

Taxes, Payout Policy, and Share Prices: Evidence from DID Analysis Using Korea's 2015–2017 Dividend Tax Cut

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The Korean government temporarily lowered dividend tax rates for investors of firms that significantly increased dividend payments in 2015–2017. This study begins by examining whether qualifying firms on average increased dividends after controlling for other factors of dividends and how additional dividend payouts were financed. Unsurprisingly, we find that qualifying firms for the dividend tax cut increased dividends substantially without incurring a substitution effect between dividends and share repurchases. The main question of this study, which is the effect of the dividend tax cut on share prices, is investigated using the difference-in-differences analysis in the propensity score matched sample. We find that the dividend tax cut increased the value of firms that took advantage of the tax cut by 22%, which is consistent with agency theory and the prevailing Korean discount in the financial market.

JEL Classification: E62, H31

Keywords: Agency Theory, Dividend Tax Cut, Difference in Difference Estimation, Payout Policy, Share Prices

I. Introduction

In 2014, the Korean government introduced a temporary dividend tax cut that lasted three years, from 2015 through 2017. The tax bill reduced the dividend income tax for “high-dividend companies” that had increased their dividend payments above the criteria set by the government. By offering lower tax rates to this

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group of high-dividend companies, this policy intended to stimulate dividend growth in Korean corporations.

This study investigates the effect of the dividend tax cut from the perspective of its implications on payout policies and valuation effects. Accordingly, we answer the following questions: (1) Did the qualifying firms increase their dividend payouts after controlling for other factors of dividends? (2) How did the qualifying firms finance the additional dividends payments? (3) Did the share prices of the qualifying firms increase between 2015 and 2017 and after 2018? (4) Is the found association between dividend and share price robust to third factors and sample selection?

Given that firms' decision to take advantage of the tax cut provision is endogenous in nature, there is a need to control for potential biases in quantifying the effect of dividend tax cuts. To address this issue, we adopted a difference-in-differences (DID) analysis augmented with propensity score matching (PSM). Our approach differs from that of prior research that has attempted to examine the impact of dividend tax cuts on payout policy (e.g., Lee and Lee, 2019), which mainly adopted simple regression models.

Investigating the effect of dividends on share prices observed in the Korean 2015–2017 dividend tax cut episode is intriguing in several ways. *Exogenous* changes in dividends caused by the temporary dividend tax cut are well suited for investigating the positive valuation effects of increasing dividends as predicted in agency theory of dividend payments (Jensen, 1986). Given that the exogenous tax change results in an increase in dividend payout, our empirical investigation of the effect of dividends on the valuation mitigated potential estimation biases from the reverse causality and spurious correlation caused by third factors. Changes observed in the dividend payouts were sizable and enabled us to identify the economically significant valuation effects arising from increasing dividends.

Our results show that the qualifying firms raised dividend payments sharply: 0.43%p in terms of the dividend-asset ratio from column (5) of Table 5 and 0.17%p in terms of the dividend-EBIT ratio from column (5) of Table 7. However, they did not decrease the share repurchase significantly. The impact was economically significant as well, considering that the dividend–asset ratio for an average firm was 1.18% during the study period. This finding suggests that the dividend tax cut from 2015 to 2017 led to the significant growth of corporate payouts in Korean corporations as the tax bill intended. The qualifying firms increased their cash dividends sharply without reducing their share repurchases, implying substantial growth in the corporations' overall payout to shareholders.

Our PSM estimations indicate that the share prices of firms taking advantage of the tax cut increased approximately by 22%. Interestingly, the valuation effects persisted even after the temporary dividend tax cut expired in 2018. The found effect is considerably larger than those found in previous studies, such as 2.01%–4.88%

between 1967 and 1996 in the US (Crawford, Franz, and Lobo, 2005) and 1.81% between 2008 and 2015 in the US as well (Khanal and Mishra, 2017).

Our finding of the substantial effect of dividends on share prices may be closely associated with the “Korean discount” phenomenon, which refers to the low share prices of Korean stocks owing to low-dividend propensity and the non-transparent operation of firms. If a temporary tax cut induced firms to pay larger dividends that lowered the Korean discount for the qualifying firms in the tax cut period and thereafter, then the hike in share prices must be included as an additional benefit of the dividend tax cut.

This study contributes to the literature in the following ways. First, we provide strong evidence of the positive relationship between dividend payouts and share prices. Previous studies have mostly used the event-study methodology (e.g., Amromin, Harrison, and Sharpe, 2008; Nguyen and Wang, 2013; Kuo and Lee, 2013; Khanal and Mishra, 2017) to examine the effect of dividends on share prices. We used the dividend tax cut as a pseudo-natural experiment that induced firms to pay larger cash dividends, thereby limiting the potential endogeneity of dividend payout decisions in investigating the effect of dividends on share prices. This increase in cash dividends can be treated as totally exogenous with respect to share prices. The reason is that the increase is mainly driven by the tax benefit incentives from the changes in the tax code.

The preceding finding suggests a potentially significant role for dividend tax cuts in mitigating the agency problem between CEOs and shareholders via changing the corporate payout policy, which remains generally unexamined in the existing literature. This finding is consistent to agency theory of dividends. Agency theory posits that a large sum of dividends reduces free cash flow for self-interested CEOs that is highly likely to be used for value destructive investments. Accordingly, an increase in dividend payments may enhance the value of firms significantly by reducing value destructive free cash flow inside corporations. In addition to a considerably high value of firms, a growth in dividend payments also leads to efficiency gain. Chetty and Saez (2010) used an agency model, in which managers and shareholders have conflicting interests, and showed that low dividend taxation encourages managers to pay out profits to shareholders instead of unproductive projects, thereby creating first-order deadweight gain.

The Korean financial market is an ideal place to examine the effect of dividend growth on the value of corporations through the lens of agency theory. The Korean market is well known for its low dividend payout propensity. Such a low propensity is one of the key factors behind “the Korean discount” that is a markedly low valuation of Korean firms considering their financial performances. Another well-known characteristic of the Korean market is the prevailing managerial entrenchment problems. For example, *chaebol* is a special type of family-owned conglomerate that typically has subsidiaries across diverse industries with members

of the founding family in ownership or management positions. Despite several *chaebol*-related reforms, the founding families continue to dominate the companies from the sidelines and have fostered a cult of personality that prioritizes loyalty.

We also provide empirical evidence supporting the positive effect of dividend tax cut on dividend payout by adopting a set of estimation methods to mitigate endogeneity biases. Whether or not dividend tax cuts are effective in increasing dividend payments is still an ongoing debate. Chetty and Saez (2005); Brown, Liang, and Weisbenner (2007); and Cha and Lee (2007) confirmed the positive effect of dividend tax cuts on payouts. Other studies (e.g., Edgerton 2013; Lee and Hong 2020) have questioned the positive association between dividend tax and payouts. We used the DID estimation augmented with PSM to evaluate the effect of tax benefits on dividend policy, strongly confirming the positive effect of dividend tax cuts.

Lastly, Korean firms' payout policy response to tax cuts does not support the widely accepted substitution effect between dividend payments and share repurchases. Grullon and Michaely (2002) found that some increases in share repurchases in the 1980s and 1990s came at the cost of a reduction (or lack of increase) in dividend payments in the US. Brown, Liang, and Weisbenner (2007) confirmed that an increase in dividends is accompanied by a decrease in share repurchases in the dividend tax cut of 2003 in the US. We robustly found no significant substitution effect between dividend and share repurchases during the dividend tax cuts.

Note that the substitution hypothesis is generally not supported in the Korean financial market. Kim et al. (2012) argued that Korean firms tend to use dividends and share repurchase simultaneously when they have internal resources to be paid out. By contrast, our finding is generally consistent with the results of Grullon and Michaely (2004), which highlight the role of share repurchase in decreasing free cash flow, similar to dividends payments, and in mitigating agency conflicts between CEOs and shareholders. Profitability is substantially high within the qualifying firms, which is closely associated with a large amount of free cash flow generation in CEOs' hands.

The remainder of this paper is organized as follows. Section 2 reviews the literature on dividend taxes, dividends, and share prices. Section 3 describes our empirical methods and data. Section 4 discusses the regression results. Lastly, Section 5 concludes this paper by presenting the summary and discussion.

II. Literature Review

Changes in dividend taxes can affect various corporate behaviors, including payouts, financing, and investments. The four theories on dividend payouts and

stock valuation are agency cost theory, signaling theory, dividend tax capitalization, and liquidity of investors. First, agency cost theory of dividends (Jensen, 1986) posits that larger cash dividends lead to higher share prices through smaller, free cash flows to self-interested managers. The following empirical studies have mainly compared cash and stock dividends that do not drain free cash flows to test the theory.

Second, signaling theory emphasizes the role of dividends in revealing insider information. This theory predicts that larger dividends, which are interpreted as a good signal for future earnings, lead to higher share prices. However, Wooldridge (1983) argued that firms' cash dividends may not increase share prices if they are related to lack of profitable investment opportunities.

Third, dividend tax capitalization theory posits that future dividend taxes are capitalized in share prices. The theory predicts that larger dividend payments decrease share prices because they increase the proportion of payouts subject to a heavier tax burden. Dividend tax cuts lead to high share prices because they reduce these tax burdens. Capitalization theory implies that lower dividend taxes, similar to the Korean 2015–2017 dividend tax cut, have counter-balancing effects on share prices, a direct positive effect from the actual dividend tax cut, and an indirect negative effect from large dividend payouts.

Lastly, a branch of theory highlights the implication of the limited liquidity of investors on share prices. Investors with limited liquidity favor dividend-paying stocks, which increase the demand for stocks with large dividend payments. Consequently, larger cash dividends are expected to be associated with higher share prices, but larger stock dividends are not.

The effects of dividend tax policy changes have been examined widely as well. Chetty and Saez (2005) examined the US dividend tax reductions in 2003 and showed that dividend payments and the number of firms paying dividends significantly increased after the US' 2003 dividend tax cut. Brown, Liang, and Weisbenner (2007) found that managerial stock option holdings played a significant role in shaping heterogeneous effects on corporations from the dividend tax cut of 2003. Amromin, Harrison, and Sharpe (2008) found that high-dividend stocks outperform low-dividend ones by a few percentage points over event windows. However, they did not find any imprint of the dividend tax cut news on the value of the aggregate US stock market. These findings suggest that tax cuts may have induced asset reallocation within equity portfolios.

Several international studies have confirmed the effects of dividend tax and imputation system on dividend payments. These studies include Alstadsæter and Jacob (2016) (on Sweden), Pattenden and Twite (2008) (on Australia), and Chan and Lin (2017) (on Taiwan).

Our study is also closely related to the dividend and tax policy changes in the Korean financial market. The low-dividend payout propensity of Korean companies

has been considered one of the primary causes of the “Korea discount,” which is a lower share value of Korean companies than other comparable Asian, American, or European companies (Noh, 2018). Choi et al. (2012) reported that the “Korea discount” are significantly present after controlling for other relevant factors, and that this discount has significantly eased in recent years.¹ Hong and Ju (2006) examined how the introduction of financial income composite taxation on net income influences the payout policy of Korean corporations. Suh and Sim (2007) examined the extent to which the valuation of Korean firms is low relative to comparable firms in other countries. They found that the prevalence of short-term speculation in the Korean stock market is related to Korea discount. Hwang and Kim (2014) investigated the response of investors and dividend-paying firms to the 2012 tax amendment to lower the threshold of global taxation on financial income. Lee and Lee (2019) examined the effect of the 2015–2017 dividend tax cut on corporate payout policies based mainly on simple regression methods with a short time period. Lee and Hong (2020), who used the same 2015–2017 dividend tax cut similar to our study, argued that dividend tax cut has a negligible effect on increasing corporate payout with non-listed firms as the treatment group. Their use of non-listed firms as a treatment group is problematic in a DID estimation. The reason is that the parallel path assumptions are hardly satisfiable because of the significant characteristic differences between listed and non-listed companies. Cho et al. (2021) found that the IFRS adoption of Korea in 2011 contributed in reducing the Korea discount.

Although our study focuses on the relationship between *cash* dividend growth and share prices, a branch of the literature has examined the effect of *stock* dividends on corporate valuation, which is more easily identifiable (Wooldridge, 1983). This branch of studies generally finds positive market responses around the announcement dates of stock dividends, although the evidence is weak in some studies. Crawford, Franz, and Lobo (2005) used data from 1967 to 1996 and investigated reactions to stock dividend announcements for the 1967–1976, 1977–1986, and 1987–1996 periods. They found the impact on stock prices to be significantly positive but decreasing in magnitude (i.e., 4.88%, 3.24%, and 2.01%, respectively) over the sampled periods. Khanal and Mishra (2017) reported in a review paper that positive relationships are observed across such countries as Greece, Turkey, India, Oman, and Taiwan.

A wide range of theories posit potential explanation on the determination of share

¹ Ramstad (2007b, as in Choi et al., 2012) noted: “... Even after South Korea met developed-market income qualifications in 2003, the firms that create indexes expressed concerns from market volatility to weak dividend payouts to the risk of trouble from neighboring North Korea ... After FTSE and MSCI criticized the low level of dividends paid by South Korean companies, the government, which owns the Korean stock exchange, in 2004 encouraged companies to change by creating an index of the top 50 companies based on dividends.”

repurchase policy as well. Closes to this work, the substitution hypothesis considers share repurchase as an alternative way of corporate payout (Grullon and Michaely, 2002). Li and McNally (2000) highlighted the role of share repurchase as a signaling tool similar to the signaling hypothesis in the dividend payout policy. Grullon and Michaely (2004) emphasized the role of share repurchase in reducing free cash flow and, thus, agency costs, within corporations.

III. Empirical Specification and Data

Korea’s 2015–2017 dividend tax cut decreased the withholding tax rate on dividend income earned on stocks held in listed companies (from 14% to 9%) and allowed financial income, which had been taxed at a progressive rate of personal income taxes, to be taxed separately at a flat 25% rate. For investors to qualify for this dividend tax cut, dividend payments had to come from firms satisfying the criteria for a “high-dividend company.” The three types of criteria are as follows. “Type 1” was applied to listed stocks, the dividend payout ratios or yields of which were over 120% of the market average. In addition, total dividend payouts increased by over 10% from the previous year. “Type 2” was applied to publicly traded companies, the dividend payout ratios or yields of which were over 50% of the market average. Total dividend payouts increased by over 30% compared with that in the previous year. “Type 3” was applied to newly listed stocks and stocks with no previous dividend payouts. These firms were required to pay dividends over 130% of the market average.

[Table 1] Qualification conditions for the dividend tax cuts

	Dividend payout ratios	Dividend increase
Type 1	Over 120% of the market average	Above 10%
Type 2	Over 50% of the market average	Above 30%
Type 3	Newly listed firms with dividends over 130% of the market average	

The dividend tax cut was designed to stimulate the cash dividend payout of Korean corporations. However, firms’ increase in cash dividend may not necessarily imply an increase in the total payout to shareholders. Firms may simultaneously reduce share repurchase, possibly inducing the tax cut’s ambiguous effects on the total payout. Contrary to this substitution effect, if the factors of the qualifying firms, such as profitability or excessive cash holdings, are associated positively with dividends and repurchase, the third factors would imply that these firms may increase share repurchase and cash dividends. To understand the economic effect of dividend tax cuts on payout policy, changes in dividend and share repurchase must be examined.

Examining the effect of tax cut on share price is considerably more intriguing than examining its effect on payout because the former can test competing theories on dividend payments. A positively persistent effect of dividend payments on share prices can be accommodated most appropriately by agency cost theory of dividends. As long as actual dividend payouts are larger than investors' expectations during and after dividend tax cuts, price continuously increases because such a large cash dividend confines the free cash flow to self-interested CEOs. Signaling theory also predicts a positive relationship between dividends and share prices. However, the theory relies on the mechanism revealing insider information to shareholders, implying a hike in share prices only during the event window of dividend announcements and not afterward. Wooldridge (1983) argued that the growth of cash dividends may reduce share prices if it is closely related to lack of profitable investment opportunities.

To address the preceding issues, this study examined firms listed on the KOSPI and KOSDAQ markets from 2009 to 2018. We deliberately chose the sample period to control for external firm value variations from large events, such as the influence of the COVID-19 pandemic. We used the KIS-Value database to obtain the financial statements of the sample firms. We excluded financial and utility firms because of their distinct regulatory environments, which may affect dividend payouts and share prices. We also excluded firm year-observations reporting negative earned equity in their financial statements. We used the dividend–asset ratio (Dv/A) as a measure of dividend. We also experimented with the dividend–EBIT ratio ($Dv/EBIT$), which has considerably few observations because we change the dividend–EBIT ratio missing when EBIT is negative. We also used share repurchases (Rep/A) and change in cash holding ($\Delta Cash/A$) as dependent variables to examine the substitution and third-factor effects among dividend payments, share repurchases, and cash holdings. We used adjusted share price (Prc_Adj) as a measure for share prices.

To control for omitted variable biases, we included a set of firm characteristic variables. We used *EBIT* to determine firm profitability (*ROA*). Debt variable (*Dbt*) determines a firm's total debt obligations, and cash (*Csh*) represents a firm's cash holdings. The three variables are normalized by total assets. The lifecycle aspect of a corporation (DeAngelo, DeAngelo, and Skinner, 2008) is determined by the ratio of retained to total earnings. We also considered the degree of controlling and foreign shareholdings. The logarithm and growth rate of total assets are also included. In the stock valuation equation, we also considered the book value per share (*BPS*) and earnings per share (*EPS*) variables in line with the valuation model of Ohlson (1995).

The DID approach was adopted to investigate the effect of dividend tax cuts in the Korean financial market. Although the introduction of a tax cut is an exogenous variation in the financial market, the DID approach may remain subject to

estimation biases because becoming an actual qualifying firm is an endogenous decision.

To resolve the aforementioned endogeneity problems, we incorporated PSM into the DID estimations. PSM is a statistical matching method that estimates the average treatment effect of a policy or treatment by considering covariates that predict receiving the treatment. The pairing of treatment and control units with similar values on PSM enables us to have markedly reliable coefficient estimates. The matching method requires strong assumptions that the marginal return is the average return, conditional on observables (Heckman and Navarro-Lozano, 2004). One benefit of such strong assumptions is the weak requirements around other features of the underlying economic model, including the separability of outcomes and exogeneity of regressors (Heckman and Navarro-Lozano, 2004). Posner, Ash, Freund, Moskowitz, and Schwartz (2001) suggested considering PSM and instrumental variable analysis when there are concerns with group differences in measured covariates and differences in unmeasured covariates, respectively.

IV. Empirical Results

This section presents our empirical results. We start with the descriptive statistics, set-up of PSM, DID analysis of dividends, share repurchases, change in cash holding, and DID analysis of share prices.

4.1. Descriptive statistics

Table 2 provides the number of firms, aggregated dividends, and shares in the overall dividends for the *HIGH* and *OTH* groups for 2015, 2016, 2017, and 2018. The *HIGH* group is defined as a group of corporations enjoying tax benefits at least once during the tax cut period, serving is an indicator of the treatment in our analysis. About 20% of firms took advantage of the dividend tax cut at least once between 2015 and 2017, while almost 10% of firms did so each year. By contrast, the *High* indicator represents the set of corporations under the benefits of dividend tax cuts for a specific fiscal year. Similarly, the *High1*, *High2*, and *High3* variables refer to companies satisfying the tax cut criteria for *Type 1*, *Type 2*, and *Type 3*, respectively, for each fiscal year.

Table 2 presents the significant role of qualifying firms in aggregate dividend payments. Although these firms account for only about 20% of the entire sample, their contribution to the aggregate dividends had been large and increased from 48% in 2015 to 56% in 2017. The role of the *High2_t* group was particularly significant in 2016 and 2017. This group paid out 27%–31% of aggregate dividends, although it accounted for 3%–4% of the sample. The total amount of dividends

increased significantly from 15 trillion won in 2015 to 21 trillion won in 2017, indicating an increase of 43% over two years.

[Table 2] Description of the sample

	Year	<i>HIGH</i>	<i>OTH</i>	<i>High_t</i>	<i>High1_t</i>	<i>High2_t</i>	<i>High3_t</i>	<i>Oth_t</i>	Total
Number of Firms (share, each year, %)	2015	346 (21.5%)	1,263 (78.5%)	148 (9.2%)	68 (4.2%)	63 (3.9%)	17 (1.1%)	1,461 (90.8%)	1,609 (100%)
	2016	355 (19.9%)	1,433 (80.1%)	176 (9.8%)	93 (5.2%)	68 (3.8%)	15 (0.8%)	1,612 (90.2%)	1,788 (100%)
	2017	355 (19.0%)	1,514 (81.0%)	169 (9.0%)	93 (5.0%)	56 (3.0%)	20 (1.1%)	1,700 (90.6%)	1,869 (100%)
	2018	355 (19.0%)	1,509 (81.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1,864 (100%)	1,864 (100%)
	2015	7,235 (48.3%)	7,740 (51.7%)	2,362 (15.8%)	1,313 (8.8%)	961 (6.4%)	89 (0.6%)	12,614 (84.2%)	14,976 (100%)
	2016	9,398 (52.7%)	8,440 (47.3%)	6,704 (37.6%)	1,769 (9.9%)	4,823 (27.0%)	112 (6.3%)	11,133 (62.4%)	17,838 (100%)
	2017	12,067 (56.2%)	9,422 (43.8%)	9,077 (42.5%)	2,242 (10.5%)	6,699 (31.4%)	135 (0.6%)	12,260 (57.5%)	21,489 (100%)
	2018	15,242 (59.5%)	10,373 (40.5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	25,615 (100%)	25,615 (100%)

Table 3 shows the summary statistics of the sample firms. The mean, standard deviation, and median of the variables are presented for the entire sample. The mean value for the *HIGH* and *OTH* groups are reported as well. We also investigated the time-series variations in dividend policy and share prices. Figures 1 and 2 show the mean value of the dividend–asset ratios and adjusted share prices for each fiscal year for the PSM matched sample (i.e., Panels (1) and (3)) and the entire sample (i.e., Panels (2) and (4)). Panels (1) and (2) show the unweighted averages, and Panels (3) and (4) present the weighted averages.

Table 3 shows that the dividend–asset ratio in *HIGH* firms is significantly higher than that in other firms. The mean level of the dividend–asset ratio is 1.33 for the *HIGH* group, which is substantially higher than the corresponding value of 0.44 for the *OTH* group. Figure 1 shows that this tendency to pay large dividends by *HIGH* firms is observed throughout the sample period. This tendency appears intensified by a substantial increase in dividend payout by *HIGH* firms after the introduction of the dividend tax cut. Panel (1) of Figure 1 shows that the control and treatment groups in the PSM sample have a similar level of and trend in dividend payouts before the introduction of the dividend tax cut, and an evidently different trend after the introduction of the dividend tax cut. Panel (4) of Figure 1 shows the asset-weighted averages of dividend payouts using the entire sample, indicating that dividend payouts of Korean firms have generally increased significantly since 2015.

HIGH firms led this significant increase in payouts in Korean firms during the sample period.

The averages of adjusted share prices of the entire sample are higher in *OTH* firms than in *HIGH* firms. However, investigating separately before and after the introduction of the dividend tax cut reveals that share prices of *HIGH* firms show a strong increasing trend after the introduction of the tax cut (see Figure 2). Panel (1) of Figure 2 shows that this stronger increasing trend in the share prices of *HIGH* firms becomes more evident when the PSM sample was used.

Figures 1 and 2 show that estimations using the PSM sample are preferred to those using the entire sample in terms of satisfying parallel path assumptions for DID estimation. Figure 1 shows that the PSM and entire samples appear to satisfy

[Table 3] Summary statistics

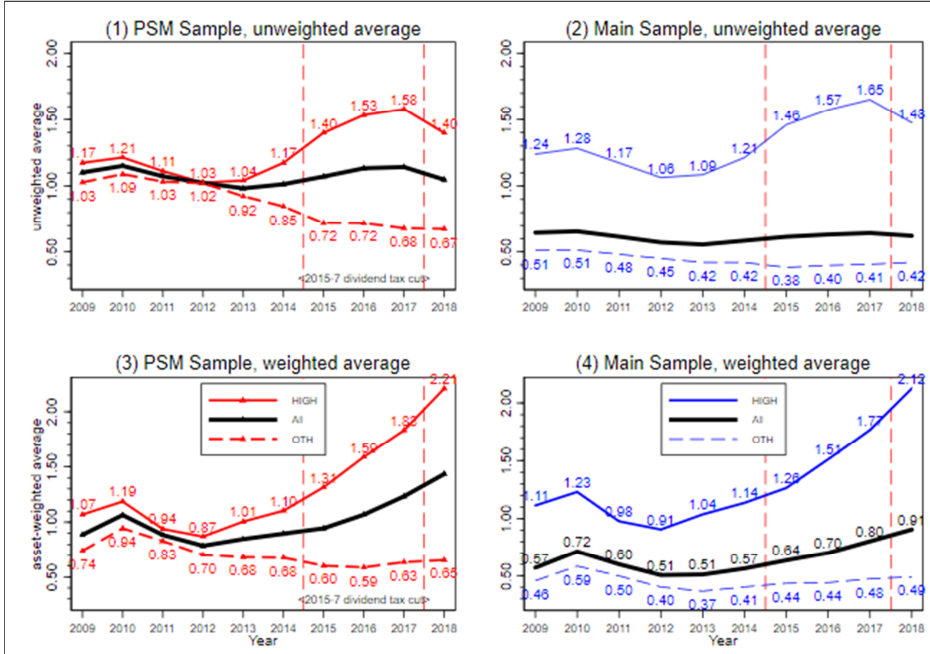
Samples (no. of observations)		All (16,358)					<i>HIGH</i> (3,215)	<i>OTH</i> (13,143)
Variables	Descriptions	Mean	(Std. Dev)	[Med]	Min	Max	Mean	Mean
Dv/A^\dagger	Dividends / asset, %	0.61	(0.96)	[0.21]	0.00	5.34	1.33	0.44
Dvc/A^\dagger	Cash dividends / asset, %	1.12	(1.14)	[0.79]	0.00	6.79	1.52	0.93
Dvs/A^\dagger	Stock dividends / asset, %	0.01	(0.04)	[0.00]	0.00	0.31	0.00	0.01
Rep/A^\dagger	Share repurchase / asset, %	0.29	(1.45)	[0.00]	0.00	80.01	0.37	0.26
$\Delta Csh/A^{\dagger\dagger}$	Change in cash / asset, %	-0.01	(0.12)	[0.00]	-3.94	0.78	0.00	-0.01
$Dv/EBIT^\ddagger$	Dividends / EBIT, %	0.13	(0.68)	[0.04]	0.00	65.66	0.24	0.10
Prc_Adj	Adj share price (2014 = 1)	1.35	(3.10)	[1.00]	0.03	269.2	1.18	1.40
<i>HIGH</i>	<i>HIGH</i> , firm dummy	0.20	(0.40)	[0.00]	0.00	1.00	1.00	0.00
<i>ContS</i>	Controlling shareholdings, %	40.20	(16.97)	[39.65]	0.00	100.00	44.16	39.23
<i>ForS</i>	Foreign shareholdings, %	6.88	(11.88)	[1.90]	0.00	89.73	8.91	6.39
<i>ROA</i>	Return (EBIT) on asset, %	2.30	(11.05)	[3.82]	-53.16	24.21	7.17	1.11
<i>Csh</i>	Cash / asset, %	17.02	(15.32)	[12.05]	0.00	70.54	19.36	16.45
$Dbt^{\dagger\dagger}$	Leverage/asset, %	42.49	(20.58)	[42.36]	0.68	90.49	35.48	44.21
R/TE^\dagger	Retained ~ / total earnings, %	21.67	(99.95)	[48.03]	-640.4	102.00	62.19	11.75
$M/BV^{\dagger\dagger}$	Market ~ / book value, %	132.27	(90.06)	[103.61]	15.48	608.01	124.29	134.22
(A)	Log of total asset	19.09	(1.49)	[18.80]	13.10	26.55	19.22	19.06
A^\dagger	Growth rate of total asset, %	10.49	(28.26)	[5.19]	-46.40	166.07	10.57	10.47
$Sales^\dagger$	Growth rate of sales %	10.78	(40.75)	[4.58]	-65.95	262.29	11.47	10.61
Bps	Book value per share	24.25	(103.65)	[5.43]	-83.07	3013.07	27.72	23.40
Eps	Earnings per share	1.46	(9.29)	[0.24]	-280.5	321.03	2.40	1.22
$ContS_A33$	$\min\{ContS\} > 33\%$, dummy	0.48	(0.50)	[0.00]	0.00	1.00	0.64	0.44
Csh_Med	$\min\{Csh\} > \text{median}$, dummy	0.14	(0.35)	[0.00]	0.00	1.00	0.24	0.12
Dbt_Med	$\min\{Debt\} > \text{median}$, dummy	0.17	(0.38)	[0.00]	0.00	1.00	0.14	0.18
ROA_SD	Standard deviation of <i>ROA</i>	6.72	(5.35)	[4.99]	0.00	43.50	4.37	7.30

Note: † Winsorized at (1, 99).

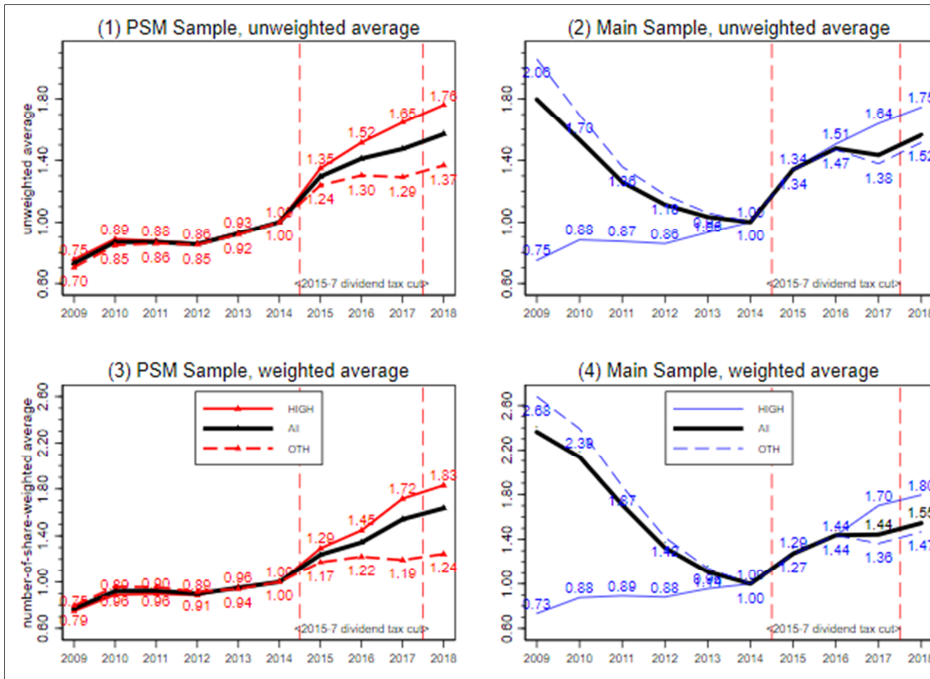
†† Winsorized at (0, 99).

‡ Replaced with missing when EBIT is negative. Number of observations are 15,837, 3,104, and 12,733 for the entire sample, *HIGH*, and *OTH*, respectively.

[Figure 1] Trend in the dividends–asset ratio in percent, 2009–2018



[Figure 2] Trend in normalized adjusted share price, 2009–2018



Note: Adjusted share price is normalized to be one in year 2014 for each firm.

the parallel path assumptions for variations in the dividend–asset ratio before the initiation of dividend tax cuts. However, variations in adjusted share prices are significantly different between the PSM and entire samples. Share prices of the treatment and control groups move in concert in the PSM sample, as shown in Panels (1) and (3). However, the entire sample shown in Panels (2) and (4) indicates that *HIGH* group companies show upward price movements (blue line), while *OTH* group companies show downward price trends (dotted blue line).

4.2. Set-up of the PSM sample

Table 3 shows that the *HIGH* and *OTH* groups in the entire sample show significantly different firm characteristics. To control for potential bias resulting from such characteristics, we conducted a DID analysis of payouts and share prices using the matched samples based on PSM. To set-up the PSM sample, we first constructed firm-level cross-sectional data of the averages of variables for the period between 2010 and 2014 (i.e., before the introduction of the tax cut).

In addition to all independent variables in payouts and share price regressions, as a candidate for confounders, we added firm dummy to control for shareholdings over 33%,² firm dummy for the cash–asset ratio higher than the yearly median, and firm dummy for the debt–asset ratio higher than the yearly median during the sample period. The within-firm standard deviation of return on assets is included as well. The four variables are time-invariant and are presumed to have close associations with a corporation’s innate characteristics.

Table 4 presents standardized differences between the *HIGH* and *OTH* groups in the entire sample and in the constructed PSM sample. We used nine variables with the standardized differences above 0.4 (see Column (3) of Table 4) as confounders. In the constructed PSM sample using the nine confounders, the standardized difference between the treatment and control groups are below 0.26 for all variables (see Column (6) of Table 4). Average dividends and average share prices of the two groups using the PSM sample show considerably similar level and trend before 2014, while those using the entire sample show extremely different levels and trends. Averages of dividends of the treatment and control groups using the PSM sample have diverged since 2014, while those of share prices have diverged since 2015. This result suggests that firms had begun to respond to the tax cut in 2014 and that share prices of the *HIGH* group only began to increase since 2015, one year after firms in the *HIGH* group increased their dividends.

² Brown et al. (2007) indicated that controlling shareholders have strong incentives to enjoy tax benefits and are capable of changing payout policies if their shareholdings are significantly large. Foreign shareholders do not have any incentive to demand large dividends in the face of the tax cut because they are not eligible for it. Consistent with this prediction, large foreign shareholdings are not associated with becoming qualifying firms.

[Table 4] Standardized difference for the PSM and entire samples

	(1)	(2)	(3)	(4)	(5)	(6)
		Main sample (n = 1,773)		Propensity score matched sample (n = 644)		
	mean in treated	mean in untreated	standardized difference	mean in treated	mean in untreated	standardized difference
<i>ContS</i>	44.83	39.25	0.354	45.03	45.3	-0.019
<i>ForS</i>	7.85	6.08	0.146	7.7	9.33	-0.126
<i>ROA</i> [†]	7.14	0.2	0.803	7.04	7.27	-0.048
<i>Csh</i>	19.45	16.12	0.233	19.07	19.07	0.000
<i>Dbt</i> [†]	36.88	46.3	-0.510	37.18	37.78	-0.034
<i>R/TE</i> [†]	60.56	1.78	0.708	60.46	62.13	-0.070
<i>M/BV</i>	117.01	124.27	-0.113	114.84	116.95	-0.033
(<i>A</i>)	19.11	18.97	0.097	19.11	19.38	-0.188
<i>A</i>	10.83	8.62	0.167	10.94	12.06	-0.097
<i>Sales</i>	12.95	10.75	0.108	13.1	11.23	0.112
<i>chaebol</i>	0.12	0.13	-0.048	0.12	0.17	-0.154
<i>kospi_mkt</i>	0.38	0.39	-0.033	0.38	0.5	-0.259
<i>bps</i>	26.29	22.61	0.036	26.77	36.68	-0.077
<i>eps</i>	2.22	1.01	0.150	2.25	2.92	-0.072
<i>ContS_A33</i> [†]	0.64	0.42	0.455	0.64	0.65	-0.005
<i>Csh_Med</i> [†]	0.27	0.11	0.403	0.26	0.25	0.026
<i>Dbt_Med</i>	0.14	0.17	-0.099	0.14	0.2	-0.158
<i>ROA_SD</i> [†]	4.38	7.89	-0.717	4.39	4.14	0.101
<i>Dv/A</i> [†]	1.16	0.44	0.808	1.1	0.98	0.128
<i>Rep/A</i>	0.34	0.26	0.109	0.32	0.39	-0.072
<i>Cash/A</i>	0.01	-0.01	0.291	0.01	0.01	0.079
<i>ROA × Dv/A</i> [†]	11.44	3.44	0.571	10.68	8.92	0.118
<i>R/TE × Dv/A</i> [†]	77.26	26.73	0.740	73.23	64.72	0.116

Note: Samples used in Table 5 are cross-sectional data of averages for each firm using years from 2010 to 2014 (i.e., before treatment). In the main sample, there are 10 variables with standardized differences above 0.40 in the absolute value. In the PSM sample, there are no variables with standardized differences above 0.26 in the absolute value.

[†]Nine variables are used as confounders in the logit estimation of the *HIGH* variable. The nine variables have standardized differences over 0.40 in the absolute value.

4.3. Regression results of payout and cash holdings

We conducted a DID regression analysis of firm-level payout and cash holdings. Table 5 shows whether and how much dividends increased in the *HIGH* firms after the introduction of the tax cut. Columns (1) to (3) use the sample of all firms. Columns (4) to (6) use the matched subsamples from PSM. Columns (1) and (4) report the regression results without control variables, and the others report those with control variables. Columns (3) and (6) control for firm fixed effects (FE).

[Table 5] Dividend–asset ratio, OLS, baseline estimations

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variables	<i>Dv/A</i>					
Sample	All			PSM		
Fixed effect?	No	No	Yes	No	No	Yes
<i>HIGH</i> ×	0.4300**	0.3997**	0.4313**	0.6344**	0.4310**	0.4432**
<i>Aft15</i>	(0.0485)	(0.0417)	(0.0421)	(0.0594)	(0.0495)	(0.0471)
<i>HIGH</i>	0.7080**	0.4131**		0.1135	0.1170*	
	(0.0621)	(0.0462)		(0.0771)	(0.0577)	
<i>Aft15</i>	−0.0636**	−0.1046**	−0.1120**	−0.2828**	−0.2272**	−0.1452*
	(0.0159)	(0.0238)	(0.0251)	(0.0390)	(0.0569)	(0.0676)
<i>ContS</i>		0.0054**	0.0029*		0.0081**	0.0086 ⁺
		(0.0009)	(0.0014)		(0.0022)	(0.0047)
<i>ForS</i>		0.0097**	0.0068**		0.0091**	0.0075*
		(0.0018)	(0.0020)		(0.0033)	(0.0032)
<i>ROA</i>		0.0248**	0.0141**		0.0565**	0.0453**
		(0.0013)	(0.0009)		(0.0045)	(0.0037)
<i>Csh</i>		0.0072**	0.0050**		0.0067**	0.0077**
		(0.0011)	(0.0008)		(0.0021)	(0.0017)
<i>Dbt</i>		−0.0063**	−0.0044**		−0.0078**	−0.0087**
		(0.0007)	(0.0007)		(0.0017)	(0.0020)
<i>R/TE</i>		0.0000	−0.0005**		0.0012	0.0013
		(0.0001)	(0.0001)		(0.0010)	(0.0017)
<i>M/BV</i>		0.0010**	0.0008**		0.0018**	0.0009*
		(0.0002)	(0.0001)		(0.0005)	(0.0004)
(<i>A</i>)		−0.0187	−0.0226		−0.0988**	−0.0533
		(0.0161)	(0.0228)		(0.0328)	(0.0599)
<i>A</i>		−0.0021**	−0.0007**		−0.0041**	−0.0017**
		(0.0003)	(0.0002)		(0.0007)	(0.0006)
<i>Sales</i>		−0.0001	0.0003*		0.0001	0.0003
		(0.0002)	(0.0001)		(0.0005)	(0.0004)
Observations	16,358	16,358	16,358	6,014	6,014	6,014
<i>R</i> ²	0.1466	0.4144	0.1357	0.0498	0.4374	0.2555

Note: Cluster-robust standard errors in parentheses; ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

Year, industry, chaebol, and KOSPI market dummies are included but not reported.

Table 5 confirms that the *HIGH* group firms increased their dividend payments substantially in 2015–2017, as shown in Table 2 and Figure 1. The *HIGH* group increased its dividend–asset ratios approximately by 0.4 percentage points compared with the control group. This value is economically significant as well. The average dividend–asset ratio of the high group was 1.0%–1.1% before 2014 (see Figure 1), and an increase of 0.4 percentage points implies a 40% increase in the dividend–asset ratio. Columns (3) and (6) show that the estimated coefficients of the interaction term of the *HIGH* and treatment period dummies remain significant when firm FE is added. In Columns (4) and (6) where the PSM sample is used, the

estimated coefficients of the interaction terms increase. These findings are consistent with the literature verifying the significant effect of the dividend tax cut on firms’ payout policies (Chetty and Saez, 2005; Alstadsæter and Jacob, 2016; Pattenden and Twite, 2008; Chan and Lin, 2017).

Table 6 presents the regression results of the dividend/EBIT ratio as the dependent variable. Given that dividend/EBIT is changed missing when EBIT is negative, the number of observations decreased to 15,837 and 5,774 for the entire and PSM samples, respectively. Qualitative regression results in Table 6 are remarkably similar to those in Table 5. Columns (1) to (3) use the entire sample

[Table 6] Dividend–EBIT ratio, OLS, baseline estimations

Dep. variables Sample Fixed effect?	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Dv/EBIT</i>					
	All			PSM		
	No	No	Yes	No	No	Yes
<i>HIGH</i> ×	0.1052** (0.0259)	0.1010** (0.0257)	0.1001** (0.0261)	0.1499** (0.0520)	0.1809** (0.0555)	0.1552** (0.0399)
<i>Afi15</i>	0.0924** (0.0166)	0.0594** (0.0164)		−0.0253 (0.0463)	−0.0138 (0.0377)	
<i>Afi15</i>	−0.0091 (0.0123)	−0.0205 (0.0170)	0.0124 (0.0221)	−0.0516 (0.0460)	−0.0283 (0.0515)	−0.0270 (0.0600)
<i>ContS</i>		0.0015** (0.0003)	0.0006 (0.0006)		0.0015* (0.0006)	0.0000 (0.0030)
<i>ForS</i>		0.0026 (0.0021)	0.0059 (0.0061)		0.0062 (0.0050)	0.0149 (0.0141)
<i>ROA</i>		−0.0016** (0.0004)	−0.0030** (0.0005)		−0.0185** (0.0030)	−0.0200** (0.0037)
<i>Csh</i>		0.0011* (0.0005)	−0.0000 (0.0005)		0.0030* (0.0014)	0.0008 (0.0012)
<i>Dbt</i>		−0.0007 (0.0008)	−0.0011** (0.0003)		−0.0002 (0.0023)	−0.0014 (0.0018)
<i>R/TE</i>		0.0003** (0.0001)	0.0002** (0.0001)		0.0005 (0.0005)	0.0014+ (0.0008)
<i>M/BV</i>		−0.0002** (0.0001)	−0.0000 (0.0001)		0.0002 (0.0002)	0.0003 (0.0003)
(<i>A</i>)		−0.0157 (0.0136)	−0.0264 (0.0263)		−0.0568 (0.0390)	−0.1087 (0.1101)
<i>A</i>		−0.0002** (0.0001)	0.0002* (0.0001)		−0.0002 (0.0004)	0.0007+ (0.0004)
<i>Sales</i>		−0.0002** (0.0001)	−0.0002** (0.0001)		−0.0003 (0.0002)	−0.0004 (0.0002)
Observations	15,837	15,837	15,837	5,774	5,774	5,774
<i>R</i> ²	0.0075	0.0217	0.0065	0.0018	0.0268	0.0207

Note: Cluster-robust standard errors in parentheses; ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.
Year, industry, chaebol, and KOSPI market dummies are included but not reported.

[Table 7] Share repurchases and changes in cash, OLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. variables	<i>share repurchases / Asset</i>				<i>ΔCash / Asset</i>			
Sample	All		PSM		All		PSM	
Fixed effect?	No	Yes	No	Yes	No	Yes	No	Yes
<i>HIGH</i> ×					−0.0091*	−0.0125*		
<i>Afi15</i>	0.1179*	0.1278*	−0.0010	0.0436	*	*	−0.0052	−0.0090*
	(0.0526)	(0.0515)	(0.1033)	(0.0907)	(0.0031)	(0.0038)	(0.0037)	(0.0045)
<i>HIGH</i>	−0.0286		−0.0919		0.0020		0.0024	
	(0.0379)		(0.0706)		(0.0023)		(0.0028)	
<i>Afi15</i>								−0.0241*
	−0.0045	−0.0500	−0.0682	0.0850	0.0118**	−0.0168**	0.0073	*
	(0.0696)	(0.0482)	(0.0859)	(0.1021)	(0.0038)	(0.0038)	(0.0046)	(0.0062)
<i>ContS</i>	−0.0024**	0.0000	−0.0076**	−0.0050	−0.0001	−0.0002	0.0001	0.0001
	(0.0009)	(0.0028)	(0.0018)	(0.0098)	(0.0001)	(0.0002)	(0.0001)	(0.0004)
<i>ForS</i>	−0.0023+	−0.0041	−0.0072*	−0.0120	−0.0003**	−0.0004+	−0.0001	−0.0007*
	(0.0014)	(0.0042)	(0.0030)	(0.0086)	(0.0001)	(0.0002)	(0.0001)	(0.0003)
<i>ROA</i>	0.0058*	0.0011	0.0196*	0.0120+	0.0017**	0.0013**	0.0023**	0.0021**
	(0.0028)	(0.0033)	(0.0090)	(0.0072)	(0.0002)	(0.0002)	(0.0003)	(0.0004)
<i>Csh</i>	0.0061**	0.0009	0.0066*	−0.0007	0.0027**	0.0066**	0.0021**	0.0055**
	(0.0016)	(0.0023)	(0.0034)	(0.0058)	(0.0001)	(0.0002)	(0.0001)	(0.0003)
<i>Dbt</i>	−0.0018*							
	*	−0.0016	0.0011	0.0044	0.0008**	0.0009**	0.0006**	0.0005
	(0.0007)	(0.0014)	(0.0016)	(0.0041)	(0.0001)	(0.0002)	(0.0001)	(0.0004)
<i>R/TE</i>					−0.0001*			
	0.0009**	0.0006**	0.0039**	0.0050**	*	−0.0001+	−0.0003**	−0.0004**
	(0.0002)	(0.0002)	(0.0012)	(0.0016)	(0.0000)	(0.0000)	(0.0001)	(0.0002)
<i>M/BV</i>					−0.0001*		−0.0001*	
	0.0010**	0.0005	0.0027**	0.0025*	*	−0.0001*	*	−0.0001*
	(0.0003)	(0.0003)	(0.0007)	(0.0010)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
(A)	−0.0025	−0.0617	−0.0410+	−0.2292+	0.0021+	0.0169*	0.0006	0.0201
	(0.0120)	(0.0460)	(0.0232)	(0.1241)	(0.0012)	(0.0083)	(0.0011)	(0.0139)
<i>A</i>	−0.0016+	−0.0013	−0.0075*	−0.0083**	0.0013**	0.0012**	0.0013**	0.0012**
	(0.0010)	(0.0010)	(0.0033)	(0.0031)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
<i>Sales</i>	0.0004	0.0003	−0.0003	−0.0005	−0.0002**	−0.0000	−0.0002**	−0.0001
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Observations	16,358	16,358	6,014	6,014	13,995	13,995	5,272	5,272
<i>R</i> ²	0.0350	0.0048	0.0536	0.0218	0.2299	0.3416	0.2429	0.3393

Note: Cluster-robust standard errors in parentheses; ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

Year, industry, chaebol, and KOSPI market dummies are included but not reported.

and show that qualifying firms increased the dividend–EBIT ratio by an average of 10%. When the PSM sample is used in columns (4) to (6), dividends are estimated to increase by 0.15%–0.18%.

Table 7 shows how share repurchases and cash holdings change in *HIGH* firms during the tax cut compared with *OTH* firms. For each dependent variable, we

report the OLS estimation results for the entire and PSM matched samples. The estimation results indicate that the *HIGH* group of firms does not reduce the amount of share repurchases while they increase cash dividends substantially. The coefficient is positive but statistically insignificant in the PSM estimation. This positive coefficient implies that the *HIGH* group even increases its share repurchases in the estimation of the entire sample. The tax bill raised the amount of payout to shareholders as it intended without incurring any substitutions between the payout methods.

The preceding result does not support the substitution hypothesis between dividends and share repurchases (Grullon and Michaely, 2002; Chetty and Saez, 2005; Brown, Liang, and Weisbenner, 2007). Moreover, the results imply that the qualifying firms did not increase dividend payments by reducing the amount of share repurchase. Kim et al. (2012) emphasized that the level of cash dividend payments is not strongly associated with share repurchase policy in the Korean market. They showed that potentially large free cash flow is a major economic factor in deciding the amount of share repurchase. Their findings are consistent with our results showing high profitability in the qualifying firms, and agency theory of share repurchase analyzed in Grullon and Michaely (2004).

Table 7 also shows that firms in the *HIGH* group do not drain their cash holdings significantly to raise their payouts. The entire sample results indicate slightly low levels of cash holdings after the tax cuts for the treatment group. However, these values appear less meaningful in terms of economic significance, considering that an average Korean firm has 17% of its total assets as cash (see Table 2). PSM shows statistically insignificant effects on the variations in cash holding policy across the treatment and control groups after the dividend tax cuts. Our estimation results in Tables 4 and 6 indicate that firms taking advantage of the tax cut significantly increased their dividends without substantially changing share repurchases and cash holding policies.

Control variables in Tables 5 to 7 generally take the expected sign and magnitude consistent with the theories and findings of previous empirical studies. Although the signs of coefficients are relatively stable across empirical specifications, we focus on our most preferred specification with the PSM estimation without FE: Column (6) in Table 5 and Columns (3) and (6) in Table 7. First, variations of controlling shareholders and foreign shareholdings are significantly positively associated with dividends but negatively associated with share repurchases. Controlling shareholders do not favor share repurchase as a payout method because they must sell their shares to receive cash, possibly reducing their controlling power over the corporation. Foreign investors may prefer continuous dividend payments over infrequent cash flows from share repurchases. Second, ROA is found to be significantly positively associated with dividends and changes in cash, indicating that high profits are used for dividends and cash holdings. Third, leverage ratio, *Dbt*,

is negatively associated with dividend payouts. The possible reason for this association is that distressed firms tend to have larger debts and smaller dividends. In terms of agency theory, larger interest payments from debt function as disciplinary tools in restricting managerial entrenchments, limiting the need for larger dividends. Fourth, M/BV , which is a measure of firms' growth opportunities, is associated positively with dividends and share repurchases, which is in contrast with widely accepted predictions. This contrasting finding is also closely related to the Korean discount phenomenon, implying a relatively low rate of dividend payout even for mature firms with large book values and limited investment opportunities. These firms tend to have low market-to-book value ratio, but they may not actively payout internal equity to shareholders.

[Table 8] Dividends, share repurchases, and change in cash, robustness

Dep. variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>Dv/A</i>			<i>Rep/A</i>			<i>ΔCsh/A</i>		
Sample	PSM	w/o 2018	w/o chaebol	PSM	w/o 2018	w/o chaebol	PSM	w/o 2018	w/o chaebol
<i>HIGH</i> × <i>Afi15</i>	0.4535** (0.0499)	0.4549** (0.0483)	0.4176** (0.0536)	−0.0370 (0.1235)	−0.0373 (0.1250)	0.0257 (0.0811)	−0.0016 (0.0039)	−0.0017 (0.0039)	−0.0014 (0.0039)
<i>HIGH</i> × <i>Afi15</i> × <i>YD18</i>	−0.0901 ⁺ (0.0468)			0.1444 (0.1295)			−0.0143 ⁺ (0.0074)		
Observations	6,014	5,382	4,976	6,014	5,382	4,976	5,272	4,640	4,357
<i>R</i> ²	0.4376	0.4301	0.4368	0.0537	0.0526	0.0672	0.2435	0.2354	0.2919

Note: Cluster-robust standard errors in parentheses; ** $p < 0.01$, * $p < 0.05$, ⁺ $p < 0.1$.
Other controls as in Column (2) of Table 5, year, industry, chaebol, and KOSPI market dummies are included but not reported.

Table 8 presents the results of robustness checks to allowing changes after the expiration of the tax cut in 2018 and to allowing different samples. Columns (1), (4), and (7) present the results when the interaction term of treatment and dummy for 2018 are added to investigate the changes in payout and cash for the qualifying firms in 2018. These firms are estimated to decrease dividends when the temporary tax cut expired in 2018 (Column 1). However, considering the substantial increase during the temporary tax cuts, the level of dividend payment in 2018 was still higher than the level before the initiation of tax benefits. The large difference between the coefficient on the treatment (0.4535) and the interaction term of treatment and dummy for 2018 (−0.0901) terms clearly shows substantially large dividends payments for the *HIGH* group compared with the matched sample in fiscal year 2018.

The exclusion of observations of fiscal year 2018 (Column 2) or *chaebol* affiliates (Column 3) does not alter the significance of our results in the dividend payout policy. The sign and magnitude of all other coefficients in share repurchases and

cash regressions do not vary significantly in the robustness checks (Columns 4-9). All terms are statistically insignificant.

4.4. Regression results of share prices

The prevailing “Korean discount” and severe managerial entrenchment problems in the Korean financial market enable us to predict potential share price hike after a large increase in dividend payments. Corporate dividend policy is considered a persistent one and investors expect that the level of dividends would not change sharply after the increase. Accordingly, an increase in dividend payments may reduce firms’ free cash flow continuously and mitigate agency conflicts between CEOs and shareholders. Given the prevailing managerial entrenchments in the Korean market, an increase in dividends may be expected to drive positive share price movements, probably in a persistent way.

Table 9 investigates this potential channel between dividend policy and share prices in the face of tax policy change. The table examines whether and how much share prices increase in *HIGH* firms after the introduction of the tax cut. Columns (1) to (3) use the sample of all firms. Columns (4) to (6) use the matched subsamples from PSM.

Table 9 shows that the share prices of the *HIGH* group firms increased substantially after the initiation of tax cuts, as indicated in Figure 2. The coefficients of the interaction term of the *HIGH* variable and treatment period dummy are statistically and economically significant regardless of our econometric model choices, such as OLS and PSM. For example, the OLS result without FE indicates that the share prices of the *HIGH* group increased by approximately 0.6 compared with that of the control group. This value is economically significant as well, considering the normalization scheme of share prices that standardizes the stock prices of 2014 to 1 for all corporations. With the PSM estimation, the estimated coefficients of the interaction term decreased to about 0.22, implying economically massive effects on share price variations from the dividend tax cuts. A smaller difference is consistent with a lower degree of share price divergence after 2015 between the treatment and control groups in the matched sample.³

An increase in dividend payout may have a large amplification effect on the value of stock, especially when the increase consists of a greater size of permanent component. The textbook constant dividend model indicates a one-to-one relationship between the percentage change in dividend payments and the equity value of a corporation. According to the model, if a firm maintains constant dividend payments D_0 with required return of r , then the equity value of a firm

³ On the basis of the preceding argument, this PSM sample is highly preferred because it satisfies the parallel path assumptions.

[Table 9] Share prices, baseline, OLS, PSM

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. variables	<i>Adjusted share price (share price in 2014=1)</i>					
Sample	All			PSM		
Fixed effect	No	No	Yes	No	No	Yes
<i>HIGH</i> ×	0.6221**	0.6715**	0.3664**	0.2296**	0.2219**	0.1228**
<i>Aft15</i>	(0.1062)	(0.1058)	(0.0925)	(0.0797)	(0.0702)	(0.0391)
<i>HIGH</i>	−0.4892**	−0.2688**		0.0309	0.0294	
	(0.0923)	(0.0658)		(0.0574)	(0.0632)	
<i>Aft15</i>	0.0505	−0.7293**	−1.3957**	0.4402**	0.3892**	0.0364
	(0.0825)	(0.2575)	(0.4858)	(0.0405)	(0.0849)	(0.0578)
<i>bps</i>		0.0004	0.0009		−0.0000	0.0000
		(0.0006)	(0.0008)		(0.0001)	(0.0004)
<i>eps</i>		−0.0107	−0.0033		0.0007	0.0016
		(0.0091)	(0.0108)		(0.0007)	(0.0014)
<i>ContS</i>		−0.0050**	−0.0266**		−0.0037**	−0.0240**
		(0.0014)	(0.0090)		(0.0014)	(0.0019)
<i>ForS</i>		−0.0068*	0.0051		−0.0023	−0.0012
		(0.0030)	(0.0037)		(0.0014)	(0.0020)
<i>ROA</i>		−0.0146**	−0.0152**		−0.0045	0.0013
		(0.0038)	(0.0056)		(0.0039)	(0.0024)
<i>Csh</i>		0.0018	0.0083**		0.0011	0.0049**
		(0.0024)	(0.0029)		(0.0011)	(0.0013)
<i>Dbt</i>		0.0049*	−0.0034		0.0030 ⁺	0.0007
		(0.0022)	(0.0032)		(0.0018)	(0.0014)
<i>R/TE</i>		−0.0001	0.0034**		−0.0003	0.0075**
		(0.0005)	(0.0011)		(0.0007)	(0.0006)
<i>M/BV</i>		0.0035**	0.0067**		0.0031**	0.0063**
		(0.0004)	(0.0006)		(0.0005)	(0.0002)
(A)		0.0568 ⁺	1.8947**		0.0046	0.9669**
		(0.0332)	(0.3851)		(0.0178)	(0.0451)
<i>A</i>		0.0033**	−0.0034*		0.0010	−0.0012*
		(0.0008)	(0.0013)		(0.0009)	(0.0006)
<i>Sales</i>		−0.0005	−0.0004		−0.0000	−0.0004
		(0.0004)	(0.0005)		(0.0005)	(0.0004)
Observations	15,216	15,216	15,216	5,972	5,972	5,972
<i>R</i> ²	0.0033	0.0437	0.0871	0.0829	0.1678	0.3348

Note: Cluster-robust standard errors in parentheses; ** p < 0.01, * p < 0.05, + p < 0.1.

Year, industry, chaebol, and KOSPI market dummies are included but not reported.

after the current dividend payment V_0 can be written as follows:

$$V_0 = \frac{D_1}{r} = \frac{D_0}{r},$$

where D_1 represents the next year dividend payments equal to the current level of

dividends D_0 with the constant dividend payout assumptions over the lifetime of the corporation.

If the firm increases dividend payment at the rate of g , then the value of the company is as follows:

$$V_0^* = \frac{D_1}{r} = \frac{D_0(1+g)}{r} = V_0(1+g).$$

The preceding equation indicates that the value of firms increases at the same rate of permanent dividend payout growth. Furthermore, because the required return of a corporation usually decreases as it matures, there can be more than one-to-one relationship between the growth of share price and that of permanent dividend payment.

Our estimation results indicate that the dividend asset ratio increases by over 0.4 for the qualifying firms during the tax cuts. Considering that the average dividend asset ratio of these firms is equal to 1.3, even including sizable dividend growth period during the tax cut period, a 20% increase of share price is no longer surprising. Our results also show that the growth of dividends during the tax cut period tends to be a permanent one; no sign of dividend reduction is found after the abolition of temporary tax benefits.

The preceding finding is noteworthy because it verifies an unintended effect of dividend tax cuts in the financial market. This regulation change directly aims at increasing the dividend payout of corporations. However, the finding suggests that this tax cut may also indirectly affect investors' valuation of qualifying firms shaped in the financial market by potentially mitigating agency conflicts inside the qualifying firms. The result provides empirical evidence supporting such an indirect effect of dividend tax cuts, which has been generally unexamined in the extant literature.

An increase in share prices is most properly explained using agency theory. The theory argues that a larger dividend payout induces a smaller free cash flow to self-interested CEOs, who are prone to making value destructive investments with excessive free cash flow. Moreover, the theory expects a positive association between dividend growth and share prices. A large sum of dividends drain free cash flow to self-interested CEOs and limit the initiation of value destructive projects.

The disciplining mechanism of dividend payout and its positive effect on share prices are likely to be strongly present in the Korean market because of the Korean discount phenomenon. The growth of dividend driven by lower tax rate increases the propensity of dividend payout and also reduces the negative effects of the non-transparent operation of firms by reducing the free cash flow to CEOs. Therefore, dividend tax cut may be capable of enhancing the market value of corporations in such countries as Korea, where an increasing dividend payout mitigates serious

agency problems.

Other competing theories do not properly explain such an increase in share prices. Signaling theory of dividends also predicts a positive association with share prices and dividend payouts. The positive relationship relies on the revelation of inside information through dividend policies. Accordingly, share price adjustments no longer occur if inside information is fully delivered to shareholders. The persistently positive valuation effect of the dividend tax cut found in the Korean financial market does not align well with signaling theory. This theory predicts instantaneous changes in stock prices in response to variations in dividend policies. Numerous firms (see Table 3) simultaneously raise their dividend payments, and this simultaneous response is inconsistent with signaling theory, which is built on an individual firm’s revealing mechanism of inside information. Lastly, it is hardly justifiable that firms with signaling motivation choose the window of temporary dividend tax cut periods to signal their inside information to shareholders by raising dividends. Several other firms increase dividends to simultaneously receive tax benefits, thereby damaging the effectiveness of dividends as a signaling tool for firms.

[Table 10] Share prices, robustness checks

Dep. Variables Sample	(1)	(2)	(3)
	<i>Adjusted share price (share price in 2014=1)</i>		
	PSM	w/o 2018	w/o chaebol
<i>HIGH</i> ×	0.1934**	0.2086**	0.1986*
<i>Afi15</i>	(0.0660)	(0.0669)	(0.0791)
<i>HIGH</i> ×	0.1140		
<i>Afi15</i> × <i>YD18</i>	(0.0786)		
Observations	5,972	5,340	4,948
<i>R</i> ²	0.1680	0.1402	0.1677

Note: Cluster-robust standard errors in parentheses; ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

Other controls as in Column (2) of Table 9, year, industry, chaebol, and KOSPI market dummies are included but not reported.

Table 10 presents the robustness check results for share price regressions. Column (1) adds the interaction term *HIGH* and fiscal year 2018 to check the share price of qualified firms showing different trends in 2018 to find their share prices are even higher in 2018 although not statistically significant.⁴ This result implies

⁴ The resolution of information on future dividend policy potentially explains the delayed valuation effect of dividend growth. Investors may not be fully sure of the corporations’ future dividend policies because the initial increase occurs during the temporary tax cut regime. The qualifying firms may enjoy tax benefits temporarily and return to lower dividend policy after the tax cut. However, our data show that most qualifying firms did not reduce dividend payments significantly after the tax cut periods (see Figure 1). Given that most qualifying firms continue to pay large dividends, investors may

that share prices of the qualifying firms kept increasing even after the expiration of the tax cut periods, when the level of dividend payments are likely to be above the expectation of investors. This result again supports the agency cost view of dividend policy. Agency theory predicts a positive valuation effect of dividend payments as far as the actual dividends are greater than investors' expectations.

Column (2) of Table 10 uses a sample without observations of fiscal year 2018 to test whether the high share prices of the *HIGH* firms weakened or strengthened after the expiration of the temporary tax cut. Column (3) uses a sample without *chaebol* to test whether the observed pattern is caused by *chaebol*. Robustness check results indicate that the share price of the qualified firms is higher than that of other firms.

4.5. Placebo test

We conducted a set of placebo tests to validate the DID approach adopted in previous studies. Table 11 shows the regression results of the placebo effect assuming treatment in 2012–14 instead of 2015–17. The interaction term uses the same treatment group but a different treatment period (i.e., 2012–14) when the temporary tax cut was not initiated. We report the estimation results based on the PSM method with and without control variables, which is our most preferred setting in terms of parallel path assumptions. Table 11 shows that the coefficients of the placebo treatment effect on dividend and share prices are not statistically significant. The estimated values are lower than the corresponding values in Tables 5 and 8. The sign of the coefficient is negative for the share price equation.

[Table 11] Placebo effect assuming treatment in 2012–14 instead of 2015–17

	(1)	(2)	(3)	(4)
Dep. variables	<i>Dividends / Asset</i>		Share prices	
Sample	PSM		PSM	
Other controls [†]	No	Yes [†]	No	Yes [‡]
<i>HIGH</i> ×	-0.0177	-0.0241	-0.0378	-0.0335
<i>Year12_14</i>	(0.0596)	(0.0534)	(0.1129)	(0.1166)
Observations	3,495	3,495	3,453	3,453
<i>R</i> ²	0.0046	0.4088	0.0030	0.0714

Note: Cluster-robust standard errors in parentheses, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

Year, industry, chaebol, and KOSPI market dummies are included, but not reported.

[†] Other controls as in Column (2) of Table 5 are included, but not reported.

[‡] Other controls as in Column (2) of Table 9 are included, but not reported.

gradually understand the direction of future dividend policy, which points to a permanent dividend payment increase within these firms. As investors' belief for permanent dividend increase deepens with a series of large dividend payments, the value of firms may increase continuously as well.

V. Conclusion and Discussion

The Korean government temporarily reduced dividend tax rates for investors of firms with large dividend growth in 2015–2017. We examined how the dividend tax cut affected corporate payout policies and share prices based on the DID analysis augmented with PSM. The treatment group is naturally set to comprise firms benefiting from tax advantages during the study period. The potential estimation bias should be controlled for properly in the DID analysis. The reason is the endogenous nature of the decision to become the group of qualifying firms.

Our main findings are as follows. First, the qualifying and other firms showed a similar trend in dividends (and a similar level of dividends in the PSM sample) before the introduction of the tax cut, but they diverged significantly after 2015. Our DID regression results show that the dividend–asset ratio of the qualifying firms are higher than that of other firms by about 0.45 percentage points after the introduction of the tax cut, which is economically significant as well. This increase of dividend payments was achieved without the reduction of share repurchase compared with the prediction of the substitution hypothesis.

Second, share prices of the qualifying firms have increased more rapidly than that of other firms since 2015. The gap between the average share prices of the qualifying firms and that of other firms continued to increase even after the expiration of the tax cut provision. Our finding of the positive association between higher cash dividends and subsequent share prices was most appropriately explained by the agency cost hypothesis. The widely known Korean discount provides the economic rationale for the observed share price increase in the group of qualifying firms.

Our findings contribute to the literature in several ways. First, we validated the positive effect of dividend tax cuts on the increase of corporate payouts based on empirical methods that mitigate potential estimation bias. Previous studies, such as Lee and Lee (2019), have minimally considered estimation bias in their calculations. Second, our finding argues against the substitution hypothesis between dividends and share repurchase (e.g., Grullon and Michaely, 2002). Consequently, the Korean dividend tax cut of 2015–2017 turned out to provide a venue for increasing total payout to shareholders. This finding is also consistent with extant studies on the Korean market highlighting the role of share repurchase in the reduction of free cash flow. Interestingly, our results suggest that the introduction of dividend tax cuts can induce an increase in share prices by increasing corporate dividends, which is a generally unexamined area in the literature. In countries with serious agency problems, the growth of dividends driven by dividend tax cut may persistently limit free cash flow to self-interested CEOs, which relatively increases the market value of shareholders. That is, dividend tax cuts appear to have indirect and unintended effects on the participants of financial markets in terms of firm valuation.

An interesting analysis is whether or not temporary tax cuts in the Korean market have long-term effects on corporate dividend policy and share prices. The characteristics of qualifying firms maintaining a higher level of dividend payments after the tax cut sunset of 2017 are interesting from the perspective of policy evaluations and design. The qualifying firms may also respond differently to a market-wide shock, such as the COVID-19 pandemic. These topics are beyond the scope of our study and are left to future research.

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배당세 감면의 배당 및 주가에 대한 효과 분석: 2015-2017 배당소득 과세특례제도를 이용한 이중차감 실증분석*

이 정 환** · 이 영***

초 록 한국 정부는 배당금을 정해진 기준 이상으로 증가시킨 ‘고배당기업’의 주주들에게 배당소득세를 낮추어주는 배당소득 과세특례제도를 2015-2017에 한시적으로 도입하여 운영하였다. 본 논문은 먼저 ‘고배당기업’들이 다른 배당요인들을 통제한 이후에도 여전히 배당을 크게 증가시켰음을 확인하였고, 이들 ‘고배당기업’들이 단순히 자사주매입을 감소시켜 배당금을 증가시킨 것은 아닌 것임을 관찰하였다. 배당금 증가 여부 보다 좀더 흥미로운 연구 가설은 ‘고배당기업’들의 주가가 배당을 높인 이후 어떻게 변화하였는가 이다. 경향점수매칭 표본(propensity score matched sample)을 이용한 분석 결과, ‘고배당기업’의 주가는 통제집단의 주가에 대비하여 22% 더 높아진 것으로 나타났다. 외생적인 요인으로 볼 수 있는 배당소득 과세특례제도로 인해 배당을 늘린 기업의 주가가 더 올랐다는 실증분석 결과는 대리인 비용 이론과 ‘코리아 디스카운트’ 현상과 일관성을 가지는 결과이다.

핵심 주제어: 배당소득세, 주가, 대리인이론, 이중차감법

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