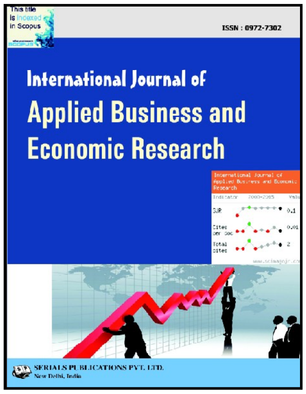

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Dividend Policy and the Sensitivity of Firm Value to Dividend Announcements and Investment

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Abstract: Based on Lintner's dividend model, we investigate how investment affects firm valuations depending on the level of dividend management, and find that the stock market generally reacts more favorably to dividend announcements by dividend managing firms than to those of non-dividend managing firms, but takes announcements of dividend reductions by non-dividend managing firms as good news, supporting our hypothesis that decreasing dividends by non-dividend managing firms are a signal of good investment opportunities, while this is not the case for dividend managing firms. We also confirm that the dividend announcement returns of firms that do not manage dividends are significantly and positively related to their investment levels, while it is not the case for firms that do manage dividends.

Keywords: Dividend management; Residual dividend policy; Investments; Dividend signaling; Value of firms

1. INTRODUCTION

Since Lintner (1956) showed that U.S. companies follow stable dividend policies, other researchers have documented firms' dividend smoothing behavior (Alli, Khan, and Ramirez, 1993; Baker and Smith, 2006; Brav, Graham, Harvey, and Michaely, 2005; Fama and Babiak, 1968), which has been increasing in the past 80 years (Leary and Michaely, 2011). The existing financial literature on dividend smoothing behavior explains such phenomenon with information asymmetries (DeMarzo and Sannikov, 2016; Guttman, Kadan, and Kandel, 2010; Leary and Michaely, 2011), agency considerations (DeAngelo and DeAngelo, 2007b; Lambrecht and Myers, 2012; Mahmudi and Pavlin, 2013), income smoothing (Baker, Mendel, and Wurgler 2016), or a firm's deterministic characteristics (Leary and Michaely, 2011; Jeong, 2013).

On the other hand, another line of research examines residual dividend policy, in which firms pay dividends with residual cash after major investment decisions, thus creating higher variability in dividend payments over time. Peterson and Benesh (1983), Prezas (1988), and Ravid (1988) find interactions between a firm's investment and financing decisions. Yoon and Starks (1995) find a positive relationship between the magnitude of dividend changes and subsequent capital investments during 1969-1988. Holder, Langrehr, and Hexter (1998) also find that a firm's dividend policy is related to investment decisions, and Lang and Litzenberger (1989) suggest that decreases in investments should follow dividend increases, supporting the residual dividend policy hypothesis.

Despite the importance and prevalence of dividend smoothing or residual dividend policies, there is little research documenting the sensitivity of a firm's value to dividend announcement depending on the firm's dividend management behavior.[1] A firm's choice of dividend policy and its impact on firm value matters because investors may have different interpretation on dividend announcements or investment activities during the past year depending on the firm's choice of dividend policy.

We conjecture that if a firm is known to follow a residual dividend policy due to the need to invest in a series of profitable projects and announces lower dividends, it still can expect a favorable market reaction to the news, and the level of investment would also positively affect the market reaction. On the other hand, a firm that follows a dividend smoothing policy would have chosen such policy since it can afford to adjust other business decisions, including capital investments,[2] and the stock market would not seriously factor in the level of investment in their reaction to dividend announcements since this type of firm's investment decisions reflect not only the firm's future business opportunities, but also managers' efforts to smooth dividends.

The existing researches examine the relation between investment and stock market reaction and find that the market does not always react positively to increased capital expenditures. According to Blackwell, Marr, and Spivey (1990) and Gobola and Tsetsekos (1992), announcements of increase (decrease) in capital expenditure are associated with positive (negative) stock returns. On the other hand, Afshar, Taffler, and Sudersanam(1992) and Kalra, Henderson, and Walker (1994) find that announcements of decrease in capital expenditures are associated with positive stock returns. However, in most studies (McConnell and Muscarella, 1985; Del-Brio, Perote, and Pindado, 2003), the direction of the stock market reaction to the announcements of capital expenditures is expected to differ across firms conditional on information involved. Increased capital expenditures can convey favorable or unfavorable information to the market. The favorable information is that the firm is likely to have better investment opportunities and the unfavorable information is that the firm is more likely to suffer from overinvestment (Titman, Wei, and Xie, 2004).

By incorporating a firm's dividend policy with its investment policy, we conjecture that investment decisions by firms that follow a residual dividend policy would deliver more information about future growth and performance than firms that follow a dividend smoothing policy, since the former prioritizes investment decisions over dividend smoothing. If this were the case, the market reaction to dividend increase or decrease would be different depending on the level of dividend management, and the level of investment would also affect the market reaction to dividend announcement. In sum, we provide an answer to why we observe both positive and negative market reactions to the announcement of dividend increase by incorporating different dividend policy of firms and relating it with investment decision.

For the purposes of this study, we classify our sample firms into two groups: "dividend managing firms" that maintain low SOA,[3] low investment levels, and a low volatility in the payout ratio over three consecutive years; and the "non-dividend managing firms" that keep these high over the same period. Low SOA is a key measure of dividend smoothness that most studies use to investigate dividend-smoothing behavior. On the other hand, firms adopting the residual dividend policy pay dividends only after fulfilling capital or other expenditures, which generates high volatility in typically unplanned dividends (Penman, 1980).

In this study, we attempt to address two issues. First, managing dividends and making investment decisions are closely related, and a firm has to decide how to allocate earnings between investments and dividends.[4] If we can differentiate firms by their level of dividend management, then we examine how the market reacts differently to dividend announcements from firms that do and do not manage dividends. Next we can hypothesize that investments will have a higher effect on the value of firms that focus more on investment and determine dividend levels as a residual after investments, while investments will not affect the value of dividend managing firms.

To analyze the market reaction to dividend announcements, we compare the cumulative abnormal returns (CARs) of dividend managing firms and non-dividend managing firms for a three-day window, days -1 through +1. We find that the market generally reacts more favorably to both dividend announcements from dividend managing firms than those of non-dividend managing firms and announcements of decreased dividends by non-dividend managing firms, supporting our hypotheses. The results explain the phenomena of a positive stock market reaction to an announcement of lower dividends from some firms.

Our research enhances our understanding of how the market considers dividend announcements and investments at the same time, filling the gap between the life cycle theory of dividend and the signaling theory. The life cycle theory of dividends posits that a firm begins to pay dividends when the firm's growth rate and investment opportunities are expected to decline in the future. Therefore, increased dividend would be a bad news. On the contrary, the signaling theory of dividends predicts that a firm pays dividends to signal its growth and profitability to the market. Firm maturity (Mueller, 1972) is associated with high cash flows but fewer investment opportunities. As a firm matures, the earnings growth of the firm would slow down, and the dividend payout increases (DeAngelo, DeAngelo, and Stultz, 2006; Bulan, Subramanian, and Tanlu, 2007). Grullon, Michaely, and Swaminathan (2002) find a significant relation between the positive announcement effect associated with dividend increases. We argue that the dividend signaling model, from which we expect a positive market response to dividend increases, applies only to those firms that focus on dividend management over investments.

Our research also provides new insights into the choice of dividend policy, and the different effects of investment decisions on firm value. First, we find that investments have a statistically significant and positive relationship only for the value of non-dividend managing firms. This result suggests that investors who are aware of the firm's preferences for capital expenditures over stable dividend payouts react more positively to investment decisions by non-dividend managing firms. Dividend managing firms prioritize stable dividends over investments, and thus their capital expenditures are less likely to be connected to firm value.

The rest of the paper is organized as follows. Section 2 defines the dividend managing and non-dividend managing firms according to Lintner's SOA measure. In Section 3, we develop the hypotheses about the sensitivity of firm value to investments considering dividend policies. In Section 4, we describe the data, provide summary statistics, and explain how we extract our sample firms from the CRSP and Compustat for the 1980–2010 period. Section 5 presents our main results and robustness tests, and Section 6 concludes.

2. MEASURES OF DIVIDEND SMOOTHING AND INVESTMENT AND PAYOUT RATIO VOLATILITIES

We measure differences across firms by the degree of dividend stability. The most common measure of dividend stability is the SOA from Lintner's (1956) partial adjustment model. We estimate SOA as c_i from the following:

$$\Delta D_{i,t} = D_{i,t} - D_{i,t-1} = \alpha_i + c_i (D^*_{it} - D_{i,t-1}) + \varepsilon_{it} \tag{1}$$

where α_i is the intercept term, ε_{it} is the error term, D_{it} is dividends in year t, and $D^*_{it} = r_i E_{it}$ where r_i represents the target dividend payout ratio and E_{it} is earnings in year t. Substituting this expression for D^*_{it} in equation (1) yields

$$D_{i,t} - D_{i,t-1} = \alpha_i + \beta_1 D_{i,t-1} + \beta_2 E_{it} + \varepsilon_{it} \tag{2}$$

The SOA (c_i) can then be estimated as $-\beta_1$ from equation (2).

The constant term (α_i) should have a positive sign to reflect the greater reluctance to reduce dividends compared to raising dividends.[5] The SOA(c_i) reflects dividend stability and measures the SOA in terms of the target payout ratio (r_i) in response to earnings changes. A higher value of c_i indicates less dividend smoothing, and vice versa. To estimate the SOA, we follow Fama and Babiak (1968) and use earnings per share (EPS) and dividends per share (DPS) rather than total earnings and dividends based on their argument that per-share data are more appropriate for measuring the SOA than Lintner's method of using aggregate data. Brav, Graham, Harvey, and Michaely(2005)[6] also suggest that the level of dividends per share (DPS) is the key metric for corporate dividend policy. Indeed, most studies examining dividend stability employ per share data rather than aggregate data (Fama and Babiak, 1968; Fama, 1974; Michaely and Roberts, 2012; Leary and Michaely, 2011).

In addition, we estimate both investment and payout ratio volatilities by computing the time-series standard deviation of a firm's yearly capital expenditures and payout ratios, respectively, over a three-year period:

$$\text{Volatility of investment} = \text{Stdev(INV)} \tag{3}$$

We use a similar model to estimate payout ratio volatility.

3. HYPOTHESES AND METHODOLOGY

3.1. Hypotheses

We propose that investment decisions by firms that follow a residual dividend policy deliver more information about the firm's future growth and performance compared to those that follow a dividend smoothing policy, since the former emphasizes investment decisions compared to the latter. By definition, dividend smoothing or dividend managing firms try to smooth their annual dividend levels, which will inevitably lead to changes in other business decisions, including capital investments. Thus, investment decisions by such firms do not purely reflect future business opportunities but rather managers' effort to smooth dividends. If this is the case, the market reaction to corporate investment decisions is more sensitive for non-dividend managing firms than for dividend managing firms. First, we hypothesize different market reactions to dividend announcements for firms that do and do not manage dividends.

H1-1) The stock market will react more favorably to dividend announcements from dividend managing firms than to those that do not manage dividends.

H1-2) Announcements of reduced dividends from non-dividend managing (dividend managing) firms would be perceived by the market as good (bad) news.

In a perfect capital market, a firm's dividend policy can be independent of its investment policy. However, existing studies show that a firm's investments can influence the information contents of dividends. Alli, Khan, and Ramirez (1993) find a negative relationship between capital expenditures and dividends, and interpret this as support for a residual dividend policy. A maturing firm inevitably encounters fewer high-return investment opportunities (Fama and French, 2001; Grullon, Michaely, and Swaminathan, 2002), which causes a decline in the level of capital expenditures and affects the firm's cash flow level. As investments lose their relative priority and the cash payout policy becomes more important, firms are more likely to use dividend announcements as their primary signal. Thus, we conjecture that firms that manage dividends are more likely to use dividends as their primary signal, and that the market will react more favorably to dividend announcements from dividend managing firms than from those that do not manage dividends.

Researchers report that the stock price moves in the same direction as dividend changes (Asquith and Mullins, 1983; Benartzi, Michaely, and Thaler, 1997; Pettit, 1972) and price reacts favorably (negatively) to announcements of a dividend increase (decrease). One possible reason for this market reaction is that dividend changes may signal future prospects, which may include investment activity. However, according to the residual dividend theory, the stock price will rise (fall) with a decreased (increased) dividend, since decreased (increased) dividends imply profitable (limited) investments. John and Lang (1991) predict that dividend increases may signal the end of outstanding investment opportunities, and thus the market should not interpret all dividend increases as good news. These findings suggest that the market would interpret a firm's dividend changes in the context of its dividend policy and its relationship with investment decisions: increased investments by non-dividend managing firms are more likely to decrease dividends, and their stock prices should rise with a lower dividend based on investment decisions. Thus, we conjecture that the market can interpret dividend decrease (increase) announcements from firms that do not manage (manage) dividends along with investments as good news. Next, we hypothesize on the association between investment and the market reaction depending on different dividend policies.

H2) The value of non-dividend managing firms is more sensitive to investment levels than for dividend managing firms.

Penman (1980) reports that dividend levels under a residual policy are unplanned and fall at the far end of a policy continuum relative to a fully managed dividend policy. According to the residual dividend theory, the stock price would fall with an increased dividend, since this implies limited investment opportunities, and would rise when a firm decreases its dividend, reflecting more profitable investments.

Thus, the payout is related to a firm's investments, and the value of a firm that follows a residual dividend policy should be more sensitive to investment.

On the other hand, managers interviewed in Lintner's (1956) survey had a consensus view that shareholders prefer a stable dividend and that the market puts a premium on stability. Brav, Graham, Harvey, and Michaely (2005) find similar results, and that managers are willing to forego positive NPV investments to avoid cutting dividends. Investors' preference for stable dividends would encourage firms result in inclinations toward stable dividend payouts over investments. DeAngelo and DeAngelo (2007a) argue that firms avoid dividend cuts to build a reputation in the equity markets and thus raise equity finance. The market also initially expects stable or increased dividend announcements from dividend managing firms. Therefore, the fact that a firm decides not to manage dividends but to prioritize investments implies that investments are critical to the firm's performance, and so we assume that non-dividend managing firms' value should be more sensitive to investment levels while that of dividend managing firms is less so.

3.2. Empirical Models

To examine the market reaction to dividend announcements for both dividend managing and non-managing firms, we employ a market adjusted model for the stock reaction. We measure the cumulative abnormal returns as follows:

$$\mathrm{CAR}_i = \Sigma_{t=-1}^{1}(r_{i,t} - r_{m,t}) \tag{4}$$

where $r_{i,t}$ represents the return on security i at date t and $r_{m,t}$ represents the return on the market indices m at date t.

The analysis uses the following empirical model:

$$\mathrm{CAR} = a_1 + \beta_1\mathrm{INV} + \beta_2\mathrm{PAYR}\ (\text{or } \beta_2\mathrm{LnCashD}) + \beta_3\mathrm{CFO} + \beta_4\mathrm{ROA} + \beta_5\mathrm{LEV} + \beta_6\mathrm{SIZE} + \beta_7\mathrm{MTB}\ (\text{or } \beta_7\mathrm{Q}) + \mathrm{IND} + \mathrm{YR} + \varepsilon_i \tag{5}$$

INV represents a firm's level of investment over a year, measured as the ratio of a firm's capital expenditures to total assets. The payout ratio (PAYR) is the percentage of a company's earnings paid out to investors as cash dividends, and LnCashD represents natural log of the cash dividend amounts. A firm's cash flow from operating activities (CFO) is earnings before interest and taxes, plus depreciation less taxes, and normalized with total assets. To measure a firm's profitability, we use return on assets (ROA) and measure this as the ratio of income before extraordinary items divided by total assets. We use leverage (LEV) measured as the ratio of a firm's total liability to total assets. We measure SIZE as a function of the natural log of a firm's total assets. Market to book ratio (MTB) is the ratio of a firm's market equity to shareholder equity, where market equity equals common shares outstanding times stock price. Tobin's Q ratio (Q), is the ratio of the sum of a firm's market equity, preferred stock value, and long-term debt to total assets, where preferred stock value equals preferred shares outstanding times stock price. We use year (YR) and industry (IND) variables to control for year and industry effects.

4. DATA

Our sample starts with all firms in both the CRSP and Compustat databases for the period from 1980 to 2010, excluding financial firms (SIC codes 6000–6999), payments such as special dividends, dividends paid at other frequencies, and other events that may affect stock prices such as stock splits, stock dividends, mergers, and so on. We also exclude firms in the public service or utility industries (SIC 4900), firms in public administration (SIC 9111-9999), closed-end funds, stock certificates, REITs, and ADRs. Throughout the excluding process, 41,813 observations remained. Firms must pay regular cash dividends and have sufficient data to calculate the SOA[7] for dividend smoothness. We also require at least three years (*t*-3 to *t*-1) of non-missing values to estimate variations[8] in investments and payout ratios for firms paying dividends. We believe that our dataset is not a random sample of Compustat firms.

Given these conditions, we estimate the SOA[9] for each firm from *t-1* to *t* according to equation (2), in addition to the volatilities of investments and payout ratios for the same period. We then split samples into high (above median) and low (below median) SOA groups, and split the sample similarly according to investment volatility and payout ratio volatility. We define non-dividend managing firms as those with high SOA, high investment volatility, and high payout ratio volatility; and dividend managing firms as those with low SOA, low investment volatility, and low payout ratio volatility. The final sample consists of 158 non-dividend managing firms and 137 dividend managing firms with 4,125 firm-year observations (548 non-dividend managing observations, 583 dividend managing observations, and 2,994 other firm observations).

In Table 1, we compare the characteristics of firms that do and do not manage dividends according to SOA, investment volatility, and payout ratio volatility. Preliminary summary statistics for our smoothing

Table 1
Summary statistics for dividend managing and non-dividend managing firms

		SOA	*INV_SD*	*PayR_SD*	*INV*	*PayR*	*LnCashD*
Non-dividend managing	Avg	0.163	0.029	0.902	0.083	0.809	3.478
	Stdev	0.226	0.020	2.775	0.040	2.559	1.718
	N	548	548	548	548	548	548
Dividend managing	Avg	0.024	0.008	0.051	0.068	0.630	4.398
	Stdev	0.039	0.003	0.023	0.024	0.152	1.573
	N	583	583	583	583	583	583
t-test		14.144***	24.705***	7.175***	7.405***	1.635	-9.409***
		CFO	*ROA*	*LEV*	*SIZE*	*MTB*	*Q*
Non-dividend managing	Avg	0.397	0.030	0.326	7.387	1.578	0.822
	Stdev	0.168	0.028	0.094	1.760	0.701	0.244
	N	548	548	548	548	548	548
Dividend managing	Avg	0.390	0.043	0.315	8.059	1.197	0.769
	Stdev	0.147	0.012	0.066	1.560	0.474	0.144
	N	583	583	583	583	583	583
t-test		0.724	-10.278***	2.372**	-6.778***	10.648***	4.440***

The sample consists of firms in both the Compustat and CRSP databases for 1980–2010. For each firm, we estimate SOA for the period *t-1* to *t* according equation (2), in addition to volatilities in investments and payout ratios for the same period. We then split the samples into high (above median) and low (below median) SOA groups, and similarly split the sample according to investment volatility and payout ratio volatility. Non-dividend managing firms are those with high SOA, high investment volatility, and high payout ratio volatility; dividend managing firms are those with low SOA, low investment volatility, and low payout ratio volatility. We obtain 1,131 firm-year observations (548 non-dividend managing observations and 583 managing observations). We provide parametric t-test statistics to test the difference in means between the two groups. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 2
Correlation matrix

	Y	*SOA*	*INV_SD*	*PayR_SD*	*INV*	*PayR*	*LnCashD*	*CFO*	*ROA*	*LEV*	*SIZE*	*MTB*	*Q*
Y	1												
SOA	0.397**	1											
	(0.000)												
INV_SD	0.603**	0.232**	1										
	(0.000)	(0.000)											
PayR_SD	0.215**	0.176**	0.176**	1									
	(0.000)	(0.000)	(0.000)										
INV	0.218**	0.093**	0.330**	-0.041	1								
	(0.000)	(0.002)	(0.000)	(0.163)									
PayR	0.050	-0.013	0.072*	0.086**	0.033	1							
	(0.092)	(0.646)	(0.014)	(0.003)	(0.262)								
LnCashD	-0.269**	-0.017	-0.224**	0.005	-0.137**	0.012	1						
	(0.000)	(0.549)	(0.000)	(0.850)	(0.000)	(0.674)							
CFO	0.021	0.053	-0.020	-0.019	0.031	-0.041	0.061*	1					
	(0.467)	(0.073)	(0.493)	(0.501)	(0.297)	(0.164)	(0.038)						
ROA	-0.298**	-0.041	-0.169**	-0.174**	0.038	-0.010	0.048	0.050	1				
	(0.000)	(0.165)	(0.000)	(0.000)	(0.191)	(0.717)	(0.100)	(0.092)					
LEV	0.071*	-0.004	0.050	0.001	0.025	-0.006	0.172**	-0.218**	-0.211**	1			
	(0.016)	(0.889)	(0.091)	(0.947)	(0.384)	(0.821)	(0.000)	(0.000)	(0.000)				
SIZE	-0.198**	0.017	-0.195**	0.016	-0.134**	-0.043	0.955**	0.010	-0.086**	0.213**	1		
	(0.000)	(0.554)	(0.000)	(0.576)	(0.000)	(0.143)	(0.000)	(0.714)	(0.003)	(0.000)			
MTB	0.277**	0.091**	0.213**	-0.005	0.089**	0.052	-0.018	0.264**	-0.037	-0.100**	-0.008	1	
	(0.000)	(0.002)	(0.000)	(0.864)	(0.003)	(0.088)	(0.537)	(0.000)	(0.217)	(0.001)	(0.788)		
Q	0.103**	-0.004	0.183**	-0.060*	0.168**	0.044	0.029	0.253**	0.271**	0.118**	-0.040	0.690**	1
	(0.000)	(0.875)	(0.000)	(0.048)	(0.000)	(0.144)	(0.331)	(0.000)	(0.000)	(0.000)	(0.190)	(0.000)	

measure, the mean SOA, are 0.163 for non-dividend managing firms and 0.024 for dividend managing firms. The non-dividend managing firms in the sample are associated with higher investment levels, higher investment opportunities, lower profit, higher leverage, and smaller sizes than firms that manage dividends, and they pay lower cash dividends than dividend managing firms do. The results are mostly consistent with Leary and Michaely (2011). Interestingly, non-dividend managing firms show higher payout ratios than managing firms do, but the difference is not significant.

Table 2 presents the Pearson's correlations and p-values of the variables. Y denotes non-dividend managing firms, and firms that avoid managing dividends will have a higher value for Y. The results show that non-dividend management is positively and significantly correlated with a firm's investment level, market to book ratio, Tobin's Q, and leverage, while it is negatively and significantly correlated with cash dividend amounts, return on assets, and size. A firm's speed of adjustment (SOA) is positively and significantly correlated with its investment level and market to book ratio. A firm's investment volatility is negatively and significantly correlated with its return on assets, size, and dividend cash amounts, while it is positively and significantly correlated with investments, payout ratio, market to book ratio, and Tobin's Q. Payout ratio volatility is negatively and significantly correlated with return on assets and Tobin's Q. Dividend cash amount is negatively and significantly correlated with investment, while it is positively and significantly correlated with cash flows, leverage and size.

5. EMPIRICAL ANALYSIS

5.1. Market Reactions to Dividend Announcements

To confirm our hypotheses, we analyze market reactions to dividend announcements based on the different dividend policy of sample firms. We examine the cumulative abnormal returns of dividend managing firms and non-dividend managing firms for the three-day-window, days -1 through +1.

Table 3
Market reaction to dividend announcements

CAR(-1+1)	*Dividend managing firms*	*Non-dividend managing firms*	*Other firms*
Avg	0.0025	0.0015	0.0023
Stdev	0.0218	0.0222	0.0214
Max	0.0934	0.1889	0.2504
Min	-0.0961	-0.1275	-0.1219
N	583	548	2994
t-value	2.744***	1.590	5.895***

CAR represents the average three-day cumulative abnormal returns during days -1 through +1 (day 0 is the dividend announcement day). The cumulative abnormal returns are measured as follows: $CAR_i = \Sigma_{t=-1}^{1}(r_{i,t} - r_{m,t})$, where $r_{i,t}$ represents the return on security *i* at date *t* and $r_{m,t}$ represents the return on market indices *m* at date *t*. Non-dividend managing firms are those with high SOA, high investment volatility, and high payout ratio volatility; dividend managing firms are those with low SOA, low investment volatility, and low payout ratio volatility. The other firms belong to neither category. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3 presents the cumulative abnormal returns for dividend managing firms, non-dividend managing firms, and firms belonging to neither category. We find that the market reacts most favorably to dividend announcements by dividend managing firms (averaging 0.25%), and least favorably to those of non-dividend managing firms (0.15%). Market reactions to dividend announcements by firms that do not belong to either of these two groups fall between the two levels (0.23%). The results suggest that dividend announcements by dividend managing firms are, on average, perceived as better news in the market, and that the markets take announcements of non-dividend managing firms as less important news since dividend policy has a lower priority than investments in the financial decisions of non-dividend managing firms.

Table 4
Market reaction to dividend changes

CAR(-1+1)	*Dividend managing firms*		*Non-dividend managing firms*	
ΔPayR	*Increase*	*Decrease*	*Increase*	*Decrease*
Avg	0.0043	-0.0005	0.0006	0.0016
Stdev	0.0229	0.0204	0.0250	0.0170
Max	0.0934	0.0737	0.1889	0.0991
Min	-0.0676	-0.0961	-0.1275	-0.0982
N	311	227	248	275
t-value	3.332***	-0.338	0.362	1.518

CAR represents the average of the three-day cumulative abnormal returns during days -1 through +1 (day 0 is the dividend announcement day). The cumulative abnormal returns are measured as follows: $CAR_i = \Sigma_{t=-1}^{1}(r_{i,t} - r_{m,t})$, where $r_{i,t}$ represents the return on security *i* at date *t* and $r_{m,t}$ represents the return on the market indices *m* at date *t*. We measure payout ratio change (ΔPayR) as a firm's difference in payout ratio from *t-1* to *t0*. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4 reports the market reaction to the announcement of dividend changes (increase or decrease) for dividend managing and non-managing firms. We find that the market reacts positively, at the level of 0.43%, for dividend increase announcements by dividend managing firms, but only at the level of 0.06% for those of non-dividend managing firms. This suggests that the market perceives dividend increase announcements as good news in general, but significantly, but only for dividend managing firms. We also find that the market reacts negatively, at the level of -0.05%, for dividend decrease announcements by dividend managing firms, while it is still positive at the level of 0.16% for non-dividend managing firms. This indicates that the market interprets dividend decrease announcements by non-dividend managing firms as the result of positive investment opportunities. As in H1-2, the results support the hypothesis that the market reacts positively to announcements of dividend increases by dividend managing firms, and perceives announcements of dividend decreases as good news related to non-dividend managing firms.

Table 5 presents the results of CARs related to dividend and investment changes, which allow us to examine the market reaction to dividend and investment changes in tandem for both types of firms. We measure a firm's investment change as the ratio of the firm's difference in capital expenditures from *t-1* to *t0* to the difference in total assets from *t-1* to *t0*. First, we find that the market reacts most positively, at 0.56%, for dividend managing firms when they increase both dividends and investments, and at 0.30%

Table 5
Market reaction to dividend and investment changes

CAR(-1+1)	*Dividend managing firms*				*Non-dividend managing firms*			
*ΔPay*R	*Increase*		*Decrease*		*Increase*		*Decrease*	
ΔINV	*Increase*	*Decrease*	*Increase*	*Decrease*	*Increase*	*Decrease*	*Increase*	*Decrease*
Avg	0.0056	0.0030	0.0005	-0.0016	0.0012	-0.0001	0.0046	-0.0010
Stdev	0.0242	0.0215	0.0180	0.0231	0.0267	0.0232	0.0172	0.0164
Max	0.0752	0.0934	0.0737	0.0528	0.1889	0.0623	0.0991	0.0398
Min	-0.0676	-0.0639	-0.0961	-0.0951	-0.0837	-0.1275	-0.0485	-0.0982
N	154	157	124	103	124	124	126	149
t-value	2.878***	1.781*	0.286	-0.688	0.509	-0.036	2.995***	-0.751

CAR represents the average three-day cumulative abnormal returns during days -1 through +1 (day 0 is the dividend announcement day). The cumulative abnormal returns are measured as follows: $CAR_i = \Sigma_{t=-1}^{1}(r_{i,t} - r_{m,t})$, where $r_{i,t}$ represents the return on security *i* at date *t* and $r_{m,t}$ represents the return on market indices *m* at date *t*. We measure investment change (ΔINV) as the ratio of a firm's difference in capital expenditures from *t-1* to *t0* to the difference in total assets from *t-1* to *t0*. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

when they increase dividends but decrease investments. The results indicate that the market considers announcements of dividend increases by dividend managing firms as significantly good news, regardless of investment changes, and reacts even more positively when higher investments accompany the dividend increase.

On the other hand, we find that the market reacts most positively, at 0.46%, for non-dividend managing firms when they decrease dividends but increase investments, while it is only 0.12%, when they increase both dividends and investments, and -0.01% when they increase dividends but decrease investments.

Our findings support our conjecture that stock market reactions differ depending on a firm's dividend policy, and that investment is an important factor to lead to the different market reactions. Dividend level is the main signal of value for dividend managing firms while it is investment activity that drives the value of non-dividend managing firms. The results also explain the phenomena that stock markets sometimes react positively to announcements of dividend decreases, which cannot be explained under the signaling theory. The empirical results suggest that the market is efficient enough to differentiate the implications of dividend announcements based on the relative importance of investments and dividend policies.

5.2. OLS Regression

Table 6 summarizes the results of the OLS regressions of dividend managing and non-dividend managing firms' value, which allows an analysis of the different role of investments in both types of firms while controlling other factors. In this regression, we control for industry and year effects. Each regression explains from 2 percent to 7 percent of the cross-sectional variations in dividend managing or non-dividend managing firms' valuations. The first seven columns represent the regression results of non-dividend managing firms and the last seven columns represent the results for dividend managing firms. The specification in columns (1) and (8) include only the main variable to test the sensitivity of the market reaction to investment level. In other columns, we add other control variables for firm characteristics.

In regression (1) in Table 6, we find a positive and significant coefficient on INV, and a positive but insignificant coefficient on INV in regression (8), supporting our hypothesis that the market reaction of non-dividend managing firms is more sensitive to investment levels than that of dividend managing firms. We include investment opportunity variables (market to book, MTB; Tobin's Q, Q) in regressions (3) and (4), and confirm that the significance of investment opportunities are also sensitive factors in the market reaction of non-dividend managing firms, even after controlling for other factors. In regressions (5) to (7), we replace dividend payout ratio (PayR) with the amount of cash dividend (LnCashD), and find positive and significant coefficients on investment and investment opportunities.

Regressions (9) to (14) in Table 6 show that the coefficients on INV and Q are negative and insignificant and that the coefficients on MTB are negative and significant, implying that investment level or investment opportunities are not critical factors in the market reaction of a dividend managing firm, again supporting our conjecture that the value of dividend managing firms is less correlated with investment level than that of non-dividend managing firms. In summary, these results indicate that investment or investment opportunities are important determinants of non-dividend managing firms' value, while it is not the case for dividend managing firms. This again supports our hypothesis that firms that follow a residual dividend policy focus more on investment policy than on dividend policy, and their announcement effect is more sensitive to investment levels.

To check the robustness of our results, we repeat the regressions in Table 6, replacing investment and payout ratio with changes in investment and changes in payout ratio, or dummy variables of investment and payout ratio to determine whether the results still hold. Table 7 reports the results of the OLS regressions for both types of firms' market reactions.

Table 6
OLS regression, dependent variable: CAR

	Non-dividend managing firms						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Const	0.262	0.302	0.832	0.465	0.294	0.842	0.476
	(1.048)	(1.167)	(2.998)	(1.683)	(1.114)	(2.971)	(1.669)
INV	0.066***	0.066***	0.046*	0.056**	0.067***	0.046*	0.056**
	(2.836)	(2.702)	(1.894)	(2.249)	(2.734)	(1.883)	(2.239)
PayR		0.000	0.000	0.000			
		(0.581)	(0.174)	(0.464)			
LnCashD					0.001	0.000	0.000
					(0.361)	(-0.078)	(0.017)
CFO		0.005	0.002	0.004	0.005	0.002	0.004
		(0.902)	(0.395)	(0.674)	(0.779)	(0.395)	(0.637)
ROA		-0.031	-0.057*	-0.056	-0.035	-0.056	-0.057
		(-0.897)	(-1.670)	(-1.500)	(-0.969)	(-1.585)	(-1.491)
LEV		0.023**	0.024**	0.018*	0.023**	0.024**	0.018*
		(2.222)	(2.367)	(1.729)	(2.237)	(2.354)	(1.707)

contd. table 6

	Non-dividend managing firms						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
SIZE		0.000	0.000	0.000	-0.001	0.000	0.000
		(-0.801)	(-0.689)	(-0.550)	(-0.576)	(-0.120)	(-0.171)
MTB			0.007***			0.007***	
			(4.692)			(4.712)	
Q				0.008*			0.008*
				(1.657)			(1.654)
R_sq	0.021	0.035	0.075	0.040	0.035	0.075	0.040
	Dividend managing firms						
	(8)	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*
Const	0.097	0.291	-0.220	0.047	0.350	-0.142	0.142
	(0.359)	(0.886)	(-0.540)	(0.124)	(1.066)	(-0.344)	(0.366)
INV	0.017	-0.008	-0.016	-0.010	-0.008	-0.016	-0.009
	(0.378)	(-0.170)	(-0.354)	(-0.213)	(-0.179)	(-0.344)	(-0.201)
PayR		-0.009	-0.007	-0.007			
		(-1.394)	(-1.096)	(-1.011)			
LnCashD					-0.006*	-0.005	-0.005
					(-1.811)	(-1.384)	(-1.266)
CFO		-0.009	-0.003	-0.004	-0.007	-0.002	-0.004
		(-1.221)	(-0.456)	(-0.491)	(-0.969)	(-0.329)	(-0.460)
ROA		-0.026	-0.007	0.047	0.084	0.077	0.116
		(-0.296)	(-0.078)	(0.460)	(0.772)	(0.710)	(1.020)
LEV		-0.017	-0.014	-0.003	-0.016	-0.013	-0.005
		(-0.965)	(-0.788)	(-0.144)	(-0.908)	(-0.760)	(-0.251)
SIZE		0.001*	0.001*	0.001*	0.008**	0.006*	0.006
		(1.759)	(1.703)	(1.754)	(2.123)	(1.682)	(1.557)
MTB			-0.007**			-0.006*	
			(-2.111)			(-1.958)	
Q				-0.013			-0.011
				(-1.325)			(-1.003)
R_sq	0.002	0.016	0.024	0.019	0.018	0.026	0.020

The sample consists of firms in both the Compustat and CRSP databases for 1980–2010, excluding financial firms, special dividends, dividends paid at other frequencies, stock splits, stock dividends, mergers, and so on. We also exclude firms in the public service or utility industries, firms in public administration, closed-end funds, stock certificates, REITs, and ADRs. Non-dividend managing firms are those with high SOA, high investment volatility, and high payout ratio volatility; dividend managing firms are those with low SOA, low investment volatility, and low payout ratio volatility. CAR, the dependent variable, represents the average three-day cumulative abnormal returns during days -1 through +1. Parametric t-test statistics test the difference in means between the two groups. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7
OLS regression: robustness check

	Non-dividend managing firms							
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Const	0.271	0.301	0.846	0.503	0.329	0.372	0.908	0.581
	(1.078)	(1.159)	(3.056)	(1.824)	(1.312)	(1.436)	(3.302)	(2.116)
ΔINV	0.029	0.033	0.026	0.031				
	(1.274)	(1.457)	(1.187)	(1.361)				
ΔPayR	0.000	0.000	0.000	0.000				
	(1.287)	(1.393)	(1.202)	(1.308)				
INV_D					0.003*	0.004*	0.003*	0.004*
					(1.852)	(1.933)	(1.725)	(1.900)
PayR_D					-0.001	-0.001	-0.001	-0.001
					(-0.684)	(-0.661)	(-0.444)	(-0.700)
CFO		0.008	0.004	0.006		0.007	0.004	0.005
		(1.450)	(0.753)	(1.051)		(1.323)	(0.640)	(0.910)
ROA		-0.028	-0.056*	-0.061		-0.031	-0.059*	-0.065*
		(-0.805)	(-1.647)	(-1.617)		(-0.892)	(-1.718)	(-1.738)
LEV		0.024**	0.025**	0.018*		0.023**	0.024**	0.017
		(2.267)	(2.421)	(1.675)		(2.205)	(2.380)	(1.598)
SIZE		-0.001	-0.001	-0.001		-0.001	-0.001	0.000
		(-1.404)	(-1.125)	(-0.987)		(-1.216)	(-0.973)	(-0.791)
MTB			0.007***				0.007***	
			(4.991)				(5.023)	
Q				0.010**				0.010**
				(2.150)				(2.253)
R_sq	0.012	0.028	0.073	0.037	0.013	0.028	0.074	0.038
	Dividend managing firms							
	(9)	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*
Const	0.150	0.313	-0.262	-0.021	0.179	0.320	-0.258	0.001
	(0.604)	(0.995)	(-0.653)	(-0.057)	(0.728)	(1.025)	(-0.646)	(0.002)
ΔINV	0.046	0.061	0.061	0.055				
	(0.554)	(0.742)	(0.747)	(0.670)				
ΔPayR	0.014	0.015	0.015	0.017				
	(1.219)	(1.277)	(1.294)	(1.424)				
INV_D					0.002	0.002	0.002	0.002
					(1.251)	(1.303)	(1.285)	(1.228)
PayR_D					0.005**	0.005***	0.005***	0.005***
					(2.556)	(2.577)	(2.614)	(2.637)

contd. table 7

CFO			-0.005	-0.005		-0.012*	-0.006	-0.006
		-0.011	(-0.692)	(-0.597)		(-1.734)	(-0.795)	(-0.723)
ROA		(-1.611)	-0.001	0.074		-0.016	0.005	0.076
		-0.022	(-0.015)	(0.718)		(-0.187)	(0.058)	(0.742)
LEV		(-0.255)	-0.017	-0.002		-0.021	-0.017	-0.003
		-0.021	(-0.955)	(-0.080)		(-1.211)	(-0.981)	(-0.137)
SIZE		(-1.183)	0.001*	0.001*		0.001*	0.001	0.001*
		0.001*	(1.776)	(1.834)		(1.734)	(1.627)	(1.689)
MTB			-0.007**				-0.007**	
			(-2.286)				(-2.309)	
Q				-0.017*				-0.016*
				(-1.727)				(-1.682)
R_sq	0.005	0.016	0.026	0.022	0.016	0.027	0.037	0.033

CAR, the dependent variable, represents the average three-day cumulative abnormal returns during days -1 through +1. Investment and dividend variables are replaced with change variables. We measure investment change (ΔINV) as the ratio of a firm's difference in capital expenditures from *t-1* to *t0* to the difference in total assets from *t-1* to *t0*. INV_D (PayR_D) is a dummy variable with a value of one if the investment (payout ratio) increases from *t-1* to *t0* and zero otherwise. Parametric t-test statistics test the difference in means between the two groups. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7 reports the results with dividend or investment change variables as independent variables, which allows us to examine the different roles of investment changes (ΔINV) and dividend changes (ΔPayR) in both types of firms. In this regression, we also control for industry and year effects. Regressions (1) to (8) represent the regression results for non-dividend managing firms and regressions (9) to (16) represent the results for dividend managing firms. The specification in columns (1) to (4) and (9) to (12) examine the sensitivity of the market reaction to changes in investment and payout ratios. The specification in columns (5) to (8) and (13) to (16) includes dummy variables, INV_D and PayR_D, for changes in investments and payout ratios, respectively.

In regressions (5) to (8), we find positive and significant coefficients on INV_D, and negative coefficients on PayR_D. We also find positive and significant coefficients on PayR_D in regressions (13) to (16). The regression results indicate that investment changes (dividend changes) are an important determinant of market reactions for non-dividend (dividend) managing firms, again supporting our conjecture that dividend (investment) decrease (increase) announcements by non-dividend managing firms yield a more positive market reaction while it is not the case for dividend managing firms.

6. CONCLUSION

Our study incorporates two existing hypotheses on firms' dividend policies along with investment decisions, and analyzes their impact on firm valuation. Consistent with our hypotheses, we find that the market reacts more favorably to dividend announcements by dividend managing firms than those of non-dividend managing firms while it shows more positive reactions to announcements of dividend decreases by non-dividend managing firms. Our findings suggest that the market takes dividend announcements or dividend increase announcements of dividend managing firms as good news, but would prefer investment policy over dividends for non-dividend managing firms.

We also hypothesize that the value of non-dividend managing firms are more sensitive to investments because these firms prioritize investment decisions over dividend decisions. We find positive and significant association between investment and the market reaction only for non-dividend managing firms even after we control for growth opportunity represented by market to book (MTB) or Tobin's Q ratio (Q). The results suggest that non-dividend managing firms focus more on investment policy over dividend policy and that investment is a main determinant of the value of non-dividend managing firms, which is confirmed by their dividend announcements.

This study shows that the stock market reacts differently to dividend decisions by firms depending on their dividend policy. It also shows that firms choose different dividend policies depending on the importance of investments at firm level and the stock market efficiently incorporates the information in their reaction to dividend announcements. Investigating differential market reactions to dividend announcements based on firm characteristics besides investments would be an interesting extension of this study for future research.

NOTES

1. The term "managing dividend" appears in Lease, John, Kalay, Loewenstein, and Sarig's (2000) book on dividend policy, in which they describe a "managed dividend" as a dividend payment greater than the residual amount. They state the following:

   > *Alternatively, managers may pay out more than this residual amount. In these cases, we say that the firm is following a managed dividend policy. If managers believe that a managed dividend policy is important to their investors and share price valuation can be positively influenced by the firm's dividend policy, they will adopt such a managed policy. (p.30)*

2. Slater and Zwirlein (1996) show a negative relationship between dividend payout and investment for S&P 400 Index firms.
3. The speed of adjustment (SOA) is derived from Lintner's (1956) partial adjustment model, and is the most common measure of dividend stability in the existing literature.
4. According to residual dividend theory, firms use cash for necessary capital expenditures, or positive NPV projects, and pay out the remaining cash to shareholders.
5. Lintner (1956, p. 107).
6. Their survey evidence also shows that only 28% of CFOs claim to target a payout ratio, while almost 40% claim to target the level of dividends per share (DPS).
7. To estimate SOA, earnings per share (EPS) and dividends per share (DPS) are required. We find 8,710 samples remained.
8. Applying this condition, 4,277 observations remained.
9. In Lintner's partial adjustment model, the SOA must meet the following condition: $0 < SOA < 1$. If it is 0, it means there is no adjustment from one time period to the next. If it is 1, it means there is immediate adjustment from one time period to the next. Unsatisfied 152 observations are excluded, and 4,125 observations remained.

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