namely, Ofer and Siegel (1987), Healy and Palepu (1988), and Nissim and Ziv (2001), argue that there is positive correlation between the two types of events. To rule out the influence of earnings announcements, we exclude the dividend changes that coincide with earnings announcement and test the abnormal returns on the filtered samples. We add this part to the paper as robustness tests. We notice that the reported abnormal returns, both long-term and short-term, survive robustness tests. Therefore, these anomalies are indeed associated with dividend changes announcements, not earnings announcements.

This paper is structured as follows. Section 2 reviews the related literature from three perspectives, theoretical framework, methodologies and empirical tests. Section 3 describes data selection and methodology applied. Section 4 introduces results of both short-term and long-term test, as well as the robustness test. Section 5 draws the general conclusion.

2. LITERATURE REVIEW

2.1. Theoretical Framework

To establish the rational that dividend changes are associated with abnormal returns, Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) propose a "cash flow signaling hypothesis", arguing that dividend changes send out transparent information from corporate managers about firms' earnings or/and cash flows. Ofer and Siegel (1987) and Healy and Palepu (1988) and more recently Nissim and Ziv (2001) confirm such hypothesis by demonstrating positive correlation between dividend changes and future earnings or/and cash flows. However, Grullon, Michaely and Swaminathan (2002) reject such correlation, arguing that previous studies produce spurious results due to inappropriate models.

Unlike aforementioned authors, Lang and Litzenberger (1989) account for stock price reactions to dividend changes by turning to investors' expectations about management actions. They contend that dividend changes do not necessarily lead to changes in earnings or/and cash flows.

2.2. Methodologies

Event studies focusing on a short horizon, for example, a few days, are not as tricky as those focusing on long horizons. As Fama (1991) stated, short-term tests provide "the cleanest evidence we have on efficiency". However, long-term studies are problematic. Barber and Lyon (1997) state that both cumulative abnormal returns (CAR) and Buy and Hold Abnormal Returns (BHAR) are not reliable in measuring long-term abnormal returns; CAR is biased distribution of true returns and BHAR is too skewed and therefore statistically problematic. Although Lyon, Baber and Tsai (1999) criticize every approach applied to long-term event studies, they document that the calendar time portfolio method has advantage over CAR and BHAR for (1) it mitigates cross-sectional dependence among sample firms, and (2) it yields more robust statistics in non-random samples. Mitchell and Stafford (2000) are the first influential authors who explicitly propose the calendar time portfolio method as a reliable means to study long-term abnormal returns.

2.3. Empirical Tests

The proposition that dividend changes are associated with price reaction is supported by a number of empirical studies, such as Pettit (1972), Aharony and Swary (1980), Brickley (1983) and Kalay and Loewenstein (1986), although some of these authors draw further inferences from different perspectives. For example, Pettit (1972) states that dividend announcements are inefficient in conveying information, while Aharony and Swary (1980) argue that dividend changes send out information beyond earnings announcements.

For now our major concern is that the aforementioned tests are done in earlier times and do not employ the calendar time portfolio approach, which is the prominent methodology for long-term event studies in the most recent decade. Strangely, no recent empirical test is found in the literature on the relations between dividend changes and abnormal returns.

3. DATA AND METHODOLOGY

3.1 Data

We collect data on stock returns and cash dividend payments from the Center for Research in Security Prices (CRSP) database. The four factors of Cahart (1997) asset pricing model, that is, traditional Fama and French (1996) three factors with a momentum factor, are obtained from Kenneth French's data base.

The beginning date of our sample is January 1980 and the ending date is December 2009. We define dividend increases/decrease as when cash dividends have been paid in two consecutive quarters, and the dividend amount paid in the current quarter is more/less than that paid in the previous quarter. In order to select representative and justified samples of our interest, the observations we obtain must meet the following criteria:

1. The company must be traded in on the NYSE, AMEX, or Nasdaq, and must pay regular cash dividend for at least two consecutive quarters with regular tax treatment (Distribution code 1232).
2. The security must be a common stock of a U.S.-based firm (Share code 10 and 11).
3. In the case of missing value or non numeric value of price, shares outstanding, return, dividend amount and declaration date, the corresponding data are deleted from the sample.
4. Firm size is measured by market value of equity and calculated as shares outstanding times closing price, or the average of ask and bid price when closing price is not available.

Searching CRSR daily file, we find totally 40949 events of dividend changes, where 32009 are dividend increases and 8940 are dividend decreases. To test whether our empirical results are constant through time, we divide the full sample into three subsamples by decades. To account for the factors that may produce difference in the magnitude of abnormal returns, we also divide our sample into 4 quartiles in terms of the magnitude of dividend change and the firm's market value of equity. Sample characteristics are summarized in Table 1.

3.2 Methodology

3.2.1. Short-term Cumulative Abnormal Returns (CAR)

In calculating short-term abnormal returns, we turn to the most straightforward measure, cumulative abnormal returns (CAR); we look into three days (-1, 0, +1) surrounding the events[2],

[2] Some earlier authors examine abnormal returns surrounding events day by day (see Pettit(1972), Aharony and Swary(1980), and Brickley(1983)). However, Michaely et al.(1995) look at the three-day window surrounding events to study short-term abnormal returns.

and sum the abnormal returns, that is, actual returns minus estimated returns, of the three days.

To calculate expected returns for each event, we set the period (-200, -20) days prior to events as the estimation period, then run regression over such period with Carhart (1997) four factors model,

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,1}(R_{m,t} - R_{f,t}) + \beta_{i,2}SMB_t + \beta_{i,3}HML_t + \beta_{i,4}UMD_t + e_{i,t} \quad (1)$$

where $R_{i,t}$ is return of event firm i at time t, $R_{f,t}$ is the return of one-month Treasury Bill. The four independent variables are excess returns on the CRSP index $(R_{m,t} - R_{f,t})$, the difference in the returns of value-weighted portfolios of small firms and big firms SMB_t, and the difference of value-weighted high book-to-market and low book-to-market portfolios HML_t, and momentum factor, that is, the difference of high return and low return in the last period UMD_t. All data are at the daily frequency.

For each event firm, we obtain a group of coefficient estimates, α_i, $\beta_{i,1}$, $\beta_{i,2}$ $\beta_{i,3}$ and $\beta_{i,4}$, with which we calculate expected returns and then cumulative abnormal returns for each event firm as follows,

$$\bar{R}_{i,t} = \alpha_i + \beta_{i,1}(R_{m,t} - R_{f,t}) + \beta_{i,2}SMB_t + \beta_{i,3}HML_t + \beta_{i,4}UMD_t + R_{f,t} \quad (2)$$

$$CAR_i\ (-1,+1) = \sum_{t=-1}^{+1} R_{i,t} - \sum_{t=-1}^{+1} \bar{R}_{i,t} \quad (3)$$

where

$\bar{R}_{i,t}$ is the expected return of event firm i on day t.

$R_{i,t}$ is the actual return of event firm i on day t;

CAR_i is the three-day cumulative abnormal return of event firm i.

Then we report mean CARs and corresponding t statistics. To test whether increases and decreases have symmetric effect, we compare absolute difference of means and medians of CARs for dividend increases and dividend decreases, in both full sample and decade subsamples. Results related to this part are reported in Table 2 and Table 3.

3.2.2. Long-term Calendar Time Portfolios Approach

Measuring long-term abnormal returns is difficult, because the choice of methodology makes a huge difference for the results. And any test for abnormal returns must be jointly tested with a model calibrating normal returns. As Mitchell and Staffod (2000) suggest, we construct calendar time portfolios consisting of all the firms in which dividend increases/decreases have occurred in the period [c-h, c-1], where c is the calendar month and h is the post-event horizon in months. The first calendar time portfolio should be constructed h months after data are first collected (Jan 1980) so that the samples can populate. Following Mitchell and Stafford (2000), we require a minimum of 10 firms to be included in each calendar time portfolio. Then, to calibrate normal returns and mitigate pre-event momentum, we adopt Carhart (1997) four factors model, adding a momentum factor to traditional Fama and French (1996) three factors,

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + e_{p,t} \tag{4}$$

where $R_{p,t}$ is portfolio return at time t, $R_{f,t}$ is the return of one-month Treasury Bill. The four independent variables are excess returns on the CRSP index $(R_{m,t} - R_{f,t})$, the difference in the returns of value-weighted portfolios of small firms and big firms SMB_t, and the difference of value-weighted high book-to-market and low book-to-market portfolios HML_t, and momentum factor, that is, the difference of high return and low return in the last period UMD_t. The intercept α is the abnormal returns of the event portfolios.

Calendar time portfolio returns can be calculated equally weighted or value weighted. Boehme and Sorescu (2002) document that value weighted portfolios produce valuable inference on market efficiency, as most anomalies calculated from equally weighted portfolios disappear in value weighted portfolios. By dividing their samples into deciles in terms of market value, they confirm that the aforementioned inconsistency is due to the fact that most anomalies in equally weighted portfolios are contributed by firms of low capitalization. Here our calendar time portfolios are equally weighted. However, we divide our samples into 4 quartiles by market value and percentage dividend change and compare the difference between the top and the bottom quartiles.

Our test approaches are as follows. To examine whether a single calendar time portfolio has apparent abnormal returns, we look at the intercept (alpha) and corresponding t statistic. To compare two extreme quartiles, we construct a supposedly hedged portfolio, longing one extreme quartile and shorting the other, and run the same regression for this portfolio. If the intercept (alpha) is statistically significant, then the difference between the returns of the two quartiles is significant.

4. STOCK PRICE REACTIONS WITH ROBUSTNESS TEST

4.1. Short-term Stock Price Reactions to Dividend Changes

We compute three-day cumulative abnormal returns (CAR) surrounding dividend increases and dividend decreases for both the full samples (1980 – 2009) and decade subsamples. As reported in Table 2, CARs are significant across all samples, for increases and decreases, in the full samples and decade subsamples. Levels of significance are at least 1%, except for the subsample for dividend decreases from 1980 to 1989, which documents 5% significance level. In the full samples, differences in means and medians are both significant at 1% level, suggesting an asymmetric effect that dividend increases induce CAR of greater magnitude than do dividend decreases. Perhaps the most intriguing finding in this table is that the upside reactions associated with dividend increases become less significant and the downside reactions produced by dividend decreases more significant as the samples represent more recent decades. As a result, the difference of CAR magnitude is prominent in 1980's and becomes ambiguous since 1990's.

Table 3 provides with more detailed results across quartiles sorted by percentage dividend change and market value of equity. Differences in means and medians of returns between the top and the bottom quartiles are prominent in the full sample; the magnitude of percentage dividend changes is positively correlated with that of absolute abnormal returns, and firms of smaller size produce more apparent abnormal returns than do those of bigger size.

Examined decade by decade, however, the quartile differences in CARs between subsamples sorted by market value appear to be diminishing.

4.2. Long-term Stock Price Reactions to Dividend Changes

Table 4, Panel A displays long-term abnormal returns, denoted as mean monthly calendar time abnormal returns (alphas). To obtain some ideas on for how long anomalies last, supposedly they exist at the first place, we examine mean monthly alphas over three post-event horizons, 12 months, 6 months and 3months. For dividend increases, post-event returns are positive at 1% significance level; mean monthly alphas are observed at 0.33%, 0.43% and 0.54% for post-event horizons over 12 months, 6 months and 3 months, respectively. On the other hand, for dividend decreases, no abnormal returns are observed.

Examining extreme quartiles sorted by market value and percentage dividend changes, respectively (Table 4, Panel B), we gain some insights into the potential sources of post-event abnormal returns. Portfolios consisting of high market value stocks, in cases of both dividend increases and dividend decreases, exhibit no post-even abnormal returns. This is to say, in cases of dividend increases, most long-term post-event abnormal returns are driven by stocks of low market capitalization. This is consistent with the findings of Boehme and Sorescu (2002) in their investigation of dividend initiations and resumptions. Interestingly, for dividend decreases, post-event abnormal returns of small stocks are significantly positive as well. Extreme quartiles sorted by percentage dividend decrease yield the same result as the full sample; no abnormal returns are observed. Here our proposal is that dividend decreases, unlike dividend increases which clearly translate to good news, send out ambiguously bad news, as evidenced by (1) three-day CARs for dividend decreases are, although negative, less significant and smaller in absolute values compared to those for dividend increases, and (2) for low market value equities, long-term abnormal returns are significantly positive, suggesting overreaction in the short run. A plausible explanation for such results is that for small firms, dividend decreases are likely to be associated with reinvesting. Such information is not explicitly conveyed in the short run. In the long run, news comes out, and downside overreactions in the short run are reversed.

4.3. Robustness Test

As mentioned in the introduction, the concurrence of dividend changes announcements and earnings announcements produces difficulties in establishing relationship between dividend changes and abnormal returns. As we calculate from the I/B/E/S file, 16.57% of dividend increases and 14.79% of dividend decreases coincide with earnings announcement of the same fiscal quarter, defining coincidence as when dividend changes happen in the three days surrounding earnings announcements.

In table 5 and table 6, we report three-day CARs surrounding events and mean monthly alphas 12 months after events for dividend increases and dividend decreases, excluding events when dividend changes announcements and earnings announcements coincide, and compare them to the corresponding results of the unfiltered samples. We find that both short-term and long-term abnormal returns are reduced to a slight extent in the filtered samples, but not to the extent that changes significance level. Generally speaking, our previous results survive the robustness test.

5. CONCLUSION

In this paper we examine both immediate and long-term stock price reaction to dividend increases and dividend decreases. We document that short-term price reactions, that is, cumulative abnormal returns in the three days surrounding events, are statistically significance for both dividend increases and dividend decreases. Yet comparing absolute differences of the two types of events, we find that the price reactions are not symmetric, as positive market reaction to dividend increases is stronger than negative reaction to dividend decreases.

In the long run, the mean monthly abnormal returns following dividend increases are significantly positive, suggesting underreaction in the short run. For dividend decreases, the alphas in the long run are not significantly different from zero. Nevertheless, for the bottom quartile sorted by market value of equity, the long-term abnormal returns 3 months, 6 months, and 12 months after dividend decreases are all significantly positive, indicating previous overreaction.

Our investigation of subsamples, sorted by market value of equity and percentage dividend change, demonstrate that the magnitude of percentage dividend changes is positively correlated with that of absolute abnormal returns, and firms of smaller size produce more apparent abnormal returns than do those of bigger size. A noteworthy finding, however, is that the differences in three-day cumulative abnormal returns between the top and the bottom quartiles have been diminishing in the past three decades.

TABLES

Table 1. Summary Statistics

Panel A. the Full Samples

	No. of observations	average percentage change	average market value (in millions)
Dividend increases			
full sample	32009	20.46%	3.62
percentage dividend change above 3rd quartile	8314	53.38%	
percentage dividend change below 1st quartile	7976	3.85%	
market value above 3rd quartile	7999		13.41
market value below 1st quartile	8000		0.05
Dividend decreases			
full sample	8940	-40.61%	2.74
percentage dividend change above 3rd quartile	1462	-68.21%	
percentage dividend change below 1st quartile	2232	-16.90%	
market value above 3rd quartile	2233		10.21
market value below 1st quartile	2233		0.04

Panel B. Decade Subsample from 1980 to 1989

	No. of observations	average percentage change	average market value (in millions)
Dividend increases			
full sample	11468	19.41%	1.00
percentage dividend change above 3rd quartile	3087	46.29%	
percentage dividend change below 1st quartile	2865	4.38%	
market value above 3rd quartile	2864		3.41
market value below 1st quartile	2865		0.03
Dividend decreases			
full sample	3915	-38.12%	0.77
percentage dividend change above 3rd quartile	517	-62.85%	
percentage dividend change below 1st quartile	978	-15.51%	
market value above 3rd quartile	977		2.62
market value below 1st quartile	977		0.03

Panel C. Decade Subsample from 1990 to 1999

	No. of observations	average percentage change	average market value (in millions)
Dividend increases			
full sample	10988	18.52%	3.02
percentage dividend change above 3rd quartile	2779	46.99%	
percentage dividend change below 1st quartile	2802	3.94%	
market value above 3rd quartile	2746		11.01
market value below 1st quartile	2747		0.04
Dividend decreases			
full sample	3016	-41.02%	3.87
percentage dividend change above 3rd quartile	418	-68.97%	
percentage dividend change below 1st quartile	754	-19.14%	
market value above 3rd quartile	754		14.34
market value below 1st quartile	754		0.05

Panel D. Decade Subsample from 2000 to 2009

	No. of observations	average percentage change	average market value (in millions)
Dividend increases			
full sample	8743	22.81%	7.80
percentage dividend change above 3rd quartile	2234	65.13%	
percentage dividend change below 1st quartile	2182	3.45%	
market value above 3rd quartile	2186		28.72
market value below 1st quartile	2185		0.08
Dividend decreases			
full sample	1814	-44.56%	5.14
percentage dividend change above 3rd quartile	454	-73.19%	
percentage dividend change below 1st quartile	457	-16.65%	
market value above 3rd quartile	454		19.04
market value below 1st quartile	453		0.06

Table 2. CARs of the Full Samples and Decade Subsamples

In this panel, we report three day cumulative abnormal returns (CAR) surrounding dividend increases and dividend decreases declarations by U.S. firms in the full sample (1980 – 2009), as well as in each decade. For each sample the mean CAR and corresponding t statistic are reported. The last two columns, difference in means (medians) are the difference between the absolute values of mean (median) CAR for dividend increases and dividend decreases. The difference in means (medians) column reports t-test (Wilcoxon rank sum z test) statistics. The symbols *, ** and *** represent statistical significance at 10%, 5% and 1% levels, respectively.

	CAR for dividend increase, %	CAR for dividend decrease, %	difference in means	difference in medians
Full sample	0.65% (29.76)***	-0.42% (-6.40)***	0.23% (3.27)***	0.10% (5.94)***
1980-1989	0.83% (23.58)***	-0.22% (-2.68)**	0.61% (6.96)***	0.21% (7.03)***
1990-1999	0.57% (15.42)***	-0.41% (-4.31)***	0.16% (1. 61)	0.01% (-2.22)
2000-2009	0.51% (11.97)***	-1.05% (-5.00)***	-0.54% (-2.51)	0.03% (0. 09)

Table 3. CARs Sorted by Percentage Dividend Change and Market Value

The samples of announcements of dividend increases and dividend decreases are divided into 4 quartiles in terms of percentage dividend change and market value, respectively. Market value is the stock price at the end of the month multiplied by shares outstanding then. The highest quartiles, Q4 (lowest quartiles, Q1) represent events with the greatest (smallest) magnitude of dividend change and firms with the highest (lowest) market value. For each of the extreme quartiles, we report the mean CAR and its significance, denoted as t statistics in brackets. Panels A – D are for the full samples and decade subsamples. The difference between the two extreme quartiles is examined in terms of means in all samples, and medians in the full samples. The significance of mean differences is evaluated with t statistics, and that of median differences with z values. T-stats and z values are showed in brackets. The symbols *, ** and *** represent statistical significance at 10%, 5% and 1% levels, respectively.

Panel A. CARs for the Full Samples

A1. CAR for dividend increases, %			
% change above 3rd quartile (Q4)	0.96% (18.45)***	Market value above 3rd quartile (Q4)	0.43% (11.67)***
% change below 1st quartile (Q1)	0.39% (10.81)***	Market value below 1st quartile (Q1)	1.02% (20.37)***
Mean difference (Q4 - Q1)	0.57% (9.10)***	Mean difference (Q1 - Q4)	0.59% (9.60)***
Median difference (Q4 - Q1)	0.29% (7.46)***	Median difference (Q1 - Q4)	0.05% (5.75)***

A2. CAR for dividend decrease, %			
% change above 3rd quartile (Q4)	-1.74% (-7.43)***	Market value above 3rd quartile (Q4)	-0.09% (-0.79)
% change below 1st quartile (Q1)	0.22% (1.93)*	Market value below 1st quartile (Q1)	-0.73% (-4.64)***
Mean difference (Q4 - Q1)	-1.96% (-7.53)***	Mean difference (Q1 - Q4)	-0.64% (-3.28)***
Median difference (Q4 - Q1)	-0.63% (-6.70)***	Median difference (Q1 - Q4)	-0.43% (-4.93)***

Panel B. CARs from 1980 to 1989

B1. CAR for dividend increases, %			
% change above 3rd quartile (Q4)	1.10% (13.44)***	Market value above 3rd quartile (Q4)	0.50% (8.89)***
% change below 1st quartile (Q1)	0.56% (9.16)***	Market value below 1st quartile (Q1)	1.20% (14.02)***
Mean difference (Q4 - Q1)	0.54% (5.22)***	Mean difference (Q1 - Q4)	0.70% (6.83)***

B2. CAR for dividend decrease, %			
% change above 3rd quartile (Q4)	-1.16% (-4.53)***	Market value above 3rd quartile (Q4)	-0.07% (-0.48)
% change below 1st quartile (Q1)	0.19% (1. 26)	Market value below 1st quartile (Q1)	-0.66% (-3.43)***
Mean difference (Q4 - Q1)	-1.35% (-9.55)***	Mean difference (Q1 - Q4)	-0.59% (-2.50)**

Panel C. CARs from 1990 to 1999

C1. CAR for dividend increases, %			
% change above 3rd quartile (Q4)	0.99% (10.35)***	Market value above 3rd quartile (Q4)	0.36% (6.08)***
% change below 1st quartile (Q1)	0.36% (6.34)***	Market value below 1st quartile (Q1)	0.87% (10.18)***
Mean difference (Q4 - Q1)	0.63% (5.73)***	Mean difference (Q1 - Q4)	0.51% (4.98)***

C2. CAR for dividend decrease, %			
% change above 3rd quartile (Q4)	-1.29% (-3.62)***	Market value above 3rd quartile (Q4)	-0.11% (-0.82)
% change below 1st quartile (Q1)	0.06% (0. 38)	Market value below 1st quartile (Q1)	-0.64% (-2.79)***
Mean difference (Q4 - Q1)	-1.35% (-8.22)***	Mean difference (Q1 - Q4)	-0.53% (-2.03)**

Panel D. CARs from 2000 to 2009

D1. CAR for dividend increases, %			
% change above 3rd quartile (Q4)	0.77% (7.70)***	Market value above 3rd quartile (Q4)	0.47% (6.37)***
% change below 1st quartile (Q1)	0.37% (5.17)***	Market value below 1st quartile (Q1)	0.82% (9.33)***
Mean difference (Q4 - Q1)	0.40% (3.26)***	Mean difference (Q1 - Q4)	0.35% (3.06)***

D2. CAR for dividend decrease, %			
% change above 3rd quartile (Q4)	-3.25% (-5.44)***	Market value above 3rd quartile (Q4)	-0.51% (-1.58)
% change below 1st quartile (Q1)	-0.05% (-0.19)	Market value below 1st quartile (Q1)	-1.50% (-3.04)***
Mean difference (Q4 - Q1)	-3.20% (-11.52)***	Mean difference (Q1 - Q4)	-0.99% (-1.69)*

Table 4. Mean Monthly Calendar Time Abnormal Returns (Alphas)

Calendar time portfolios consist of firms in which dividend increases/decreases have occurred in the time period [c-h, c-1] before calendar month c, where h is the post-event horizon in months.

The coefficients are estimated using Carhart (1997) four factors model.

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_1 (R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + e_{p,t}$$

where $R_{p,t}$ is portfolio return at time t, $R_{f,t}$ is the return of one-month Treasury Bill. The four independent variables are excess returns on the CRSP index $(R_{m,t} - R_{f,t})$, the difference in the returns of value-weighted portfolios of small firms and big firms SMB_t, the difference of value-weighted high book-to-market and low book-to-market portfolios HML_t, and momentum factor, that is, the difference of high return and low return in the last period UMD_t. The intercept α is the abnormal returns of the event portfolios. The samples of dividend increases and dividend decreases are divided into 4 quartiles in terms of percentage dividend change and market value respectively. T-statistics in parentheses are based on Newey and West (1987). The symbols *, **, *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Panel A. Mean Monthly Calendar Time Abnormal Returns, the Full Samples

	12 months	6 months	3 months
Alpha for dividend increase, %	0.33% (3.25)***	0.43% (4.05)***	0.54% (4.84)***
Alpha for dividend decrease, %	0.00% (0.01)	0.06% (0.41)	-0.03% (-0.17)

Panel B. Mean Monthly Calendar Time Abnormal Returns in Subsamples, Sorted by Market Value and Percentage Dividend Change

B1. Mean monthly Jensen's alpha following dividend increases			
	12 months	6 months	3 months
Market value above 3rd quartile (Q4)	0.03% (0 .31)	0.11% (0.99)	0.14% (1.24)
Market value below 1st quartile (Q1)	0.68% (4.43)***	0.85% (5.57)***	1.03% (6.07)***
market value Q1 - Q4	0.65% (4.64)***	0.74% (5.23)***	0.87% (5.34)***
% change above 3rd quartile (Q4)	0.49% (3.83)***	0.68% (5.09)***	0.92% (5.82)***
% change below 1st quartile (Q1)	0.21% (2.17)**	0.23% (2.37)**	0.29% (2.81)***
% change Q4 - Q1	0.28% (2.77)***	0.45% (4.13)***	0.64% (5.06)***

B2. Mean monthly Jensen's alpha following dividend decreases			
	12 months	6 months	3 months
Market value above 3rd quartile (Q4)	0.11% (0.82)	0.23% (1.28)	0.29% (1.31)
Market value below 1st quartile (Q1)	0.68% (4.33)***	0.88% (5.71)***	1.07% (6.17)***
market value Q1 - Q4	0.57% (2.71)***	0.61% (2.47)**	0.84% (3.03)***
% change above 3rd quartile (Q4)	-0.15% (-0.84)	-0.22% (-0.98)	-0.11% (-0.35)
% change below 1st quartile (Q1)	0.09% (0.70)	0.02% (0.13)	-0.04% (-0.20)
% change Q4 - Q1	-0.23% (-1.33)	-0.27% (-1.20)	-0.03% (-0.12)

Table 5. Robustness Test of Cumulative Abnormal Returns (CAR)

In this table, mean three-day CARs surrounding dividend increases and dividend decreases are reported for the samples excluding coincidences of dividend changes and earnings announcement, compared to unfiltered samples including the coincidences. T statistics are denoted in brackets. The symbols *, ** and *** represent statistical significance at 10%, 5% and 1% levels, respectively.

	Unfiltered sample	Filtered sample, excluding coincidences
3 days CAR around dividend increases	0.65% (29.76)***	0.59% (26.20)***
3 days CAR around dividend decreases	-0.42% (-6.40)***	-0.34% (-4.96)***

Table 6. Robustness Test of Mean Monthly Calendar Time Abnormal Returns

In this table, mean monthly abnormal returns (alphas) for the samples excluding the coincidences of dividend changes and earnings announcements are calculated in [c-12, c-1], where c is the calendar month, and compared to unfiltered samples including the coincidences. T statistics are denoted in brackets. The symbols *, ** and *** represent statistical significance at 10%, 5% and 1% levels, respectively.

	Unfiltered sample	Filtered sample, excluding coincidences
Mean monthly alpha after dividend increases	0.33% (3.25)***	0.32% (3.11)***
Mean monthly alpha after dividend decreases	0.00% (0. 01)	-0.09% (-0.54)

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