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The relationship between changes in corporate payout policy and capital structure

Songhee Kim
Business School, Korea University, Seoul, Republic of Korea
Jaeuk Khil
College of Business Administration, Hanyang University ERICA, Ansan, Republic of Korea, and
Yu Kyung Lee
Division of Business Administration, Pukyong National University, Busan, Republic of Korea

Abstract

This paper aims to investigate the impact of corporate dividend policy on the capital structure in the Korean stock market. To distinctly discern the voluntariness of changes in corporate dividend policy, we analyze companies that, following a substantial increase, do not reduce dividends for the subsequent two years or, after a significant decrease, do not raise dividends for the following two years. Our empirical findings indicate that companies that increase dividends experience a significant decrease in both book and market leverage, even after controlling for variables such as target leverage ratios. This result suggests that a large increase in dividends can effectively reduce information asymmetry, leading to a lower cost of equity. On the contrary, after a decrease in dividends, both book leverage and market leverage significantly increase, revealing a symmetric relationship between dividend policy and capital structure. In conclusion, large dividend increases in Korean companies not only reduce information asymmetry but also lower the cost of equity capital, resulting in observable changes in the leverage ratio.

Keywords Dividend payout policy, Capital structure, Signaling theory, Trade-off theory, Pecking-order theory

Paper type Research paper

1. Introduction

Miller and Modigliani (1961), who present the dividend irrelevance theory, argue that, under the assumption of perfect capital markets, a company's dividend policy is unrelated to its corporate value and does not affect investor investment policies. However, in actual financial markets where friction factors such as transaction costs, taxes, bankruptcy costs and information asymmetry exist, the dividend policy significantly impacts shareholders' wealth and is a crucial financial decision. Easterbrook (1984) and Lease *et al.* (2000) assert that dividend policies affect future investment decisions, intimately relate to capital-raising methods and become factors in determining capital structure. In addition, numerous studies,

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including Antoniou *et al.* (2008), Adedeji (1998), Baskin (1989), Aggarwal and Kyaw (2010) and Fama and French (2002), continue attempts to elucidate the relationship between dividends and capital structure. Recently, Cooper and Lambertides (2018) contend that an increase in dividends results in an increase in leverage, and the increase in dividends partially signals changes in capital structure. Therefore, in this paper, we aim to analyze the impact and causes of a company's dividend policy on financing decisions by examining the company's capital structure after the company's dividend policy has changed.

Traditional theories related to dividend policy encompass the agency theory and dividend signaling theory [1]. The agency theory posits that by reducing the free cash flows used to satisfy managerial personal interests through dividends, agency costs can be minimized (Easterbrook, 1984; Jensen, 1986). Following the dividend signaling theory, changes in dividend policy, such as increases or decreases in dividends, inherently serve as a means of conveying information about a company's future performance, reducing information asymmetry between managers and investors (Lintner, 1956; Ross, 1977; Bhattacharya, 1979; Miller and Rock, 1985; John and Williams, 1985; Marsh and Merton, 1987; Ambarish *et al.*, 1987). Furthermore, studies also assert that increasing dividends provides a more certain signal about a company's future earnings (Arnott and Asness, 2003; Zhou and Ruland, 2006). In this manner, when dividends signal future earnings, companies may seek to raise funds through equity capital as the cost of raising capital decreases. Consequently, there could be a negative relationship between dividend payout and debt ratio (Antoniou *et al.*, 2008).

Cooper and Lambertides (2018) argued that companies convey private information that the market cannot anticipate through their dividend policies, suggesting that corporate financing behavior can be signaled by dividend policy. Some studies focus on analyzing firms that have significantly increased or decreased dividends to differentiate the voluntary nature of changes in dividend policies (Grullon *et al.*, 2002). Therefore, this paper adopts the methodologies of Grullon *et al.* (2002) and Cooper and Lambertides (2018) to examine whether changes in capital structure are observed in companies that have demonstrated a relatively significant dividend change, by either significantly increasing or decreasing dividends.

Grullon *et al.* (2002) and Cooper and Lambertides (2018) state that an annual analysis is conducted on companies with a quarterly dividend growth rate of 12.5% or more (less), particularly emphasizing the consistency of dividend changes. Cooper and Lambertides (2018) focus on the consistency of dividend changes. In particular, in cases where the direction of dividend changes is mixed over the five years following the dividend change, they are excluded from the analysis. If companies with dividend changes show continuous dividend changes in the same direction over the five years, only the first change is considered, limiting the analysis conservatively. However, in the case of South Korea, a more relaxed criterion is needed due to the low dividend payout ratio. Therefore, the quarterly dividend growth rate is converted into an annual dividend growth rate, and companies that increase (decrease) dividends by 12.5% or more are targeted. Specifically, companies are selected based on whether dividends do not decrease (increase) for at least 2 years after a significant increase (decrease) in dividends. In other words, after a rapid dividend increase, we focus on companies that experience additional dividend increases or no dividend change.

One of the prominent theories regarding capital structure is the trade-off theory, which considers factors such as corporate tax advantages, bankruptcy costs and agency costs. When accounting for these elements, the theory suggests the existence of an optimal capital structure, also known as a target leverage ratio, that maximizes the firm's value (Kim and Sorensen, 1986; Graham, 2000; Myers, 2001). If companies seek to achieve optimal leverage according to the pecking-order theory, firms with a higher debt ratio, which face a greater risk of bankruptcy, would reduce dividends to lower the cost of external capital. Another theory related to capital structure is the pecking-order theory, where information asymmetry between management and investors causes costs when raising external capital. Therefore,

companies in need of funds tend to utilize the lowest-cost internal retained earnings first, covering any shortfall with relatively inexpensive convertible bonds and debt, rather than opting for the issuance of costly new equity (Myers, 1984; Myers and Majluf, 1984) [2]. Numerous studies have examined the relationship between capital structure and dividend policy; however, the results still exhibit a mixed pattern (Baskin, 1989; Aggarwal and Kyaw, 2010) [3]. Therefore, this paper aims to analyze the relationship between dividends and capital structure by considering the target leverage and the level of information asymmetry, which are major factors that can affect capital structure. To the best of our knowledge, this is the first paper to examine the actual relationship between dividends and capital structure and its causes in the Korean stock market.

Many prior studies have attempted to confirm the research hypothesis that changes in dividends convey future information about a company, but ultimately, they have not reached a unified conclusion. In response, some researchers have attempted to analyze the relationship between dividends and the debt ratio from the view of capital structure. However, the results of these analyses remain mixed. Fama and French (2002) explore the relationship between dividends and the debt ratio from an alternative perspective on the free cash flow problem. They discover a negative relationship between target dividends and target leverage ratios but emphasize the limitations of their results due to multicollinearity with key variables. Additionally, Frank and Goyal (2009) show that companies that pay dividends have lower debt levels than those that do not. At the same time, they emphasize the need for further research, as it is difficult to provide a clear interpretation of this relationship between dividend payments and leverage in the current capital structure theory. In contrast, some studies reveal a positive correlation between dividends and the debt ratio. Ravid and Sarig (1991) argue that both dividends and debt provide crucial information about a company's financial soundness and prospects. They claim that better companies can handle higher debt and, by paying higher dividends, can convey information about their stability and profitability to the market.

In Korea, several empirical studies analyze various theories related to dividends. However, there are few studies specifically focusing on the relationship between dividends and capital structure. Kim Ph *et al.* (2007) examine the interaction among dividend policy, debt policy and ownership structure. They find a negative correlation between debt and dividends, suggesting that these factors can jointly reduce information asymmetry in the company. Studies on dividends in the Korean stock market mainly utilize indicators such as dividend payout ratio, dividend yield or dividend level. While some studies consider dividend growth rates, there is almost no research focusing on significant changes in dividends. Given that existing variables do not adequately explain changes in capital structure resulting from changes in dividends, it is imperative to analyze situations where significant changes in dividends serve as a potent means of conveying information. Accordingly, in this study, using the analysis method of Cooper and Lambertides (2018), we exclude the possibility of diluted information due to inconsistent directions in dividend changes. Specifically, we focus on firms that increase (decrease) dividends by at least 12.5%, and observe them for the next two years to ensure that dividends do not decrease (increase) during that period.

The results of this study are as follows. First, both book and market leverage decrease significantly after dividend increases. In contrast, after a decrease in dividends, both book and market leverage experience a substantial increase. These results are interpreted as powerful and positive signals through dividends elevating the company's reputation, effectively reducing information asymmetry between investors and management, fundamentally resolving the cost of equity capital and having a significant impact on lowering costs.

Second, to assess whether changes in leverage following dividend increases or decreases are intended to revert to the target leverage ratio for achieving the optimal capital structure, the actual leverage is segmented into two groups: groups whose actual debt ratio is higher

than the target leverage ratio and groups whose actual debt ratio is lower than the target leverage ratio. The results show that, regardless of the target leverage ratio, in both groups, leverage significantly decreases after a dividend increase, and leverage increases after a dividend decrease. In other words, regardless of the target leverage ratio, similar results to the previous analysis are derived, confirming that the target leverage ratio is not the main factor. Thus, significant changes in dividend policy lead to a significant change in capital structure, irrespective of the target leverage ratio.

Third, to examine the influence of information asymmetry, groups are classified based on daily stock return volatility and company size. According to previous literature, firms with high daily stock return volatility or small company size can be interpreted as firms with relatively severe information asymmetry (Comprix *et al.*, 2011; Lang and Lundholm, 1993; Leuz and Verrecchia, 2000; Moeller *et al.*, 2007; Vermaelen, 1981). In the view of dividend signaling theory, a substantial increase in dividends is expected to transmit a strong and positive signal to the market, reducing the cost of equity capital and, consequently, leading to a decrease in leverage. Therefore, we anticipate that our primary findings will be more pronounced in groups experiencing substantial information asymmetry. As expected, within the group with high information asymmetry, the coefficient for the dividend increase has a significant negative value, and the coefficient for the dividend decrease has a significant positive value. However, within the group with low information asymmetry, the coefficient values of the dividend increase or dividend decrease variables are either not significant or exhibit smaller size and significance than the subsample with high information asymmetry.

This study has the following contributions. First, this paper contributes to the academic discussion on the relationship between dividends and capital structure by explaining changes in capital structure through a refined dividend criterion. According to previous literature analyzing the impact of dividend policy on capital structure, in the US stock market, an observed phenomenon is an increase in leverage after a substantial increase in dividends, and it is suggested that voluntary changes in dividends allow predictions of changes in capital structure (Cooper and Lambertides, 2018). However, in the case of the Korean stock market, which differs from the dispersed ownership structure in the US and has a concentrated ownership structure with controlling shareholders, the incentive for firms to pay dividends is low, and the actual dividend payout ratio is significantly low. Consequently, investors show a relatively significant positive reaction to the increase in dividends, especially effectively manifesting in the aspect of the capital structure associated with information asymmetry issues. In other words, as information asymmetry is alleviated through dividends, a significant decrease in the debt ratio is evident. Interpreting a substantial increase in dividends as a method to reduce information asymmetry implies a relatively lower cost of equity capital. Through this, this paper provides implications by suggesting a means to alleviate difficulties faced by companies experiencing severe information asymmetry.

Secondly, this paper explores the impact of both dividend increases and decreases on the capital structure. Unlike the commonly used variables such as dividend payout ratio and dividend yield in existing literature, this study employs the methodology proposed by Grullon *et al.* (2002) to analyze the asymmetric impact of dividend policy (Cooper and Lambertides, 2018). The analysis reveals that in the US, the effects of dividend increases and decreases on capital structure appear asymmetric. In contrast, in Korea, a significant increase in leverage is observed after a decrease in dividends. This empirical finding demonstrates a symmetric relationship between dividend policy and capital structure, contributing meaningfully to the literature.

The structure of this paper is as follows. Section 2 explains the sample and research method, Section 3 presents the empirical analysis results, Section 4 examines the robustness of the analysis and, finally, Section 5 concludes the study.

2. Sample and research design

2.1 Sample selection and financial characteristics

The sample period for this study is from 2000 to 2019. The sample for analysis consists of non-financial manufacturing companies listed on the stock market during the sample period. The study targets 863 listed companies with available financial, accounting and stock price data, excluding those in a state of capital erosion. To eliminate the influence of outliers, the top and bottom 1% are winsorized. The financial, accounting and stock data of the sample firms are extracted using the FNGuide database.

2.2 Research design

This paper empirically analyzes changes in financing behavior following voluntary changes in the dividend policy of firms. In this context, Grullon *et al.* (2002) and Cooper and Lambertides (2018) define firms with a quarterly dividend increase of 12.5% or more as dividend-increasing firms, and firms with a dividend decrease of −12.5% or more as dividend-decreasing firms. Cooper and Lambertides (2018) emphasize the consistency of dividend changes, excluding cases where the direction of dividend changes is mixed in the five years after the dividend change. If there is a consecutive dividend change in the same direction for five years for firms with dividend changes, only the first change is considered, limiting the analysis conservatively.

However, directly applying such criteria to the Korean market may be somewhat challenging. This is because the dividend payout tendency of Korean firms is significantly lower compared to the United States, and there are also many non-dividend-paying companies. Therefore, in this study, we intend to modify the definition of firms with dividend increases or decreases to better suit the Korean situation. In Korea, firms with dividend increases have increased annual dividends by at least 12.5% and have not decreased dividends for the next two years. Similarly, companies with dividend decreases are those that have reduced dividends by at least 12.5% annually and have not increased dividends for the next two years. Essentially, our focus is on companies that either maintain or further increase dividends following a significant dividend increase. On the flip side, after a substantial dividend decrease, we consider companies that do not increase dividends.

In this paper, to investigate the changes in financing decisions following changes in dividend policy, we first provide a broad overview of how book leverage, market leverage and main variables change over the three years after the significant dividend change [4]. Subsequently, we conduct a regression analysis to examine the firm's financing behavior after a significant dividend change. In this analysis, the dependent variable is the change in leverage, while dummy variables for dividend increases and decreases, reflecting changes in dividend policy, serve as independent variables. We control for variables previously identified in the literature as influencing capital structure, intending to analyze the patterns of changes in financing behavior following substantial dividend adjustments.

2.2.1 Estimation of target leverage. Before examining changes in the capital structure following a shift in the firm's dividend policy, we first aim to estimate the target leverage. Firms typically tend to move toward their target leverage, with those having actual leverage lower than the target more likely to increase it in the future and, conversely, those with actual leverage higher than the target are more likely to decrease it. In this paper, we employ the methodology proposed by Kayhan and Titman (2007) to estimate the predicted value of the target leverage. The variables used in the analysis include proxies representing the potential benefits and costs of debt utilization, as suggested in previous literature (Titman and Wessels, 1988; Rajan and Zingales, 1995; Hovakimian *et al.*, 2001). Additionally, to account for industry-specific characteristics not explained by these variables, we include industry dummies.

$$Lev_t = \alpha_0 + \beta_1 \mathrm{Div}_{\mathrm{Pay}\,t-1} + \beta_2 M/B_{t-1} + \beta_3 PPE_{t-1} + \beta_4 EBITD_{t-1} + \beta_5 R\&D_{t-1} + \beta_6 R\&D\ dummy_{t-1} + \beta_7 SE_{t-1} + \beta_8 Size_{t-1} + \beta_9 Industry + \varepsilon_{t-1} \quad (1)$$

Lev: Book leverage or market leverage, where book leverage is the ratio of book debt to total assets, and market leverage is the ratio of book debt to the sum of book debt and market equity.

Div_Pay: A dummy variable that takes the value of 1 for dividend-paying firm-year, and 0 otherwise.

M/B: Market value of equity is divided by the book value of equity.

PPE: Property, plant and equipment scaled by total assets.

EBITD: Earnings before interest, taxes, depreciation and amortization scaled by total assets.

R&D: Research and development expenditure scaled by total assets.

R&D dummy: A dummy variable that takes the value of 1 if the firm has no R&D expense, and 0 otherwise.

SE: Selling expenses scaled by total sales.

Size: Natural logarithm of total sales.

Industry: Industry indicators.

In this study, the target leverage ratio is estimated using Tobit regression based on equation (1), and the estimated values, according to the definition of the debt ratio, are constrained to be within the range of 0–1. Using the estimated target leverage, the leverage deficit is calculated as $LevDef = Lev - Target\_Lev$, allowing us to examine the difference between the actual and target leverage. Moreover, by computing the change in the target leverage as $\Delta Target\_Lev = Targe\_Lev_{t+n} + Targe\_Lev_t$, we gain insights into the direction in which the target leverage has evolved.

2.2.2 Changes in leverage in response to dividend changes. In this study, we empirically verify changes in corporate financing behavior following a substantial change in dividend policy. We apply the methodology proposed by Cooper and Lambertides (2018), which improves upon the model suggested by Kayhan and Titman (2007) by introducing dummy variables related to dividend policy in addition to the variables known to influence changes in the debt ratio in previous literature. In this case, the included dummy variables are as follows. The first one is Div_Inc, a dummy variable that takes a value of 1 if a firm increases dividends by more than 12.5% compared to the previous year in year t and does not decrease dividends for the next two years; otherwise, it takes a value of 0. The second variable is Div_Dec, a dummy variable that takes a value of 1 if a firm decreases dividends by more than −12.5% compared to the previous year in year t and does not increase dividends for the next two years; otherwise, it takes a value of 0. The change in dividends is calculated as the percentage change from the previous year [5], as follows: $(Div_t - Div_{t-1})/Div_{t-1}$

In this study, we conduct a regression analysis using the three-year change in leverage as the dependent variable, represented by equation (2). The independent variables include the dummy variables for dividend changes in year t, and control variables representing determinants of capital structure are set as covariates. In this study, we use clustering regression analysis to estimate robust standard errors, controlling for clustering at the individual firm level.

$$Lev_{t+3} - Lev_t = \alpha_0 + \beta_1 \text{Div\_Inc}_t + \beta_2 \text{Div\_Dec}_t + \beta_3 M/B_t + \beta_4 PPE_{[t+3,t]} + \beta_5 EBITD_{[t+3,t]} + \beta_6 Size_t + \beta_7 R\&D_{[t+3,t]} + \beta_8 Age_t + \beta_9 \text{Ind\_Lev}_{[t+3,t]} + \beta_{10} Industry + \beta_{11} Year + \varepsilon_t \quad (2)$$

$$Lev_{t+3} - Lev_t = \alpha_0 + \beta_1 \text{Div\_Inc}_t + \beta_2 \text{Div\_Dec}_t + \beta_3 M/B_t + \beta_4 PPE_{[t+3,t]} + \beta_5 EBITD_{[t+3,t]} + \beta_6 Size_t + \beta_7 R\&D_{[t+3,t]} + \beta_8 Age_t + \beta_9 \text{Ind\_Lev}_{[t+3,t]} + \beta_{10} \text{LevDef}_t + \beta_{11} \text{Target\_Lev}_{[t+3,t]} + \beta_{12} Industry + \beta_{13} Year + \varepsilon_t \quad (3)$$

$Lev_{t+3} - Lev_t$: The change in book or market leverage between years t+3 and t [6].

Div_Inc_t: A dummy variable that takes a value of 1 if a firm increases dividends by more than 12.5% compared to the previous year in year t and does not decrease dividends for the next 2 years, and 0 otherwise.

Div_Dec_t: A dummy variable that takes a value of 1 if a firm decreases dividends by more than 12.5% compared to the previous year in year t and does not increase dividends for the next 2 years, and 0 otherwise.

M/B_t: Market value of equity divided by the book value of equity in year t.

$PPE_{[t+3,t]}$: The change in property, plant and equipment, scaled by total assets, between years t+3 and t.

$EBITD_{[t+3,t]}$: The change in earnings before interest, taxes, depreciation and amortization, scaled by total assets, between years t+3 and t.

$Size_t$: Natural logarithm of total sales in year t.

$R\&D_{[t+3,t]}$: The change in research and development expenditure, scaled by total assets, between t+3 and t.

Age_t: Natural logarithm of firm age in year t.

$\text{Ind\_Lev}_{[t+3,t]}$: The change in industry average leverage within the same 2-digit sector between t+3 and t.

LevDef_t: Leverage deficit is the difference between actual leverage and target leverage in year t.

$\text{Target\_Lev}_{[t+3,t]}$: The change in estimated target leverage using stage 1 of Kayhan and Titman (2007), either based on book leverage or market leverage, between t+3 and t.

Industry: Industry indicators.

Year: Year indicators.

In this paper, we use control variables known from previous literature to influence changes in both dividends and leverage. We include M/B (market-to-book ratio), asset tangibility, profitability and firm size as control variables, following Rajan and Zingales (1995). Additionally, we include R&D intensity (Harris and Raviv, 1991), firm age (Brewer *et al.*, 1996) and industry leverage (Frank and Goyal, 2004).

In equation (3), we examine changes in the capital structure while controlling for the impact using variables calculated based on the estimated target leverage (Target_Lev) from equation (1). The leverage deficit variable (LevDef) represents the difference between the actual and the target leverage ratio. This variable is known to be suitable for predicting how a company raises capital, whether it issues debt or equity (Hovakimian *et al.*, 2001; De Jong

et al., 2011). Additionally, the direction of the leverage deficit variable, whether it has a positive value or a negative value, can influence the direction of changes in the debt ratio (Cooper and Lambertides, 2018). Therefore, in equation (3), we introduce the changes in the leverage deficit variable and the target leverage ratio to explore various reactions to the difference between the target and actual debt ratios.

3. Empirical results

3.1 Financial characteristics of sample firms

In Table 1, the summary statistics of key variables are presented. The mean and median of the book leverage for the sample firms are 42.29 and 43.05%, respectively. Meanwhile, the mean and median of the market leverage ratio are 54.21 and 54.70%, suggesting slightly higher values. Their standard deviations are 19.64 and 28.00%, respectively. The mean of the three-year change variables in the book leverage is −0.53%, while for the market leverage, it is −4.56%, indicating a more significant decrease in the market leverage ratio. The mean annual growth rate of dividends is 13.94%, showing an increasing trend, and the maximum dividend change rate is approximately 320% [7]. The median value is 0.00%, indicating the presence of many companies maintaining their dividends. The mean value of the market-to-book ratio, a proxy for growth opportunities, is 104.02%, with a median of 78.19%. The mean value of EBITD, a proxy for profitability, is 7.00%.

Table 2 presents the results of the Pearson correlation analysis among the key variables. The changes in book leverage ($BookLev_{[t+3,t]}$) and market leverage ($MarketLev_{[t+3,t]}$) in response to dividend changes (DIV) both show significant negative correlations. This implies a decrease in leverage following an increase in dividends. Among the key variables influencing changes in leverage, the market-to-book ratio (M/B) shows a significant positive correlation, while negative correlations are observed between dependent variables and asset tangibility (PPE) and the selling expenses ratio (SE). Overall, the correlation coefficients

	N	Mean	Std	Min	Median	Max
Book lev	11,596	0.4229	0.1964	0.0321	0.4305	0.8520
Market lev	11,596	0.5421	0.2800	0.0185	0.5470	0.9895
Book $lev_{[t+3,t]}$	11,297	−0.0053	0.1175	−0.3680	−0.0062	0.3598
Market $lev_{[t+3,t]}$	11,297	−0.0456	0.1739	−0.5938	−0.0227	0.3996
DIV	7,895	0.1394	0.5533	−0.8000	0.0000	3.2012
M/B	11,596	1.0402	1.0870	0.1856	0.7819	8.5990
PPE	11,596	0.3158	0.1920	0.0002	0.3065	0.8006
EBITD	11,596	0.0700	0.0637	−0.1160	0.0640	0.2671
SE	11,593	0.0311	0.0390	−0.0012	0.0194	0.2338
R&D	11,596	0.0091	0.0182	0.0000	0.0009	0.0985
Asset (bil.)	11,596	1476.44	3986.43	27.23	283.91	26862.91
Age	11,596	38.1061	17.2623	3.0000	39.0000	83.0000

Note(s): This table presents summary statistics for key variables used in the empirical analysis of firms listed on the Korean Stock Exchange from 2000 to 2019. Book lev is the book debt to total assets, and market lev is the book debt to the sum of book debt and market equity. Book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$ are defined as the changes in book and market leverage, respectively, from year t to t+3, subsequent to a dividend change. DIV is calculated as the difference in annual dividends between year t and year t−1, scaled by the annual dividend of year t−1. M/B is the market-to-book ratio. PPE is property, plant and equipment divided by total assets. EBITD is earnings before interest, taxes, depreciation and amortization divided by total assets. SE represents selling expenses scaled by total sales. R&D is R&D expenditure over total assets. Asset is book value of total assets in billions of Korean won (KRW). Age is the number of years since the company's inception

Source(s): Table by authors

Table 1.
Summary statistics

Table 2.
Correlation matrix

	Book lev	Market lev	Book $lev_{[t+3,t]}$	Market $lev_{[t+3,t]}$	DIV	M/B	PPE	EBITD	SE	R&D	Size	Age
Market lev	0.5353***	1.0000										
Book $lev_{[t+3,t]}$	−0.2109***	−0.1592***	1.0000									
Market $lev_{[t+3,t]}$	−0.1046***	−0.3830***	0.5148***	1.0000								
DIV	0.0315***	0.0064	−0.0538***	−0.0234**	1.0000							
M/B	0.1620***	−0.4707***	0.0699***	0.2361***	0.0358***	1.0000						
PPE	0.2415***	0.3026***	−0.0431***	−0.0707***	0.0104	−0.0702***	1.0000					
EBITD	−0.0735***	−0.0376***	−0.0669***	0.0069	0.1685***	−0.0242***	0.1632***	1.0000				
SE	0.0452***	0.0736***	−0.0237**	−0.0487***	0.0023	−0.0158*	0.1330***	−0.0332***	1.0000			
R&D	0.0269***	−0.1268***	0.0027	0.0113	0.0088	0.1307***	−0.0335***	0.0813***	0.0180*	1.0000		
Size	0.3116***	0.1157***	−0.0314***	0.0685***	0.0326***	0.0201**	0.1508***	0.3077***	−0.0264***	0.1063***	1.0000	
Age	−0.0645***	0.0344***	−0.0138	−0.0244***	−0.0203*	−0.0719***	0.0197**	−0.1501***	−0.0136	−0.0433***	−0.0084	1.0000

Note(s): This table shows the Pearson correlation coefficients of variables used in this study. Book lev is the book debt to total assets, and market lev is the book debt to the sum of book debt and market equity. Book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$ are defined as the changes in book and market leverage, respectively, from year t to t+3, subsequent to a dividend change. DIV is calculated as the difference in annual dividends between year t and year t−1, scaled by the annual dividend of year t−1. M/B is the market-to-book ratio. PPE is property, plant and equipment divided by total assets. EBITD is earnings before interest, taxes, depreciation and amortization divided by total assets. SE represents selling expenses scaled by total sales. R&D is R&D expenditure over total assets. Size is the natural logarithm of total sales. Age is the number of years since the company's inception. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

among the major explanatory variables in Table 2 are generally low. The absolute values of the correlation coefficients between the explanatory variables used in the study are mostly below 0.5, confirming the absence of multicollinearity issues.

Table 3 shows the descriptive statistics of each group according to the change in dividends, categorized into three groups: dividend increases, no dividend change and dividend decreases. To examine the mean and median differences between groups, *t*-tests and Wilcoxon tests are conducted. Group (a), characterized by a dividend increase of 12.5% or more without subsequent decreases, exhibits a higher book leverage ratio compared to group (c), which experiences dividend decreases. However, group (a) has a lower book leverage ratio than group (b), where dividends remain unchanged. Similar results are observed in the market leverage ratio. Additionally, despite having the lowest average firm age among the three groups, group (a) consistently shows the highest mean values in profitability (EBITD) and size. This indicates that companies with increasing dividends tend to be larger and demonstrate stable performance. Meanwhile, group (c), which experiences a dividend

	(a) Dividend increases (N = 1,168)	(b) No dividend change (N = 9,662)	(c) Dividend decreases (N = 229)	(a)-(b) Difference test	(a)-(c) Difference test	(c)-(b) Difference test
Book	0.3916	0.4248	0.3683	0.0000	0.0661	0.0000
lev	[0.3933]	[0.4316]	[0.3631]	(0.0000)	(0.0454)	(0.0000)
Market	0.5254	0.5416	0.5255	0.0630	0.9963	0.3910
lev	[0.5222]	[0.5470]	[0.5145]	(0.0604)	(0.9584)	(0.3680)
DIV	0.5645	0.0799	−0.3388	0.0000	0.0000	0.0000
	[0.3333]	[0.0000]	[-0.2857]	(0.0000)	(0.0000)	(0.0000)
M/B	0.9695	1.0497	0.9506	0.0170	0.7509	0.1837
	[0.7650]	[0.7843]	[0.7235]	(0.1739)	(0.0220)	(0.0011)
PPE	0.3041	0.3162	0.3168	0.0420	0.3475	0.9635
	[0.2996]	[0.3065]	[0.3146]	(0.0943)	(0.4663)	(0.9810)
EBITD	0.1015	0.0656	0.0655	0.0000	0.0000	0.9836
	[0.0933]	[0.0603]	[0.0558]	(0.0000)	(0.0000)	(0.5749)
SE	0.0273	0.0317	0.0304	0.0003	0.2188	0.6128
	[0.0180]	[0.0198]	[0.0180]	(0.0037)	(0.4814)	(0.5429)
R&D	0.0085	0.0092	0.0065	0.1863	0.1009	0.0279
	[0.0009]	[0.0009]	[0.0009]	(0.3739)	(0.4919)	(0.2620)
Size	19.7358	19.3437	19.4754	0.0000	0.0282	0.2279
	[19.5398]	[19.1685]	[19.3429]	(0.0000)	(0.0191)	(0.1522)
Age	37.2021	38.2810	39.8122	0.0435	0.0437	0.1825
	[38.0000]	[39.0000]	[41.0000]	(0.0570)	(0.0422)	(0.1645)

Note(s): This table reports the comparative mean and median characteristics of firms that increase, no change and decrease dividends. (a) Dividend increases include firms that increase dividends by 12.5% or more in year t and do not decrease dividends in the following 2 years, (b) no dividend change represents firms that do not pay dividends or exhibit insignificant dividend changes and (c) dividend decreases refer to firms that decrease dividends by 12.5% or more in year t and do not increase dividends for the following 2 years. Book lev is the book debt to total assets, and market lev is the book debt to the sum of book debt and market equity. DIV is calculated as the difference in annual dividends between year t and year t−1, scaled by the annual dividend of year t−1. M/B is the market-to-book ratio. PPE is property, plant and equipment divided by total assets. EBITD is earnings before interest, taxes, depreciation and amortization divided by total assets. SE represents selling expenses scaled by total sales. R&D is R&D expenditure over total assets. Size is the natural logarithm of total sales. Age is the number of years since the company's inception. The median values are presented in brackets. The difference-test columns are *p*-values from the *t*-test for the mean difference, and the numbers in parentheses indicate *p*-values from the Wilcoxon *z*-test for the median difference

Source(s): Table by authors

Table 3. Mean and median differences in firm characteristics by dividend changes

decrease of 12.5% or more, exhibits the lowest values in EBITD and R&D variables, along with the lowest leverage ratio. This highlights a notable deterioration in the financial status of firms that have reduced their dividends.

Table 4 details the evolution of key firm characteristics from the year of dividend change (t = 0), through the subsequent five years (t = 5). Panel A, focusing on firms with dividend increases, reveals a continuous decline over five years in both the book leverage ratio (−1.76%) and the market leverage ratio (−6.72%). These changes are statistically significant at levels of 5 and 1%, respectively. During the three-year primary analysis period, as emphasized in this study, both leverage ratios exhibit a significant decrease, reflecting the five-year pattern. These changes are statistically significant at the 1% level. Panel B, which analyzes firms experiencing dividend decreases, records an increase in the book leverage ratio over the same five-year period, significant at the 1% level. However, for the market leverage ratio during this period, the observed increase does not reach statistical significance.

3.2 Analysis of changes in capital structure in response to dividend policy changes

This section aims to analyze the impact of changes in dividend policy on the capital structure, specifically the leverage ratio, after controlling for key variables influencing the capital structure. The results of this analysis are presented in Table 5. Panel A, focusing on the book leverage ratio as the dependent variable, shows that the coefficient for the dividend increase dummy variable (Div_Inc) is negatively significant at the 1% level in column (1). In contrast, the coefficient for the dividend decrease dummy variable (Div_Dec) is positively significant at the 1% level. In column (2), which includes industry and year dummy variables as controls, the results are consistent with those in column (1). In column (3), the analysis further controls for key variables influencing capital structure. Column (4) extends this analysis by controlling for additional variables associated with the target leverage ratio, specifically the leverage deficit variable and the three-year variation in target leverage. The analysis consistently reveals a marked decrease in leverage subsequent to dividend increases and a notable increase in leverage following dividend decreases. Panel B, analyzing the market leverage ratio as the dependent variable, yields results that align with those observed in panel A. The analysis with the market leverage ratio also shows that there is a significant reduction in leverage after dividend increases and a significant increase in leverage following dividend decreases.

To summarize, when an increase in dividends signals an upturn in future cash flows, firms are more inclined to favor equity financing over debt. This preference is reflected in a negative correlation with leverage ratios. Conversely, a decrease in dividends, signaling a potential decline in future cash flows, tends to increase the cost of equity capital. As a result, firms may lean toward debt financing rather than equity, indicating a positive correlation between dividend decreases and leverage ratios. Therefore, in cases where substantial increases in dividends reduce information asymmetry, it can be interpreted that there is likely a consequent decrease in the cost of equity capital. This finding holds particular significance as it offers a viable solution for firms facing challenges due to severe information asymmetry.

In reviewing the impacts of changes in dividend policy on leverage ratios, it is noted that significant increases in leverage ratios follow the adoption of dividend increase policies in the US market. This effect is not observed with dividend decreases. Particularly, companies that increase their dividends demonstrate outcomes that are in stark contrast to those seen in the US market, marking a distinct divergence (Cooper and Lambertides, 2018). Cooper and Lambertides (2018) argue that this asymmetry in the US market stems from the discretionary nature of dividend increases, in contrast to the non-discretionary nature of dividend decreases. Unlike in the United States, where dividend policies have long been customary, in South Korea, increases in dividends have often been driven not only by autonomous

Table 4. Characteristics of firms that change dividends over time

Year	0	1	2	3	4	5	Change from 0 to 3 (*p*-value)	Change from 0 to 5 (*p*-value)
Panel A: dividend increases								
Book lev	0.3916	0.3793	0.3733	0.3702	0.3720	0.3740	−0.0214***	−0.0176**
							(0.0031)	(0.0240)
Market lev	0.5254	0.4905	0.4688	0.4609	0.4581	0.4583	−0.0645***	−0.0672***
							(0.0000)	(0.0000)
DIV	0.5645	0.2621	0.2251	0.0803	0.0896	0.1517	−0.4842***	−0.4128***
							(0.0000)	(0.0000)
M/B	0.9695	1.0290	1.0449	1.0249	1.0072	0.9824	0.0554*	0.0129
							(0.0901)	(0.6744)
PPE	0.3041	0.2931	0.2832	0.2765	0.2787	0.2757	−0.0276***	−0.0285***
							(0.0002)	(0.0002)
EBITD	0.1015	0.1046	0.1028	0.0923	0.0845	0.0782	−0.0092***	−0.0232***
							(0.0003)	(0.0000)
SE	0.0273	0.0268	0.0255	0.0249	0.0253	0.0254	−0.0024*	−0.0019
							(0.0949)	(0.1962)
R&D	0.0085	0.0085	0.0083	0.0082	0.0085	0.0085	−0.0003	0.0000
							(0.6973)	(0.9800)
Size	19.7358	19.8169	19.8861	19.9078	19.9145	19.9137	0.1720**	0.1779**
							(0.0140)	(0.0158)
Age	37.2021	38.2021	39.2021	40.2021	41.0450	41.9990	3.0000***	4.7970***
							(0.0001)	(0.0000)
Panel B: dividend decreases								
Book lev	0.3683	0.3739	0.3845	0.4004	0.4149	0.4282	0.0321*	0.0599***
							(0.0719)	(0.0025)
Market lev	0.5255	0.5374	0.5460	0.5464	0.5382	0.5420	0.0209	0.0165
							(0.4090)	(0.5276)
DIV	−0.3388	−0.1480	−0.1510	0.4333	0.3098	0.1933	0.7721***	0.5322***
							(0.0000)	(0.0001)

(*continued*)

Table 4.

Year	0	1	2	3	4	5	Change from 0 to 3 (*p*-value)	Change from 0 to 5 (*p*-value)
M/B	0.9506	1.1512	1.0695	1.0133	0.9815	0.9199	0.0627	−0.0306
							(0.7094)	(0.7321)
PPE	0.3168	0.3152	0.3112	0.3021	0.2981	0.3019	−0.0147	−0.0149
							(0.4210)	(0.4280)
EBITD	0.0655	0.0511	0.0433	0.0428	0.0463	0.0493	−0.0227***	−0.0162***
							(0.0000)	(0.0032)
SE	0.0304	0.0331	0.0335	0.0332	0.0334	0.0336	0.0029	0.0032
							(0.5381)	(0.5075)
R&D	0.0065	0.0071	0.0074	0.0067	0.0070	0.0076	0.0002	0.0011
							(0.9000)	(0.4880)
Size	19.4754	19.4769	19.4667	19.4731	19.4830	19.5791	−0.0023	0.1037
							(0.9869)	(0.4836)
Age	39.8122	40.8122	41.8122	42.8122	43.3581	43.5377	3.0000*	3.7255**
							(0.0715)	(0.0275)

Note(s): This table presents firm characteristics over time for firms that increase or decrease dividends, in panels A and B, respectively. Panel A presents the dividend increases group, which includes firms that increase dividends by 12.5% or more in year t and do not decrease dividends in the following 2 years. Panel B describes the dividend decreases group, encompassing firms that decrease dividends by 12.5% or more in year t and do not increase dividends for the following 2 years. The fiscal year of the dividend change sets date zero (t = 0). Change from 0 to t represents the difference between year 0 and year + t (where t = 3 or 5). Book lev is the book debt to total assets, and market dev is the book debt to the sum of book debt and market equity. DIV is calculated as the difference in annual dividends between year t and year t−1, scaled by the annual dividend of year t−1. M/B is the market-to-book ratio. PPE is property, plant and equipment divided by total assets. EBITD is earnings before interest, taxes, depreciation and amortization divided by total assets. SE represents selling expenses scaled by total sales. R&D is R&D expenditure over total assets. Size is the natural logarithm of total sales. Age is the number of years since the company's inception. The numbers in parentheses are *p*-values from the *t*-test for the mean difference. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Source(s): Table by authors

	(1)	(2)	(3)	(4)
Panel A: book lev$_{[t+3,t]}$				
Div_Inc$_t$	−0.0165***	−0.0132***	−0.0107***	−0.0086***
	(−4.89)	(−3.93)	(−3.24)	(−2.63)
Div_Dec$_t$	0.0366***	0.0327***	0.0276***	0.0267***
	(5.45)	(4.97)	(4.27)	(4.21)
M/B$_t$			0.0030*	0.0019
			(1.76)	(1.20)
PPE$_{[t+3,t]}$			0.1559***	0.0760***
			(6.95)	(3.82)
EBITD$_{[t+3,t]}$			−0.2447***	−0.1388***
			(−8.86)	(−5.67)
Size$_t$			−0.0038***	−0.0024**
			(−4.31)	(−2.32)
R&D$_{[t+3,t]}$			0.4907**	0.3359*
			(2.23)	(1.82)
Age$_t$			0.0009	−0.0013
			(0.46)	(−0.58)
Ind_Lev$_{[t+3,t]}$			0.4141***	0.3445***
			(12.39)	(11.97)
LevDef$_t$				−0.2074***
				(−18.75)
Target_Lev$_{[t+3,t]}$				0.4995***
				(17.95)
Intercept	−0.0044***	−0.0523***	0.0547***	0.0295
	(−2.94)	(−6.59)	(2.62)	(1.27)
Industry dummy	No	Yes	Yes	Yes
Year dummy	No	Yes	Yes	Yes
Observations	11,297	11,297	11,294	10,930
Adj-R^2	0.0038	0.0368	0.1135	0.2270
Panel B: market lev$_{[t+3,t]}$				
Div_Inc$_t$	−0.0191***	−0.0152***	−0.0135***	−0.0183***
	(−3.38)	(−2.95)	(−2.81)	(−3.89)
Div_Dec$_t$	0.0661***	0.0584***	0.0468***	0.0414***
	(6.54)	(6.21)	(5.04)	(4.71)
M/B$_t$			0.0281***	0.0051*
			(11.58)	(1.93)
PPE$_{[t+3,t]}$			0.1925***	0.1177***
			(7.05)	(4.22)
EBITD$_{[t+3,t]}$			−0.3697***	−0.3551***
			(−10.23)	(−10.26)
Size$_t$			0.0045***	0.0050***
			(3.85)	(3.67)
R&D$_{[t+3,t]}$			−0.0546	0.1532
			(−0.24)	(0.72)
Age$_t$			−0.0006	0.0028
			(−0.22)	(0.94)
Ind_Lev$_{[t+3,t]}$			0.4040***	0.3596***
			(14.78)	(14.47)
LevDef$_t$				−0.2380***
				(−22.96)
Target_Lev$_{[t+3,t]}$				0.4415***
				(8.74)

(*continued*)

Table 5. Regression analysis of capital structure changes following dividend changes using leverage ratios

	(1)	(2)	(3)	(4)
Intercept	−0.0450***	−0.0828***	−0.1483***	−0.1042***
	(−21.99)	(−7.96)	(−5.33)	(−3.39)
Industry dummy	No	Yes	Yes	Yes
Year dummy	No	Yes	Yes	Yes
Observations	11,297	11,297	11,294	10,930
Adj-R^2	0.0040	0.1089	0.2270	0.3124

Note(s): This table presents the regression results exploring the impact of changes in dividend policy on firms' leverage ratios. Panel A uses book $lev_{[t+3,t]}$, while panel B uses market $lev_{[t+3,t]}$ as the dependent variable. Book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$ are defined as the changes in book and market leverage from year t to t+3 subsequent to a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 12.5% or more in year t compared to the previous year and does not decrease dividends in the following 2 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 12.5% or more in year t compared to the previous year and does not increase dividends in the following 2 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 5.

corporate decisions but also by pressures from the government, retail investors and foreign investors (Lee and Kim, 2018; Noh, 2018) [8]. Therefore, symmetrical results are observed in South Korea, contrasting with the asymmetrical outcomes in the US market.

3.3 Analysis of capital structure following dividend changes considering target leverage ratios

This section seeks to examine the extent to which alterations in corporate debt policies, following changes in dividend policies, reflect a convergence toward target leverage ratios as postulated by the trade-off theory. Table 6 presents the estimated target leverage ratios and leverage deficits (LevDef) as estimated using stage 1 of Kayhan and Titman's (2007) model, for each dividend increase group and dividend decrease group. Panel A focuses on book leverage, while panel B pertains to market leverage. In panel A, it is observed that for the dividend increase group, target leverage ratios exceed their actual leverage ratios. Similarly, for the dividend decrease group, the target ratios are notably higher than the book leverage ratios. However, this difference is more pronounced in the dividend decrease group, leading to a significant difference in leverage deficit between the two groups, which is statistically significant at the 10% level.

In panel B, our analysis of market leverage ratios reveals a subtle distinction. Companies that opt for dividend increases generally exhibit actual leverage ratios exceeding their target ratios. In contrast, for the dividend decrease group, actual leverage ratios tend to fall short of the target leverage ratios. This suggests that companies within the dividend increase group do not exhibit a leverage deficit, implying they maintain more favorable debt utilization, in contrast to those in the dividend decrease group, which display a pronounced leverage deficit. Although the difference in leverage deficit variables between the two groups is positive, it

	Dividend increases (N = 1,168)		Dividend decreases (N = 299)		Dividend increases minus decreases	
	Mean	Std.dev	Mean	Std.dev	Dif	*p*-value
Panel A: book leverage						
Book lev	0.3916	0.1737	0.3683	0.1818	0.0233	0.0661
Target blev	0.3951	0.1026	0.3920	0.0934	0.0031	0.6748
LevDef	−0.0035	0.1471	−0.0241	0.1420	0.0206	0.0516
Panel B: market leverage						
Market lev	0.5254	0.2824	0.5255	0.2733	−0.0001	0.9963
Target mlev	0.5214	0.1159	0.5335	0.1067	−0.0121	0.1423
LevDef	0.0039	0.2495	−0.0078	0.2465	0.0117	0.5159

Note(s): This table shows the average leverage, target leverage and deficits for firms that increase or decrease dividends at the time of change. Panel A presents the results obtained using the book leverage ratio, while panel B shows the results obtained using the market leverage ratio. Dividend increases group includes firms that increase dividends by 12.5% or more in year t and do not decrease dividends in the following 2 years. Dividend decreases group includes firms that decrease dividends by 12.5% or more in year t and do not increase dividends for the following 2 years. Book lev is the book debt to total assets, and market lev is the book debt to the sum of book debt and market equity. Target blev and target mlev are estimated using stage 1 of Kayhan and Titman (2007), using book leverage and market leverage, respectively. Levdef is the difference between actual leverage and target leverage. The *t*-test results for the mean difference between the two groups with the corresponding *p*-values are presented in the last two columns

Source(s): Table by authors

Table 6. Target leverage ratios and leverage deficits of dividend-changing firms

falls short of statistical significance. To summarize, for firms increasing dividends, no consistent outcomes were observed in relation to target debt levels. However, firms decreasing dividends were found to utilize less debt than their target leverage ratios, indicating that the role of target leverage ratios in determining capital structure is marginal.

Our prior analysis of capital structure changes following substantial shifts in dividend policies indicated significant adjustments in capital structure in response to dividend changes. This raises the possibility that changes in firms' leverages might be a regression toward target leverage ratios, according to the trade-off theory, independent of dividend changes. Thus, this chapter aims to thoroughly analyze the impact of target leverage ratios and leverage deficits on corporate debt policies. It examines the outcomes for firms categorized into two distinct groups: those with actual leverage ratios above their targets, and those with ratios below their targets. This enables a detailed examination of whether achieving target leverage ratios is a primary factor driving changes in capital structure. If the empirical findings align with our earlier analysis, it could indicate that target leverage ratios are not the primary drivers of changes in capital structure. The results of this analysis are presented in Table 7.

In panel A, employing book leverage ratios for the analysis, we examine firms whose actual leverage ratios exceed their target levels. The findings across columns (1) and (2) reveal a consistent negative coefficient for the dividend increase variable. Specifically, this negative relationship is statistically significant in column (1). However, upon adjusting for the leverage deficit and target leverage ratio variables in column (2), the significance of this relationship disappears. The coefficient for the dividend decrease variable is positive and significant at the 10% level in column (1). This significance intensifies to 5% in column (2) following the inclusion of variables related to target leverage. In columns (3) and (4), where the analysis focuses on the group with actual leverage ratios lower than the target levels, both the dividend increase variable and the dividend decrease variable exhibit negative and positive coefficients, respectively, each achieving statistical significance. In panel B, which utilizes

	Above target leverage		Below target leverage	
	(1)	(2)	(3)	(4)
Panel A: book lev$_{[t+3,t]}$				
Div_Inc$_t$	−0.0116**	−0.0066	−0.0108**	−0.0091**
	(−2.34)	(−1.34)	(−2.34)	(−2.02)
Div_Dec$_t$	0.0198*	0.0232**	0.0249***	0.0261***
	(1.82)	(2.26)	(3.30)	(3.37)
M/B$_t$	0.0053**	−0.0009	0.0045*	0.0049*
	(2.18)	(−0.36)	(1.90)	(1.87)
PPE$_{[t+3,t]}$	0.1969***	0.0763***	0.1426***	0.0787***
	(6.19)	(2.73)	(5.17)	(3.00)
EBITD$_{[t+3,t]}$	−0.2823***	−0.1776***	−0.1583***	−0.0997***
	(−7.24)	(−5.03)	(−4.41)	(−3.03)
Size$_t$	0.0042**	0.0039**	−0.0068***	−0.0065***
	(2.54)	(2.45)	(−6.08)	(−5.34)
R&D$_{[t+3,t]}$	0.3452	0.2320	0.5579**	0.4552*
	(1.27)	(0.97)	(2.04)	(1.85)
Age$_t$	0.0016	0.0018	−0.0008	−0.0025
	(0.51)	(0.57)	(−0.27)	(−0.85)
Ind_Lev$_{[t+3,t]}$	0.4371***	0.3690***	0.3114***	0.2882***
	(10.59)	(10.04)	(7.77)	(7.83)
LevDef$_t$		−0.2584***		−0.1944***
		(−10.74)		(−8.54)
Target_Lev$_{[t+3,t]}$		0.6091***		0.3949***
		(17.00)		(10.70)
Intercept	−0.1023***	−0.0871**	0.1218***	0.0943***
	(−2.82)	(−2.43)	(4.39)	(3.32)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Observations	5,616	5,333	5,678	5,597
Adj-R^2	0.1279	0.2319	0.1084	0.1588
Panel B: market lev$_{[t+3,t]}$				
Div_Inc$_t$	−0.0175**	−0.0188***	−0.0158***	−0.0175***
	(−2.47)	(−2.66)	(−2.76)	(−3.02)
Div_Dec$_t$	0.0650***	0.0600***	0.0230**	0.0235**
	(5.41)	(4.97)	(1.99)	(2.05)
M/B$_t$	0.0950***	0.0602***	0.0129***	0.0037
	(6.75)	(3.83)	(6.94)	(1.48)
PPE$_{[t+3,t]}$	0.2217***	0.1174***	0.1934***	0.1030***
	(6.43)	(3.13)	(5.88)	(3.05)
EBITD$_{[t+3,t]}$	−0.3434***	−0.3985***	−0.3149***	−0.3366***
	(−6.74)	(−7.64)	(−7.55)	(−7.88)
Size$_t$	0.0116***	0.0110***	0.0021	0.0019
	(5.37)	(4.87)	(1.48)	(1.16)
R&D$_{[t+3,t]}$	−0.1512	0.3007	−0.1510	0.1136
	(−0.37)	(0.76)	(−0.66)	(0.49)
Age$_t$	0.0065	0.0076	0.0004	0.0018
	(1.34)	(1.54)	(0.13)	(0.50)
Ind_Lev$_{[t+3,t]}$	0.3734***	0.3604***	0.3673***	0.3557***
	(10.24)	(10.06)	(11.54)	(12.04)
LevDef$_t$		−0.1556***		−0.2310***
		(−6.20)		(−9.84)
Target_Lev$_{[t+3,t]}$		0.4769***		0.4095***
		(6.35)		(6.56)

Table 7.
Regression analysis of capital structure changes following dividend changes considering target leverage ratios

(*continued*)

	Above target leverage		Below target leverage	
	(1)	(2)	(3)	(4)
Intercept	−0.3615***	−0.2828***	−0.0437	−0.0910**
	(−7.76)	(−5.85)	(−1.16)	(−2.14)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Observations	5,772	5,604	5,522	5,326
Adj-R^2	0.1713	0.1968	0.2190	0.2627

Note(s): This table presents the regression results exploring the impact of changes in dividend policy on firms' leverage ratios, with the analysis partitioned by whether a firm's actual leverage is above or below its target leverage. Panel A uses book $lev_{[t+3,t]}$ as the dependent variable, while panel B uses market $lev_{[t+3,t]}$. Book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$ are defined as the changes in book and market leverage from year t to t+3 subsequent to a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 12.5% or more in year t compared to the previous year and does not decrease dividends in the following 2 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 12.5% or more in year t compared to the previous year and does not increase dividends in the following 2 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 7.

market leverage ratios as the dependent variable, a significant reduction in leverage ratios is observed in both groups – those with actual leverage ratios above and those below their target levels – following increases in dividends. In contrast, a pronounced decrease in dividend payouts leads to a significant increase in leverage ratios. These findings suggest that the trade-off theory might have limitations in fully explaining capital structure adjustments.

According to the trade-off theory, firms are expected to adjust their leverage toward the target ratio regardless of whether dividends increase or decrease. Specifically, firms with actual leverage ratios above the target should reduce their debt, whereas those with leverage below the target should increase it to align with the target ratio. However, our findings consistently show that leverage ratios significantly decrease in both groups– those with actual leverage above and those below the target ratios – following an increase in dividend policies. In contrast, substantial reductions in dividend payouts are followed by a notable increase in leverage ratios. These findings, therefore, suggest that the trade-off theory may not offer a sufficient comprehensive explanation for capital structure dynamics.

3.4 Analysis of capital structure following dividend changes considering information asymmetry

Existing research indicates that the degree of information asymmetry between management and external investors may impact the selection of capital financing methods (Shleifer and Vishny, 1997; La Porta *et al.*, 2000; Kim and Kim, 2017). Companies experiencing significant information asymmetry tend to follow the pecking-order theory more closely (Myers and Majluf, 1984; Bharath *et al.*, 2009). In the previous section, we observe significant changes in

capital structure following major alterations in dividend policies, which are interpreted as strong and positive signals conveyed through dividends. These signals enhance the company's reputation and effectively reduce the information asymmetry between investors and managers. Consequently, they address the fundamental drivers of the cost of equity financing, leading to cost reduction. This section is dedicated to an in-depth analysis of how information asymmetry influences corporate capital financing strategies. Our methodology entails dividing firms into two categories: those with high levels of information asymmetry, and those with low levels.

This study aims to investigate how firms adapt their capital financing strategies following significant changes in dividend policies. To achieve this, we categorize firms into two distinct groups according to their levels of information asymmetry, using proxies for information asymmetry commonly used in previous research: daily stock return volatility (Comprix *et al.*, 2011; Lang and Lundholm, 1993; Leuz and Verrecchia, 2000; Moeller *et al.*, 2007) and firm size (Vermaelen, 1981). The daily stock return volatility reflects the varying perceptions and reactions among investors, often driven by the asymmetrical distribution of information in the stock market (Comprix *et al.*, 2011; Lang and Lundholm, 1993; Leuz and Verrecchia, 2000; Moeller *et al.*, 2007). It is calculated as the standard deviation of a firm's daily stock price returns. Information asymmetry occurs when market participants have different amounts and qualities of information, and greater information asymmetry leads to increased market uncertainty and greater price volatility. Firm size serves as an additional criterion for distinguishing information asymmetry (Vermaelen, 1981). According to prior research, smaller firms generally attract less market attention, produce limited relevant information and therefore have constrained information availability. In contrast, larger firms attract higher levels of investor and media attention, leading to demands for regular and comprehensive information disclosure, making them more likely to share information transparently. The findings are presented in Table 8.

Panel A of Table 8 presents the analysis results using daily stock return volatility as a proxy for information asymmetry. The sample firms are divided into two groups, depending on whether their daily stock return volatility is above or below the median value. In the group with higher information asymmetry (above median), where daily stock return volatility exceeds the median, the coefficient for the dividend increase variable is statistically significant and negative. On the contrary, the coefficient for the dividend decrease variable exhibits a statistically significant positive value. This indicates a trend in firms with high information asymmetry, where leverage ratios decrease following dividend increases and increase following dividend decreases. For the group with lower information asymmetry (below median), the coefficient of the dividend increase variable is not statistically significant for book leverage but shows a statistically significant negative value for market leverage. On the other hand, the coefficients of the dividend decrease variables show a statistically significant positive value, either book or market leverage. Importantly, the magnitude and significance of these coefficients are more pronounced in the subset of firms experiencing higher levels of information asymmetry.

Panel B presents the analysis results, categorizing firms into the top 50% and bottom 50% based on the median value of firm size. This resemblance to the results in panel A reinforces the consistency of the observed trends across different measures of information asymmetry. In the subset characterized by higher information asymmetry levels (below median), the coefficient for the dividend increase variable is negatively significant, while for the dividend decrease variable, it shows a positively significant value. For firms with lower information asymmetry levels (above median), the coefficient for the dividend increase variable lacks statistical significance in the context of book leverage but is negatively significant for market leverage. On the contrary, the coefficients of the dividend decrease variables are statistically

	Above median		Below median	
	Book $lev_{[t+3,t]}$ (1)	Market $lev_{[t+3,t]}$ (2)	Book $lev_{[t+3,t]}$ (3)	Market $lev_{[t+3,t]}$ (4)
Panel A: using an annual standard deviation of daily returns				
Div_Inc_t	−0.0126**	−0.0240***	−0.0063	−0.0133**
	(−2.46)	(−3.36)	(−1.54)	(−2.16)
Div_Dec_t	0.0370***	0.0569***	0.0206***	0.0365***
	(3.51)	(4.15)	(2.71)	(3.37)
M/B_t	0.0023	0.0047*	0.0021	0.0030
	(1.23)	(1.71)	(0.69)	(0.62)
$PPE_{[t+3,t]}$	0.0852***	0.1184***	0.0656**	0.1184***
	(3.41)	(3.22)	(2.53)	(3.25)
$EBITD_{[t+3,t]}$	−0.1326***	−0.3182***	−0.1398***	−0.4096***
	(−4.27)	(−7.09)	(−4.12)	(−8.56)
$Size_t$	−0.0024	−0.0004	−0.0025**	0.0100***
	(−1.63)	(−0.23)	(−2.19)	(5.54)
$R\&D_{[t+3,t]}$	0.2125	0.0921	0.5149**	0.1980
	(0.86)	(0.34)	(2.28)	(0.59)
Age_t	−0.0032	0.0011	0.0007	0.0049
	(−1.07)	(0.27)	(0.28)	(1.31)
$Ind\_Lev_{[t+3,t]}$	0.3869***	0.3782***	0.3005***	0.3435***
	(9.54)	(11.38)	(9.27)	(10.81)
$LevDef_t$	−0.2476***	−0.2459***	−0.1751***	−0.2405***
	(−16.30)	(−16.75)	(−14.44)	(−18.67)
$Target\_Lev_{[t+3,t]}$	0.5217***	0.4578***	0.4739***	0.4455***
	(14.69)	(6.72)	(13.17)	(6.84)
Intercept	0.0524	0.0228	0.0950***	−0.1093***
	(1.57)	(0.55)	(3.61)	(−2.81)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Observations	5,306	5,306	5,624	5,624
Adj-R^2	0.2463	0.3091	0.2049	0.3249
Panel B: using a market capitalization				
Div_Inc_t	−0.0048	−0.0185***	−0.0150***	−0.0189**
	(−1.13)	(−3.33)	(−2.76)	(−2.45)
Div_Dec_t	0.0136*	0.0223**	0.0335***	0.0586***
	(1.73)	(2.09)	(3.45)	(4.52)
M/B_t	0.0042**	0.0042	−0.0067	0.0343***
	(2.31)	(1.61)	(−0.75)	(3.29)
$PPE_{[t+3,t]}$	0.1204***	0.1474***	0.0409	0.0877**
	(4.28)	(3.83)	(1.56)	(2.33)
$EBITD_{[t+3,t]}$	−0.1501***	−0.4777***	−0.1219***	−0.2338***
	(−4.58)	(−11.00)	(−3.41)	(−4.62)
$Size_t$	−0.0020	0.0014	0.0034	0.0113***
	(−1.45)	(0.77)	(1.58)	(3.27)
$R\&D_{[t+3,t]}$	0.1678	0.2231	0.5440*	0.1842
	(0.81)	(0.94)	(1.85)	(0.48)
Age_t	−0.0012	0.0027	−0.0013	0.0093*
	(−0.47)	(0.81)	(−0.32)	(1.70)
$Ind\_Lev_{[t+3,t]}$	0.3590***	0.3501***	0.3201***	0.3446***
	(9.44)	(11.11)	(7.73)	(10.16)

(*continued*)

Table 8.
Regression analysis of capital structure changes following dividend changes considering information asymmetry

	Above median		Below median	
	Book $lev_{[t+3,t]}$ (1)	Market $lev_{[t+3,t]}$ (2)	Book $lev_{[t+3,t]}$ (3)	Market $lev_{[t+3,t]}$ (4)
$LevDef_t$	−0.1985***	−0.2257***	−0.2428***	−0.2655***
	(−13.51)	(−13.78)	(−13.36)	(−15.79)
$Target\_Lev_{[t+3,t]}$	0.5032***	0.4529***	0.4963***	0.4086***
	(13.23)	(6.86)	(13.33)	(5.77)
Intercept	−0.0012	−0.1462***	−0.0618	−0.2210***
	(−0.04)	(−3.42)	(−1.37)	(−3.26)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Observations	5,477	5,477	5,453	5,453
Adj-R^2	0.2519	0.3474	0.2272	0.2471

Note(s): This table reports the regression results exploring the impact of changes in dividend policy on firms' leverage ratios stratified by information asymmetry level. Panel A features the results segmented by the median value of the annual standard deviation of daily returns, while panel B represents the results divided by the median market capitalization; both measures serve as a proxy for information asymmetry. The dependent variables are book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$, which indicate the changes in book and market leverage from year t to t+3 after a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 12.5% or more in year t compared to the previous year and does not decrease dividends in the following 2 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 12.5% or more in year t compared to the previous year and does not increase dividends in the following 2 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 8.

significant and positive. These coefficients are more predominant in the subsample with higher information asymmetry levels.

In conclusion, our findings reveal significant changes in capital structure following a significant increase or decrease in dividends in the high information asymmetry group, consistent with our previous analyses. However, within the group characterized by low information asymmetry, the coefficients show either reduced statistical significance or lower effect sizes compared to those in the subgroup with higher information asymmetry levels. These results robustly support our central hypothesis, which posits that significant increases in dividends serve as a powerful and positive signal to the market. This effectively narrows the information gap between investors and corporate management, addresses the fundamental factors driving the cost of equity financing and consequently leads to modifications in the capital structure.

4. Robustness test

4.1 Analysis of capital structure following dividend changes with varied time intervals

To enhance the robustness of our analysis, this section extends the observation period for both capital structure and control variables from the initial three years to four years

following dividend policy changes. The analysis employs the methodology outlined in Table 5, with the outcomes presented in Table 9. Aligned with the results in Table 5, the extended analysis indicates that significant dividend increases lead to a decreased reliance on debt financing, while considerable decreases in dividends correspond to increased debt financing. This effect is due to the powerful signaling conveyed by dividend changes,

	Book $lev_{[t+4,t]}$ (1)	Market $lev_{[t+4,t]}$ (2)
Div_Inc_t	−0.0095**	−0.0191***
	(−2.36)	(−3.33)
Div_Dec_t	0.0322***	0.0446***
	(4.44)	(4.41)
M/B_t	0.0017	0.0094***
	(0.94)	(2.68)
$PPE_{[t+4,t]}$	0.0774***	0.1302***
	(3.85)	(4.72)
$EBITD_{[t+4,t]}$	−0.1089***	−0.3543***
	(−3.98)	(−9.42)
$Size_t$	−0.0034***	0.0067***
	(−2.60)	(3.82)
$R\&D_{[t+4,t]}$	0.5129**	0.2856
	(2.57)	(1.25)
Age_t	−0.0018	0.0027
	(−0.60)	(0.70)
$Ind\_Lev_{[t+4,t]}$	0.3524***	0.3706***
	(10.98)	(13.50)
$LevDef_t$	−0.2488***	−0.2928***
	(−18.06)	(−23.03)
$Target\_Lev_{[t+4,t]}$	0.5677***	0.4434***
	(18.79)	(7.96)
Intercept	0.0502*	−0.1304***
	(1.71)	(−3.31)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Observations	10,155	10,155
Adj-R^2	0.2671	0.3546

Note(s): This table presents the regression results exploring the impact of changes in dividend policy on firms' leverage ratios, with an adjustment to a four-year time interval for evaluation for both dependent and independent variables. The dependent variables are book $lev_{[t+4,t]}$ and market $lev_{[t+4,t]}$, which indicate the changes in book and market leverage from year t to t+4 after a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 12.5% or more in year t compared to the previous year and does not decrease dividends in the following 2 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 12.5% or more in year t compared to the previous year and does not increase dividends in the following 2 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+4,t]}$ is property, plant and equipment divided by total assets between years t+4 and t. $EBITD_{[t+4,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+4 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+4,t]}$ is R&D expenditure over total assets between years t+4 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+4,t]}$ is the industry's average leverage over four years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+4,t]}$ is the difference in target leverage between years t+4 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 9. Regression analysis with varied time intervals

which trigger adjustments in the capital structure. An increase in dividends signals anticipated improvements in future cash flows, reducing the cost of equity capital and thus prompting firms to prefer equity over debt for financing. In contrast, a decrease in dividends indicates expected reductions in future cash flows, increasing the cost of equity capital, which leads firms to lean toward debt financing rather than equity. To sum up, extending the analysis period for both the dependent and control variables reveals that ongoing increases in dividends exert a persistent influence on capital financing behavior, affirming the earlier findings of this study.

4.2 Analysis of capital structure following dividend changes with various dividend criteria

To augment the robustness of our research, we refine the definition of voluntary dividend policies and conduct further analysis [9]. Koh and Park (2014) and Kim and Kim (2019) define firms that voluntarily pay low or no dividends – despite profitability above the industry median – as the basis for their empirical investigations. They point out the crucial difference between profitable firms choosing not to pay dividends and less profitable ones being forced to withhold dividends. Adopting this methodology, we carry out additional analyses. The results are detailed in Table 10. The analysis shows that an increase in dividends leads to a significant decrease in both the book and market leverage ratios. In contrast, reductions in dividends are associated with significant rises in both book and market leverage ratios.

Additionally, the analysis is conducted with the dividend threshold adjusted from the initial 12.5%–8%, and the outcomes are presented in Table 11. The results, which utilize both book leverage ratio and market leverage ratio as dependent variables, align closely with the main findings of this research.

In a concluding robustness test, Table 12 utilizes modified dummy variables to assess changes in dividends. These variables are assigned a value of 1 if a firm, after adjusting its dividends by at least 12.5% from the previous year, does not reverse its dividend direction – either by increasing or decreasing – in the subsequent three years. This extension of the observation period from two years to three years makes the analysis more rigorous. The results of this analysis remain broadly consistent with the primary conclusions of our study.

5. Conclusion

This study conducts a comprehensive analysis of the relationship between changes in corporate dividend policies and future capital structures in the Korean stock market, integrating capital structure and dividend payout theories. The objective is to elucidate the intentions behind dividend payments by observing patterns of continuous change. The findings indicate that increases in corporate dividends significantly reduce both book and market leverage ratios, whereas decreases in dividends lead to significant increases. This evidence strongly supports the notion that dividends function as significant positive signals, enhancing a firm's reputation, mitigating information asymmetry between investors and management and thereby reducing the cost of equity financing.

We further investigate the influence of dividend policy on corporate financing strategies, considering both target leverage and the level of information asymmetry. The results reveal that, regardless of the target leverage, firms increasing dividends tend to reduce their dependence on leverage for capital funding, while those reducing dividends are observed to increase their leverage usage. Moreover, when examining firms categorized by their levels of information asymmetry, we discover that among those with higher information asymmetry, the dividend increase variable significantly negatively affects leverage, whereas the dividend decrease variable has a significantly positive effect. For the group with lower information asymmetry, the analysis reveals that the coefficient of the dividend increase variable shows no significant

	Book $lev_{[t+3,t]}$ (1)	Market $lev_{[t+3,t]}$ (2)
Div_Inc_t	−0.0063*	−0.0100*
	(−1.66)	(−1.89)
Div_Dec_t	0.0122***	0.0090*
	(3.50)	(1.85)
M/B_t	0.0024	0.0049*
	(1.55)	(1.86)
$PPE_{[t+3,t]}$	0.0772***	0.1173***
	(3.89)	(4.18)
$EBITD_{[t+3,t]}$	−0.1328***	−0.3514***
	(−5.43)	(−10.07)
$Size_t$	−0.0017*	0.0057***
	(−1.65)	(4.12)
$R\&D_{[t+3,t]}$	0.3516*	0.1781
	(1.92)	(0.84)
Age_t	−0.0015	0.0029
	(−0.67)	(0.99)
$Ind\_Lev_{[t+3,t]}$	0.3435***	0.3615***
	(11.98)	(14.52)
$LevDef_t$	−0.2151***	−0.2426***
	(−19.21)	(−23.22)
$Target\_Lev_{[t+3,t]}$	0.5004***	0.4502***
	(18.07)	(8.90)
Intercept	0.0146	−0.1188***
	(0.63)	(−3.82)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Observations	10,930	10,930
Adj-R^2	0.2273	0.3109

Note(s): This table shows the regression results exploring the impact of changes in dividend policy on firms' leverage ratios, using the alternative measure for the voluntariness of dividend changes. The dependent variables are book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$, which indicate the changes in book and market leverage from year t to t+3 after a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm's profitability is lower than the industry median, and its cash dividend to total assets ratio is higher than the industry median in year t, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm's profitability is higher than the industry median and its cash dividend to total assets ratio is lower than the industry median in year t, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 10. Regression analysis with an alternative voluntariness dividend proxy

relationship when the dependent variable is book leverage. Furthermore, when considering market leverage as the dependent variable, the coefficients for both the dividend increase and decrease variables in the lower information asymmetry group are found to be comparatively smaller and less significant than in the higher information asymmetry subgroup.

In conclusion, this study demonstrates that firms in domestic markets, characterized by higher information asymmetry than in advanced capital markets, can mitigate these

	Book $lev_{[t+3,t]}$ (1)	Market $lev_{[t+3,t]}$ (2)
Div_Inc_t	−0.0089***	−0.0200***
	(−2.86)	(−4.36)
Div_Dec_t	0.0239***	0.0396***
	(3.90)	(4.67)
M/B_t	0.0019	0.0050*
	(1.19)	(1.90)
$PPE_{[t+3,t]}$	0.0762***	0.1182***
	(3.83)	(4.23)
$EBITD_{[t+3,t]}$	−0.1387***	−0.3549***
	(−5.67)	(−10.26)
$Size_t$	−0.0024**	0.0051***
	(−2.29)	(3.74)
$R\&D_{[t+3,t]}$	0.3357*	0.1519
	(1.82)	(0.72)
Age_t	−0.0013	0.0027
	(−0.59)	(0.92)
$Ind\_Lev_{[t+3,t]}$	0.3449***	0.3599***
	(11.98)	(14.51)
$LevDef_t$	−0.2077***	−0.2383***
	(−18.79)	(−23.02)
$Target\_Lev_{[t+3,t]}$	0.4999***	0.4412***
	(17.97)	(8.73)
Intercept	0.0291	−0.1052***
	(1.25)	(−3.43)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Observations	10,930	10,930
Adj-R^2	0.2270	0.3128

Note(s): This table presents the regression results exploring the impact of changes in dividend policy on firms' leverage ratios, applying an 8% dividend threshold – a modification from the previously used 12.5%. The dependent variables are book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$, which indicate the changes in book and market leverage from year t to t+3 after a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 8% or more in year t compared to the previous year and does not decrease dividends in the following 2 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 8% or more in year t compared to the previous year and does not increase dividends in the following 2 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 11.
Regression analysis with revised 8% dividend threshold

challenges through consistent dividend policies. It is anticipated that this will offer investors critical insights into the dividend policies and capital financing strategies of domestic companies, underscoring the vital role of consistent dividend strategies in mitigating information asymmetry.

	Book $lev_{[t+3,t]}$ (1)	Market $lev_{[t+3,t]}$ (2)
Div_Inc_t	−0.0099***	−0.0184***
	(−2.60)	(−3.19)
Div_Dec_t	0.0209**	0.0521***
	(2.47)	(4.83)
M/B_t	0.0019	0.0051*
	(1.22)	(1.95)
$PPE_{[t+3,t]}$	0.0764***	0.1180***
	(3.84)	(4.22)
$EBITD_{[t+3,t]}$	−0.1378***	−0.3521***
	(−5.62)	(−10.18)
$Size_t$	−0.0024**	0.0049***
	(−2.32)	(3.63)
$R\&D_{[t+3,t]}$	0.3365*	0.1583
	(1.83)	(0.74)
Age_t	−0.0012	0.0029
	(−0.55)	(0.98)
$Ind\_Lev_{[t+3,t]}$	0.3452***	0.3608***
	(11.99)	(14.52)
$LevDef_t$	−0.2078***	−0.2381***
	(−18.75)	(−22.98)
$Target\_Lev_{[t+3,t]}$	0.5001***	0.4430***
	(17.97)	(8.77)
Intercept	0.0295	−0.1038***
	(1.26)	(−3.38)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Observations	10,930	10,930
Adj-R^2	0.2261	0.3117

Note(s): This table presents the regression results exploring the impact of changes in dividend policy on firms' leverage ratios, with a focus on the changes observed in three years (from year t to t+3) following a change in dividend. The dependent variables are book $lev_{[t+3,t]}$ and market $lev_{[t+3,t]}$, which indicate the changes in book and market leverage from year t to t+3 after a dividend change, respectively. The independent variables are given below. Div_Inc_t is a dummy variable that equals 1 if a firm increases its dividend by 12.5% or more in year t compared to the previous year and does not decrease dividends in the following 3 years, and 0 otherwise. Div_Dec_t is a dummy variable that equals 1 if a firm decreases its dividend by 12.5% or more in year t compared to the previous year and does not increase dividends in the following 3 years, and 0 otherwise. M/B_t is the market-to-book ratio in year t. $PPE_{[t+3,t]}$ is property, plant and equipment divided by total assets between years t+3 and t. $EBITD_{[t+3,t]}$ is earnings before interest, taxes, depreciation and amortization divided by total assets between years t+3 and t. Size is the natural logarithm of total sales in year t. $R\&D_{[t+3,t]}$ is R&D expenditure over total assets between years t+3 and t. Age_t is the natural logarithm of firm age in year t. $Ind\_Lev_{[t+3,t]}$ is the industry's average leverage over three years. $Levdef_t$ is the difference between actual leverage and the target leverage in year t. $Target\_Lev_{[t+3,t]}$ is the difference in target leverage between years t+3 and t. The target leverage is estimated using stage 1 of Kayhan and Titman (2007). The numbers in parentheses are *t*-values and estimated using robust standard errors that adjust for heteroskedasticity and firm clustering. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively

Source(s): Table by authors

Table 12. Regression analysis considering the changes in dividends up to 3 years later

Notes

1. There are other theories related to dividends, such as the residual theory of dividends, life cycle theory and dividend catering theory.
2. Additionally, other theories related to capital structure include Baker and Wurgler's (2002) market timing theory and Welch's (2004) inertia theory.

3. Baskin (1989) analyzes that an increase in past dividends leads to higher future cash needs, thereby becoming a factor in increasing the debt ratio. Additionally, Aggarwal and Kyaw (2010) analyze the interdependence between capital structure and dividend policy of multinational companies. As a result, they find that multinational companies provide high dividends and, in case of insufficient funds for dividend payment, through debt issuance.
4. To consider the possibility that the impact of book and market leverage may differ, this paper utilizes both variables to compare the results (Welch, 2004; Cooper and Lambertides, 2018).
5. Grullon *et al.* (2002) and Cooper and Lambertides (2018) explicitly state that dividend initiation and cessation are not considered when constructing the dividend change variables. Therefore, we maintain the same conditions in this paper.
6. To simplify the notation, hereafter we use $BookLev_{[t+3,t]}$ or $MarketLev_{[t+3,t]}$ to represent changes in book or market leverage, respectively.
7. After removing the impact of extreme values of cash dividends, the minimum and maximum values of dividends are similar to the criteria of Grullon *et al.* (2002) and Cooper and Lambertides (2018).
8. "Government's Push for 'Increase Dividends' Leads to Significant Surge in Cash Dividends Last Year." Edaily, 8 February 2015.; "Shareholders Demand 'Increase Dividends,' Government Prioritizes 'Capital Soundness' . . . Dilemma in the Financial Sector." Chosun Ilbo, 7 February 2023.
9. We are indebted to an anonymous referee for this test.

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Corresponding author
Yu Kyung Lee can be contacted at: yukyunglee@pknu.ac.kr