

THE INTRA-INDUSTRY EFFECTS OF REIT DIVIDEND ANNOUNCEMENTS

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ABSTRACT

This study investigates the intra-industry effects of cash dividend announcements for U.S. real estate investment trusts (REITs). That is, based on the market model framework, this study examines whether a change in an announcing REIT's dividends has information externality on its peers/rivals. Our results suggest that REIT dividend announcements have contagion effects. In addition, consistent with the existing literature, these contagion effects are found to be asymmetric and more prevalent for dividend-decreasing events.

Keywords: REIT, dividend, intra-industry effect, contagion effect

INTRODUCTION

Informational asymmetry between corporate insiders and outsiders is a cornerstone for development of the modern finance paradigm. It is well understood that outside investors have an intrinsic information disadvantage relative to insiders. Consequently, outside investors often resort to corporate announcements as one of their main sources of corporate information. Among all corporate information and announcements, dividend announcements have a special place in academic research. For one thing, cash dividends are the only way that investors can receive cash flows from the firms, and thus are the fundamental source of corporate value. Frankfurter and Wood (2002) provide a detailed literature review summarizing the theoretical and empirical relations between dividend policies and firm values.

Understanding the role of dividend policies in shaping the prices and values of real estate investment trusts (REITs) is a particularly interesting inquiry for several reasons. First, REITs are widely perceived among investors as yield instruments. To maintain their favorable tax-exempt status, REITs must pay out at least 90% of their taxable incomes as cash dividends to shareholders. Second, there is a lack of consensus on the information value of REIT dividends. Intuitively, REIT dividends largely reflect REITs' capacities to generate cash flows since their cash flows are mostly from the operation of commercial property. REIT dividends, therefore, have more information about the qualities of firms can be better extracted from dividend changes (Muhlhofer and Ukhov, 2010). On the other hand, REITs are relatively transparent compared with industrial firms since REITs derive their cash flows from the operation of commercial property, which is more straightforward to price than more complex assets held by industrial firms (Muhlhofer and Ukhov, 2010). The effects of asymmetric information and other market imperfections are mitigated; thus, REIT dividends should be relatively uninformative (Hayunga and Stephens, 2009).

Given the importance of dividend policies on REIT valuation, the purpose of this study is to contribute to our understanding of REIT dividend policies by focusing on a unique aspect of the information contents of dividend announcements. Traditionally, researchers have addressed the question of whether and how dividend policies affect announcing REITs. Examples of these studies are Wang, Erickson, and Gau (1993); Bradley, Capozza, and Seguin (1998); Li, Sun, and Ong (2006); Hayunga and Stephens (2009); Simpson, Emery, and Moreno (2009); Hardin and Hill (2008); and Lee, Chiu, Lee, Chiang, Slawson (2010). Further, Ooi (2001) examined dividend payouts policy of U.K. property companies. Although the existing literature helps us better understand the economic functions of dividend payout, it is unclear whether REIT dividend announcements have information externality; that is, whether the dividend payout of an announcing REIT transmits information about industry condition to shareholders in peer REITs.

Focusing on the intra-industry dynamic of REIT dividend announcements can contribute to the existing literature and industry practice in at least three important ways. First, this study extends the many intra-industry effect studies of dividend announcements on other industries to the REIT industry. This is an important extension because the intra-industry effects are likely to be industry-specific (Balachandran, Faff, and Nguyen, 2004). As far as we know, the only existing study on the REIT industry is Lee, Chiang, and Lin (2011) who study the announcements of REIT effective *stock* dividends during the 2009 financial crisis. Different from theirs, this current study explores the intra-industry effects of REIT *cash* dividends announcements. Second, Chiang (2010) finds that REIT prices have tended to co-move more in the last two decades. This increasing return synchronicity does not seem to arise because the fundamentals of REITs are more synchronized today. The author conjectures that information externality (e.g., increasing information sharing and spillover) is a likely reason for the stylized fact. The current study adds to this line of the REIT literature by examining whether information externality exists in the REIT industry. Third, for practitioners, the existence of intra-industry effects provides a trading opportunity on peer/rival REITs. Furthermore, if intra-industry effects are contagious and if there is a positive association among the abnormal returns of an announcing REIT and its peers/rivals, it would make sense to group REITs into one or multiple investment styles.

Based on a rich sample during the 2001–2008 period, we find a strong positive association between the abnormal return of an announcing REIT and those of its peers/rivals when the event REIT cuts cash dividends. This documented contagion effect is consistent with existing literature which shows that contagion effects are asymmetric and more prevalent for dividend-decreasing events. The evidence also calls for the need to group REITs into one or multiple styles to further understand their co-movement relationship.

LITERATURE REVIEW

A firm's cash dividend payout contains information about the quality and prospects of that firm. Based on information asymmetry, the theory of signaling suggests that, when a firm announces an increase in dividend payout, the announcement is a signal implying that the firm is of higher quality and is expected to generate greater cash flows in the future in order to sustain the elevated dividend payout. In contrast, when a firm announces a dividend cut, a signal is created suggesting that management expects a prolonged decrease in the firm's capacity to generate cash flow. Overall, the existing literature shows that corporate dividend policy is an important indicator that can be used to mitigate the information asymmetry between managers and shareholders and has important implications on corporate values (Lintner, 1956; Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985).

A well-documented stylized fact of dividend policy is that firms prefer stable dividend payouts. This preference is created because shareholders' wealth is sensitive to changes in dividend payout, and this sensitivity is asymmetrical to whether dividends are increased or decreased. Denis, Denis, and Sarin (1994) find that the average excess return due to dividend increases is approximately five times that of dividend decreases. As a result, firms prefer to smooth out dividend payout over time to maximize their shareholders' wealth (Brav, Graham, Harvey, and Michaely, 2005).

Another information aspect of dividend policy receives relatively little attention; that is, a firm's dividend payout has pricing implications on its peers/rivals. In other words, this additional aspect of dividend policy is about whether dividend policy has information externality. In general, depending on the sign of the association between the price reaction of an announcing firm and those of its peers/rivals, there are three possible intra-industry effects: (1) a positive association between announcing firms and peers/rivals; i.e., contagion effects, (2) a zero association between announcing firms and peers/rivals; that is, dividend announcements convey only firm-specific information, and (3) a negative association between announcing firms and peers/rivals; i.e., competitive effects.

The existing evidence from investigating traditional, non-REIT firms is mixed. Firth (1996) finds that dividend-decreasing announcements have contagion effects on peers/rivals. Similarly, Caton, Goh, and Kohers (2003) document that dividend-termination announcements have contagion effects. In contrast, Laux, Starks, and Yoon (1998) find no evidence for either contagion effects or competitive effects. Howe and Shen (1998) also find that dividend-initiation announcements have little contagion effects.

A particularly interesting study by Balachandran, Faff, and Nguyen (2004) points out that the intra-industry effects are likely to be industry-specific. The authors study three industry sectors: general industries, the financial industry, and the energy industry. They find evidence of contagion in the energy industry, but no evidence of intra-industry effects in general industries. The results from the financial industry seem to be sensitive to the choice of sample period.

The seemingly industry-specific nature of intra-industry effects motivates the current study. It appears that the REIT industry may have its own unique set of intra-industry effects, which warrants our investigation. Particularly, when a REIT announces a dividend increase, the announcement is a credible signal implying that management expects greater cash flow from its commercial properties in the future enough to sustain the increased dividend payout. On the other

hand, when a REIT announces a dividend cut, the announcement is a trustworthy suggestion that management expects a prolonged decrease in the capacity of its underlying properties to generate cash flow.

More importantly dividend changes do not only signal information about the announcing REITs (Wang, Erickson, and Gau, 1993; Hayunga and Stephens, 2009), but also can disclose information relevant for their rival REITs (Laux, Starks and Yoon, 1998). A contagion effect could occur as a result of cash flow generating capacities of their commercial properties being driven by common factors, that is, the extent to which the properties share tenants, operating facilities, labor markets. The dividend revisions of the announcing REITs might provide information about these factors and thus elicit similar stock price revisions for other REITs. Contagion may also happen if REITs use industry practices as targets for their own dividend policies (Marsh and Merton, 1987). This is because, in this case, dividend announcements would provide information on the likelihood that rival REITs will change its dividend in the same direction.

However dividend announcements can also contain information concerning shifts in the industry's competitive balance (Laux, Starks and Yoon, 1998). Particularly dividend increases (decreases) might disclose the announcing REITs are stronger (weaker) than previously expected in competing tenants, for example. The competitive effects may attenuate or reverse the contagion effects. The extent of such offsetting competing effects depend the extent of competition of the industry (Laux, Starks and Yoon, 1998). Therefore the net intra-industrial effects of dividend announcements in the REIT market are not necessarily the same to those in other markets.

In particular, the intra-industry literature for REITs is thin. To the best of our knowledge, the only existing study is by Lee, Chiang, and Lin (2011), who study the intra-industry effects for the announcements of REIT effective *stock* dividends during the 2009 financial crisis. The strength of the current study is that we have a much longer sample period and sample size. This empirical advantage may lead to a more powerful test.

METHODS AND SAMPLES

Empirical Methods

This study adopts the short-window event study methodology to investigate REITs' price reaction to dividend changes. The event window is defined as $(-1, 0)$; that is, the day before the event day, and the event day itself. It is well known that the choice of the underlying market model is unlikely to have material impacts on statistical inferences for short-window event studies. For this reason, our market model has a relatively simple form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} is the daily return of i at time t , and R_{mt} is proxied by the Russell 2000 Index (Howe and Jain, 2004), and ε_{it} is the equation error. This study also experiments with use of the S&P 500 Index as the market proxy. The unreported results are qualitatively similar. This study follows Wang, Erickson, and Gau (1993) and uses the period between the 60 days prior to the event day and the 60 days after the event day to estimate the alpha and the beta of the market model. This study also experiments with a different estimation period of using the 120 days prior to the event day to estimate the alpha and the beta of the market model. The unreported results are again qualitatively similar. With these estimates, the abnormal return for i at time t can be computed as follows (Kohers (1999); Impson (2000); Bessler and Nohel (2000)):

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (2)$$

The cumulative abnormal return between event window (t_1, t_2) then can be calculated as follows:

$$CAR = \sum_{t=t_1}^{t_2} AR_{it} \quad (3)$$

Based on the cumulative abnormal returns from sampled events, our first set of statistical tests is performed based on the following t -statistic for the null hypothesis of the population of cumulative abnormal returns which has a zero mean:

$$t = \frac{\bar{x}}{\sqrt{s^2/n}} \quad (4)$$

where \bar{x} is the average of cumulative abnormal returns, s is the standard error of cumulative abnormal returns, and n is the sample size.

Our second set of statistical tests is performed with the use of regression models. The dependent variable includes cumulative abnormal returns for peer/rival REITs. The specification of independent variables is largely guided by the existing literature and is chosen as follows:

$$CAR_{ij} = f(ACAR_j, ALMV_j, CORR_{ij}, LEV_i, RLMV_i, YDUMMY_j) \quad (5)$$

where

CAR_{ij}	the cumulative abnormal return for the peer/rival REIT j to the announcement of the announcing REIT i
$ACAR_i$	the cumulative abnormal return of the announcing REIT i
$ALMV_i$	the natural logarithm of the announcing REIT's market capitalization in million dollars
$CORR_{ij}$	the correlation coefficient between the announcing REIT i and a peer/rival REIT j between days -205 and -6
LEV_j	the ratio of the book value of debt to the book value of total assets for the peer/rival REIT j
$RLMV_j$	the natural logarithm of the peer/rival REIT j 's market capitalization in million dollars
$YDUMMY_i$	1 if the REIT market is a bull market when the sampled announcement is made, and 0 otherwise

The regression model is estimated via both pooled ordinary least squared regressions and panel data regressions. The computation of t -statistic is based on White (1980), which has the heteroskedasticity-consistent property.

The parameter of interest for the current study is $ACAR_i$, which indicates the direction and degree of the intra-industry effects of dividend announcements (Firth, 1996). If contagion effects dominate the intra-industry dynamics, we would expect the sign for $ACAR_i$ to be positive. That is, the announcement has similar effects on peer/rival REITs. In contrast, if competitive effects are stronger, we would expect the sign for $ACAR_i$ to be negative in the sense that the announcing REIT's gain (loss) is a loss (gain) to its rivals. This research design is well established in the existing literature; e.g., Chen, Ho, and Shih (2007), Erwin and Miller (1998), Hertzal (1991), and Kohers (1999).

The size of the announcing REIT, $ALMV_i$, is the first control variable in our multi-variate specification. The reason for including this variable is that intra-industry effects may be a function of news visibility. One would expect that a larger announcing firm may have a larger degree of intra-industry effects (Firth, 1996). On the other hand, depending on the relative dominance of contagion effects and competitive effects, it is possible that the size effect can have either positive or negative influence on peers/rivals. Kohers (1999) documents a negative size effect for dividend initiations.

The return association between announcing REITs and peers/rivals can be due to their existing co-movement relation. This existing co-movement may exist because either they share the same set of fundamentals or they are classified as the same investment style. It is therefore necessary to control for this existing co-movement relation when we study intra-industry effects. In this study, we follow Balachandran, Faf, and Nguyen (2004) and use the correlation coefficient of return, $CORR_{ij}$, between the announcing REIT and a peer/rival during the period of -205 day to -6 day relative to the announcement day to measure the existing co-movement relation. (We also include another dummy variable PEER, which is defined as 1 if the other REIT is in the same sector and 0 otherwise in the regressions. The PEER coefficients are not statistically significant in unreported regressions. More importantly the inclusion of PEER does not significantly affect the results of our results regarding CORR and other variables.)

LEV_j is the ratio of the book value of debt to the book value of total assets for the peer/rival REIT j . It is well known that a firm's beta, and thus its price reaction relative to an average peer, is increasing in its financial leverage. To control for this individual sensitivity, this study follows Chen, Ho, Shih (2007) and Lee, Chiang, and Lin (2011) and includes this variable as a control variable in our multi-variate specification.

Our specification includes both the size of the announcing REIT, $ALMV_i$, whose rationale for inclusion was discussed earlier, and the size of the peer/rival j , $RLMV_j$. (We also try use $ALMV/RLMV$ to measure the relative size effect instead of using $ALMV$ and $RLMV$ separately. The coefficients of $ALMV/RLMV$ are not statistically significant in unreported regressions. More importantly using $ALMV/RLMV$ does not significantly affect the results of our results regarding other variables.) The logic for this additional control variable is similar; that is, news visibility is a function of firm size. In addition, larger REITs should have better liquidity, which also has implications on the return association between announcing REITs and their peers/rivals.

Finally, we include a dummy variable $YDUMMY_i$ that takes on the value of 1 if the REIT market is a bull market. This is a quite standard control variable in existing studies; e.g., Below and Johnson (1996), Caton, Goh, and Kohers (2003), Jansen and Tsai (2010), Liu, Szweczyk, and Zantout (2008), and Schultz (2003). It has long been hypothesized that intra-industry effects are sensitive to market conditions.

The Samples

The sample of dividend announcements and the market and accounting data for announcing REITs and peer REITs is collected from the SNL database. This study focuses on equity REITs because the 2008 financial crisis introduces some discontinuities in the data on mortgage REITs. We follow Wang, Erickson, and Gau (1993) and define changes in dividends as the differences between the current quarter's cash dividends and the previous quarter's cash dividends. According to this definition, our sample of dividend reduction includes those events in which dividends are eliminated (Jensen, Lundstrum, and Miller, 2010). Our sample period is from January 2001 to December 2008. The sample period starts in January 2001 because the REIT Modernization Act changes the dividend payout requirement from 95% to 90% of taxable income starting January 2001. The sample period ends in December 2008 because REITs are allowed to effective stock dividends starting in 2009 to cope with the turmoil of the global financial crisis.

To avoid confounding information, this study deletes announcements whose event windows overlap with those of other announcements. These make up for around 10% of the announcements made during the study period. This study obtains similar results when these announcements are included in the analyses. This leads us to focus on 654 dividend-increasing events and 225 dividend-decreasing events of 139 REITs with complete relevant data as shown in Table 1. The table presents the numbers of dividend-increasing and dividend-decreasing events over time. It is clear that REITs experienced operating difficulties in 2008. There are only 42 quarterly dividend-increasing events in 2008, which is less than half of the counterparts in the previous years. We also see the highest number of dividend-decreasing events in 2008, a total of 46 events.

Table 1: REIT dividend announcements

Year	No. of Dividend Announcements		Mean of Dividend Changes	
	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases
2001	80	28	0.028	-0.111
2002	86	23	0.029	-0.137
2003	76	41	0.023	-0.069
2004	89	27	0.021	-0.140
2005	98	18	0.017	-0.122
2006	90	28	0.028	-0.389
2007	93	14	0.065	-0.116
2008	42	46	0.022	-0.134

Note: Dividend changes are measured in US dollars.

The table reveals two interesting facts about REIT dividend announcement practices. First, the number dividend-increasing events is larger than that of decreasing events every year except 2008. Second, the absolute magnitude of average dividend change for the decreasing events each year is larger than that of the increasing events. These reveal that REITs are reluctant to announce dividend decreases; however the cut is large when announced. Along with the existing non-REIT studies, this supports us to study REIT dividend-increasing and decreasing events separately. For each of the dividend announcements in Table 1, we track the price reactions of all other REITs to study the intra-industry effects. That is, for each announcement, peer/rival REITs in this study are all the non-announcing REITs.

Table 2 presents the descriptive statistics for the sample REITs and the relevant variables. The average ACAR is 0.211% for dividend-increasing announcements. The magnitudes for dividend-increasing announcements are slightly smaller than those reported by Wang, Erickson, and Gau (1993) and Hayunga and Stephens (2009). One possible reason put forward by Hayunga and Stephens (2009) is that REITs become more transparent than before. The authors found that the average CAR experienced by announcing REITs in their study for the period 1992-2003 was lower than that in the study of Wang, Erickson, and Gau (1993) study for the time period 1985-1988.

The average ACAR is -0.035% with a standard deviation of 50.337% for dividend-decreasing announcements. This is consistent with the previous REIT studies. In particular Hayunga and Stephens (2009) found that the mean CARs for dividend-decreasing announcing REITs are not statistically significant for the period 1992-2003. The standard deviation of ACAR for dividend-decreasing announcements is 50.337% in this current study. This indicates a very large variation in the market response to REITs who announced dividend decreases.

Table 2: Descriptive statistics

Variable	Dividend Increases		Dividend Decreases	
	Mean	Std. Dev	Mean	Std. Dev
ACAR	0.211%	0.404%	-0.035%	50.337%
ALMV	7.673	0.335	7.217	0.389
CORR	0.244	0.172	0.195	0.209
LEV	0.582	0.201	0.583	0.207
RLMV	6.704	1.769	6.640	1.781
YDUMMY	0.704	0.456	0.588	0.492

Note: CAR is the cumulative abnormal return of the non-announcing REIT. ACAR is the cumulative abnormal return of the announcing REIT. ALMV is the natural logarithm of the announcing REIT's market capitalization in million dollars. CORR is the correlation coefficient of returns between the non-event firm and the event firm. LEV is the ratio of the book value of debt to the book value of total assets for rival REIT. RLMV is the natural logarithm of the rival REIT's market capitalization in million dollars. YDUMMY is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise.

EMPIRICAL RESULTS

Impacts on non-announcing REITs

Table 3 shows the wealth effects during the window of -1 day to 0 day, (-1, 0), relative to the announcement day for peer/rival REITs when announcing REITs announce increases or decreases in cash dividends. The results show that REIT dividend announcements have contagion effects. When increases in cash dividends are announced, the cumulative abnormal returns during the (-1, 0) window for peer/rival REITs have an average value of 0.114%. The *t*-statistic is 2.066, which is statistically significant at the 5% level. The results also show that the contagion effects for the announcements of decreases in dividends are stronger. On average, when decreases in cash dividends are announced, the mean cumulative abnormal return during the two-day window for peer/rival REITs is -0.231%. The *t*-statistic is -2.867, which is statistically significant at the 1% level. This documented asymmetric response pattern in which dividend decreases have a stronger effect is consistent with the existing evidence; e.g., Denis, Denis, and Sarin (2004), Li and Lie (2006), and Lie (2004).

As discussed earlier, there is evidence supporting contagion effects when dividend announcements have similar effects on peer/rival REITs. That is, when a REIT announces an increase in its dividend payout, this new information contains good news for its peers/rivals as well. By the same token, when a REIT announces a decrease in its dividend payout, this seemingly firm-specific news, in fact, contains some industry-wide elements. As a result, we observe the share prices of peers/rivals fall in a similar fashion. Relative to those existing studies that examine the dividend announcements of traditional, non-REIT stocks, our results are largely consistent with Firth (1996) and Canton, Goh, and Kohers (2003), but at odds with Laux, Starks and Yoon (1998) and Howe and Shen (1998).

Table 3: Rival REIT reactions to REIT cash dividend announcements

Announcements	CAR(-1,0)
Dividend Increases	0.114% ** (2.066)
Dividend Decreases	-0.231% *** (-2.867)

Note: CAR(-1,0) is the cumulative abnormal return on the days before the announcement day and the announcement day itself. Div(+) is a dividend-increasing event and Div(-) is a dividend-decreasing event. *t*-statistics are in parentheses. **Significant at the 5% level. ***Significant at the 1% level.

Variations in non-announcing REIT responses

Having documented that REIT dividend announcements have contagion effects in the traditional event study framework, our investigation turns to the question of how robust the contagion effects are in an alternative specification. That is, the relation between the cumulative abnormal return of an announcing REIT and those of its peers/rivals is

investigated in a multi-variate regression framework that controls for other known determinants of cumulative abnormal returns.

Table 4: Pooled OLS regressions

Explanatory Variable	Dividend Increases	Dividend Decreases
ACAR	-5.364 (-1.101)	0.417*** (6.601)
ALMV	-0.092 (-1.065)	-0.310*** (-4.459)
CORR	0.470*** (9.216)	-1.303*** (-8.822)
LEV	-0.017 (-0.222)	-0.167 (-0.922)
RLMV	-0.014 (-0.748)	-0.040 (-0.901)
YDUMMY	0.046 (1.302)	0.116 (1.650)
Constant	0.722*** (2.831)	2.335*** (5.537)
N	102,534	33,810
AIC	-4.228	-3.344

Note: The table shows the regression estimates ($\times 100$) of Equation (5). The dependent variable is the sum of the two-day (-1,0) *CAR* of rival REIT. *ACAR* is the cumulative abnormal return of the announcing REIT. *ALMV* is the natural logarithm of the announcing REIT's market capitalization in million dollars. *CORR* is the correlation coefficient of returns between the non-event firm and the event firm. *LEV* is the ratio of the book value of debt to the book value of total assets for rival REIT. *RLMV* is the natural logarithm of the rival REIT's market capitalization in million dollars. *YDUMMY* is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise. *t*-statistics are in parentheses. The *t*-statistics are White (1980) adjusted for the pooled OLS regression. **Significant at the 5% level. ***Significant at the 1% level.

The pooled regression results are shown in Table 4. The unreported VIFs (variance inflation factors) for the independent variables in the regressions in the studies are all well below 10. This indicates that the regressions do not suffer from severe multicollinearity problem (Gujarati, 2003; Lee, Kuo, Lee and Lin, 2011). Overall, the regression results continue to support our earlier event-study results that REIT dividend announcements have contagion effects. For dividend-decreasing events, the coefficient for *ACAR* is positive and has a value of 0.417%. The *t*-statistic is 6.601, which is statistically significant at the 1% level. The result suggests that when a REIT announces a dividend cut, the announcement has intra-industry implications and thus the prices of peers/rivals also fall, resulting in a positive association between the cumulative abnormal return of the announcing REIT and those of its peers/rivals.

For dividend-increasing events, there is no evidence of association between the cumulative abnormal return of the announcing REIT and those of its peers/rivals under our multi-variate regression framework. The coefficient for *ACAR* is -5.364%. The *t*-statistic is -1.101, which is not statistically significant at any conventional level. The result is consistent with the stylized fact that contagion effects can be asymmetrical (Hong and Stein, 2003; Yuan, 2005).

For dividend-decreasing events, the coefficient for *ALMV* is -0.310%. The *t*-statistic is -4.459, which is statistically significant at the 1% level. The result suggests that, when announcing dividend cuts, a larger announcing REIT has a strong contagion effect on peer firms. The evidence is consistent with the finding of Chen, Ho, and Shin (2007) and Firth (1996). On the other hand, for dividend-increasing events, the coefficient for *ALMV* is -0.092%. The *t*-statistic is -1.065, which is not statistically significant at the 5% level.

The point estimates for the correlation coefficient of returns (*CORR*) between the event firm and the non-event firm for dividend-increasing and dividend-decreasing events are 0.470% and -1.303%, which are both statistically significant at the 1% level. Because *CORR* is used to measure the extent of closeness between the event firm and the non-event firm,

the documented relation suggests that contagion effects exist. As expected, contagion effects are eminent when the event firm and the non-event firm are alike (Lang and Stulz, 1992; Firth, 1996).

Similar to Lee, Chiang, and Lin (2011), the current study does not find a significant relation for the financial leverages of non-event firms (*LEV*) on dividend-increasing and dividend-decreasing events. Neither are the coefficients for the market capitalization of a non-event firm (*RLMV*). This is similar to Bessler and Nohel (2000), who argues that larger rival firms experience greater price declines when event firms cut their dividends, but who cannot document a statistically significant coefficient in their study. The current study likewise does not find a strong relation to market condition (*YDUMMY*) on dividend-increasing and dividend-decreasing events. The evidence is consistent with the finding of Liu, Szewczyk, and Zantout (2008) and Caton, Goh, and Kohers, (2003) and suggests that REIT dividend-increasing and dividend-decreasing announcements are not perceived differently with respect to market phase.

Table 5: Panel data regressions

Explanatory Variable	Dividend Increases		Dividend Decreases	
	Fixed effect	Random effect	Fixed effect	Random effect
ACAR	-5.435 (-1.119)	-5.044 (-1.373)	0.411*** (7.165)	0.426*** (7.424)
ALMV	-0.078 (-0.387)	-0.077 (-0.364)	-0.335*** (-4.427)	-0.333*** (-4.410)
CORR	0.479*** (2.387)	0.457*** (6.784)	-1.270*** (-9.422)	-1.267** (-9.405)
LEV	-0.015 (-0.289)	-0.015 (-0.300)	-0.174 (-1.267)	-0.162 (-1.183)
RLMV	-0.012 (-1.894)	-0.011 (-1.911)	-0.043*** (-2.639)	-0.043*** (-2.666)
YDUMMY	0.025 (0.943)	0.029 (1.103)	0.132** (2.269)	0.131** (2.249)
Constant	0.609** (2.517)	0.608** (2.509)	2.524*** (4.682)	2.509*** (4.656)
N	102,534	102,534	33,810	33,810
AIC	-4.223	-4.197	-3.338	-3.269

Note: The table shows the regression estimates ($\times 100$) of Equation (5). The dependent variable is the sum of the two-day (-1,0) *CAR* of rival REIT. *ACAR* is the cumulative abnormal return of the announcing REIT. *ALMV* is the natural logarithm of the announcing REIT's market capitalization in million dollars. *CORR* is the correlation coefficient of returns between the non-event firm and the event firm. *LEV* is the ratio of the book value of debt to the book value of total assets for rival REIT. *RLMV* is the natural logarithm of the rival REIT's market capitalization in million dollars. *YDUMMY* is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise. *t*-statistics are in parentheses. **Significant at the 5% level. ***Significant at the 1% level.

This study also experiments with a variety of alternative regression estimators. Table 5 shows the regression results from two sets of panel data regressions: one under the fixed effect and other under the random effect. Regardless of the specification, the results are qualitatively similar to those shown in Table 4. Contagion effects continue to be strong among dividend-cutting events. The coefficients for *ACAR* are 0.411% and 0.426% under the fixed effect and the random effect, respectively. The *t*-statistics are 7.165 and 7.424, respectively. Both are statistically significant at the 1% level. Similarly, contagion effects appear to be asymmetrical and are absent among dividend-increasing events. The coefficients for *ACAR* are -5.435% and -5.044% under the fixed effect and the random effect, respectively. The *t*-statistics are -1.119 and -1.373, respectively. They are not statistically significant at any conventional level.

Robustness Checks

To check the robustness of the above results, we ask the following three questions: (1) Are the previous results materially influenced by the Lehman brother crisis and subsequent events? (2) Are the results in the previous sections

significantly influenced by clustering announcements? (3) Do the announcements in the splitting margin of the sample events affect the empirical results? To answer the first question, we exclude the samples after September 2009 and repeat the analyses in the above sections. Similar to Caton, Goh and Kohers (2003), to mitigate the second concern, we replicate the previous analyses with samples excluding announcements within the previous 5 days to the next two days of other announcements. To answer the third question, we exclude 5% of rival REITs whose CARs are close to zero in the studied dividend announcing events to verify the robustness of our results in the previous sections.

Table 6 presents the robustness checks for the results of Table 2. In particular Panel A (B, C) is the check for the first (second, third) question. All the panels clearly show that peer/rival REITs experience significantly positive (negative) cumulative abnormal returns during the (-1, 0) window when increases (decreases) in cash dividends are announced. The results clearly verify the finding in Table 2 that REIT dividend announcements have contagion effects. Table 7, 8, and 9 gives the pooled OLS, fixed effect, and random effect regression estimates for answering the three questions. It is clear that our baseline results are robust. REIT dividend announcements clearly deliver contagion messages to peers. In the dividend-increasing events, *CORR* is still statistically significant and positive in all the models for robustness checks. In the dividend-decreasing events, *ACAR*, *ALMV* and *CORR* still have significant coefficients with the same signs as those in Tables 4 and 5.

Table 6: Rival REIT reactions to cash dividend announcements

Announcements	CAR(-1,0)
Panel A: Robustness Check 1	
Dividend Increases	0.154%*** (3.666)
Dividend Decreases	-0.156%*** (-3.941)
Panel B: Robustness Check 2	
Dividend Increases	0.061%*** (4.860)
Dividend Decreases	-4.570%*** (-2.938)
Panel C: Robustness Check 3	
Dividend Increases	0.121%** (2.021)
Dividend Decreases	-0.227%*** (-2.973)

Note: CAR(-1,0) is the cumulative abnormal return on the days before the announcement day and the announcement day itself. Div(+) is a dividend-increasing event and Div(-) is a dividend-decreasing event. *t*-statistics are in parentheses.**Significant at the 5% level. ***Significant at the 1% level.

CONCLUSION

This study investigates the intra-industry effects of REIT dividend announcements. Based on the sample period 2001-2008, we find that REIT dividend announcements have information externality. Specifically, within the traditional event-study framework, we find that when a REIT announces an increase in dividend payout, its peers/rivals also experience positive excess returns. Similarly, when a REIT announces a cut in dividend payout, investors perceive this to be bad news to its peers/rivals as well. That is, the news is contagious.

In addition to event-study investigations, this study controls for other known determinants of excess returns in a multi-variate regression framework. The regression results show that the intra-industry effects among dividend-increase events documented earlier disappear when control variables are added into the specification. The contagion effects thus appear to be more robust and more prevalent among dividend-decreasing events. We find a strong positive association between the cumulative abnormal returns of announcing REITs and those of peers/rivals when announcing REITs cut dividend payouts.

Overall, we find evidence suggesting that the REIT industry is characterized by contagion effects. The results suggest that the co-movement of REIT prices may have a contagion component. The results have important implications to the existing REIT literature. For example, to the extent that information externality is stronger among those REITs perceived to be the same style, these REITs should have higher degree of price co-movement. This implication is consistent with Ambrose, Lee, and Peek (2007), who find that, when REITs are included in the S&P 500 Index, the

price movement between the indexed REITs and stocks increases and so does the co-movement between non-indexed REITs and stocks.

Table 7: Pooled OLS regressions for robustness checks

Variable	Panel A: Robustness Check 1		Panel B: Robustness Check 2		Panel C: Robustness Check 3	
	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases
ACAR	-9.194 (-1.394)	0.002** (2.033)	-5.608 (-1.303)	0.463*** (10.977)	-3.467 (-1.110)	0.019*** (2.313)
ALMV	-0.124 (-1.511)	-0.182** (-2.402)	-0.121 (-1.226)	-0.340*** (-6.001)	-0.098 (-1.876)	-0.222*** (-2.626)
CORR	0.521*** (10.696)	-0.114*** (-3.461)	0.484*** (10.834)	-1.378*** (-9.775)	0.435*** (8.311)	-0.116*** (-5.398)
LEV	-0.006 (-0.083)	-0.094 (-0.509)	0.025 (0.566)	-0.059 (-0.536)	-0.041 (-0.575)	-0.120 (-0.613)
RLMV	-0.014 (-0.735)	-0.046 (-0.885)	-0.003 (-0.318)	-0.015 (-0.824)	-0.016 (-0.809)	-0.052 (-0.934)
YDUMMY	0.075** (2.348)	0.111 (1.761)	0.062** (2.181)	0.132** (2.218)	0.072 (1.947)	0.149 (1.163)
Constant	0.911*** (3.755)	1.737*** (6.473)	0.826*** (3.993)	2.287*** (5.578)	0.767*** (2.850)	2.032*** (7.236)
N	100,878	30,912	42,228	25,254	97,566	27,738
AIC	-4.408	-3.985	-4.609	-3.687	-4.226	-3.946

Note: The table shows the regression estimates ($\times 100$) of Equation (5). The dependent variable is the sum of the two-day (-1,0) *CAR* of rival REIT. *ACAR* is the cumulative abnormal return of the announcing REIT. *ALMV* is the natural logarithm of the announcing REIT's market capitalization in million dollars. *CORR* is the correlation coefficient of returns between the non-event firm and the event firm. *LEV* is the ratio of the book value of debt to the book value of total assets for rival REIT. *RLMV* is the natural logarithm of the rival REIT's market capitalization in million dollars. *YDUMMY* is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise. *t*-statistics are in parentheses. The *t*-statistics are White (1980) adjusted for the pooled OLS regression. **Significant at the 5% level. ***Significant at the 1% level.

Table 8: Fixed effect regressions for robustness checks

Variable	Panel A: Robustness Check 1		Panel B: Robustness Check 2		Panel C: Robustness Check 3	
	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases
ACAR	-8.909 (-1.783)	0.016*** (3.013)	-5.856 (-1.257)	0.472*** (9.747)	-3.251 (-1.256)	0.022*** (2.473)
ALMV	-0.127 (-1.192)	-0.185*** (-3.014)	-0.119 (-1.193)	-0.426*** (-6.632)	-0.096 (-1.686)	-0.227*** (-3.489)
CORR	0.534*** (8.613)	-0.107*** (-5.926)	0.472*** (8.427)	-1.277*** (-11.209)	0.436*** (6.287)	-0.114*** (-4.928)
LEV	-0.006 (-0.129)	-0.085 (-0.779)	0.033 (0.772)	-0.040 (-0.346)	-0.038 (-0.737)	-0.130 (-1.145)
RLMV	-0.014*** (-2.432)	-0.048*** (-3.694)	-0.003 (-0.529)	-0.019 (-1.318)	-0.015 (-1.478)	-0.051 (-1.741)
YDUMMY	0.075*** (3.030)	0.119** (2.262)	0.062*** (2.839)	0.181*** (3.691)	0.071 (1.622)	0.149 (1.632)
Constant	0.926*** (4.124)	1.754*** (4.075)	0.809*** (4.027)	2.893*** (6.346)	0.750** (3.002)	2.070*** (4.546)
N	100,878	30,912	42,228	25,254	97,566	27,738
AIC	-4.398	-3.974	-4.601	-3.683	-4.219	-3.935

Note: The table shows the regression estimates ($\times 100$) of Equation (5). The dependent variable is the sum of the two-day (-1,0) *CAR* of rival REIT. *ACAR* is the cumulative abnormal return of the announcing REIT. *ALMV* is the natural logarithm of the announcing REIT's market capitalization in million dollars. *CORR* is the correlation coefficient of returns between the non-event firm and the event firm. *LEV* is the ratio of the book value of debt to the book value of total assets for rival REIT. *RLMV* is the natural logarithm of the rival REIT's market capitalization in million dollars. *YDUMMY* is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise. *t*-statistics are in parentheses. The *t*-statistics are White (1980) adjusted for the pooled OLS regression. **Significant at the 5% level. ***Significant at the 1% level.

Table 9: Random effect regressions for robustness checks

Variable	Robustness Check 1		Robustness Check 2		Robustness Check 3	
	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases	Dividend Increases	Dividend Decreases
ACAR	-9.257 (-1.751)	0.038*** (3.008)	-5.582 (-1.234)	0.489*** (10.124)	-3.473 (-1.347)	0.018*** (2.384)
ALMV	-0.127 (-1.191)	-0.185*** (-3.035)	-0.120 (-1.009)	-0.416*** (-6.484)	-0.098 (-1.194)	-0.221*** (-3.394)
CORR	0.519*** (8.401)	-0.107*** (-5.921)	0.482*** (8.619)	-1.266*** (-11.120)	0.435*** (6.304)	-0.116** (-4.952)
LEV	-0.006 (-0.125)	-0.085 (-0.911)	0.025 (0.603)	-0.053 (-0.455)	-0.041 (-0.779)	-0.116 (-1.019)
RLMV	-0.014** (-2.524)	-0.048*** (-3.639)	-0.025 (-0.493)	-0.019 (-1.342)	-0.015 (-1.477)	-0.052 (-1.803)
YDUMMY	0.078*** (3.167)	0.119** (2.258)	0.625*** (2.883)	0.178*** (3.633)	0.071 (1.639)	0.147 (1.606)
Constant	0.929*** (4.139)	1.754*** (4.102)	0.814*** (4.046)	2.835*** (6.222)	0.780** (3.049)	2.022*** (4.444)
N	100,878	30,912	42,228	25,254	97,566	27,738
AIC	-4.322	-3.907	-4.524	-3.614	-4.143	-3.868

Note: The table shows the regression estimates ($\times 100$) of Equation (5). The dependent variable is the sum of the two-day (-1,0) *CAR* of rival REIT. *ACAR* is the cumulative abnormal return of the announcing REIT. *ALMV* is the natural logarithm of the announcing REIT's market capitalization in million dollars. *CORR* is the correlation coefficient of returns between the non-event firm and the event firm. *LEV* is the ratio of the book value of debt to the book value of total assets for rival REIT. *RLMV* is the natural logarithm of the rival REIT's market capitalization in million dollars. *YDUMMY* is a dummy variable and equals 1 if the REIT market is a bull market and 0 otherwise. *t*-statistics are in parentheses. The *t*-statistics are White (1980) adjusted for the pooled OLS regression. **Significant at the 5% level. ***Significant at the 1% level.

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