

Original Article

# Dividend Tax Reforms and the Cost of Equity Capital: Evidence from Quasi-Natural Experiments in China

Guiping Li<sup>1</sup>, Wei Liu<sup>2</sup>

<sup>1</sup>Department of Accounting, Hebei Finance University, China.

<sup>2</sup>Financial Research Center, Chinese Academy of Fiscal Sciences, China.

Received Date: 17 June 2020

Revised Date: 26 July 2020

Accepted Date: 29 July 2020

**Abstract** - Based on the natural experiment of dividend tax adjustment of China in 2015, the paper studies the impact and its mechanism of dividend tax adjustment on equity capital cost with the data of Shanghai and Shenzhen A-share listed companies in 2014-2016 by establishing moderated mediator models. Empirical results show that dividend tax adjustment reduces the cost of equity capital of listed companies and that financial leverage, dividend distribution, and risk-taking play moderating intermediary effects, while financing constraints only play a moderating effect in the influence of dividend tax adjustment on the cost of equity capital. These conclusions evaluate the economic effect of dividend tax adjustment in China from a micro perspective and provide theoretical reference and inspiration for the companies to control costs and for the government to optimize the taxation system.

**Keywords** - Dividend Tax Adjustment, Cost of Equity Capital, Mediating effect, Moderating effect.

## I. INTRODUCTION

This document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website.

In recent years, tax cuts and fee reductions have been an important measure to reduce the cost of China's new normal economy. As a medium connecting investors' returns and the company's capital cost in the capital market, a dividend tax is often used by the government to maintain the healthy development of the capital market and stimulate economic growth. After the dividend tax rate reduction enacted as part of the 2003 Jobs and Growth Tax Relief Reconciliation Act in the US (hereafter referred to as JGTRRA03), the cost of equity capital of U.S. public corporations all decrease, and the decrease will be larger for those firms that are expected to issue new equity in the future, and that tend to use dividends rather than stock repurchases to make distributions to shareholders (Guenther, Jung, and Williams, 2005). Dhaliwal, Krull,

and Li (2007) find that the cost of equity capital decreases by 1.02% and that the decline is smaller for firms largely held by institutional investors. Sikes and Verrecchia (2012) predict that lower liquidity amplifies and higher liquidity attenuates the positive relation between expected rates of return and investor-level tax rates, that the decrease of expected rates of return is significantly larger for non-dividend paying firms which are less liquid and significantly smaller for firms with greater institutional investor ownership due to firms being more liquid. Dai, Shackelford, Zhang, and Chen (2013) argue that it was financial constrain, not dividend status, which influences the relation between shareholder taxes and the cost of equity capital, and that non-dividend-paying companies are often financially constrained. Stinson and Ricketts (2015) extend prior research to account for significant shifts in institutional holdings for non-dividend stocks relative to dividend stocks following the tax change, and that significant increases in institutional ownership for high-risk firms led to larger reductions in the implied cost of equity capital compared to other firms that were more heavily favored by individuals.

Reliability of prior empirical research conclusion to the relation between dividend Tax and the cost of equity capital is based on JGTRRA03. An undisputed fact is that JGTRRA03 cut not only individual dividend tax rates but also cut individual capital gain tax rates, which have a mixing impact on the judgment of the relationship between dividend Tax and the cost of equity capital. This paper address this research question by using recent quasi-natural experiments in China. Specifically, the 85th Fiscal Taxation Document of China in 2012, the dividend tax differentiation reform, mandates that individual investors' dividend tax rates vary with the length of their shareholding periods. Since January 1, 2013, the dividend tax rate, which was 10% before the reform, equals 20% if shares have been held shorter than or equal to 1 month, 10% if shares have been held longer than 1 month, and shorter than or equal to 1 year, and 5% if shares have been held longer than 1 year. On September 7, 2015, the 101st Fiscal Taxation policy in 2015, the dividend tax differentiation adjustment stipulates dividends tax-free if



shares held longer than 1 year. The dividend tax differentiation reform in 2012 and adjustment in 2015 of China are the best natural experiments to examine the effect of dividend tax reform on the corporate cost of equity capital, for China is an emerging developing country, capital market and income tax system are different from American's, individual investors dominate the trading sphere of China's equity market, and China set to fiscal taxation policies focuses on individuals dividend tax rate change without other taxes change, which is not likely to be contaminated by concurrent events.

Although the Prior research has made an in-depth study on the relationship between dividend tax and the cost of equity capital, it has not revealed the specific mechanism of the impact of dividend tax on the cost of equity capital. Because tax characteristics, corporate tax avoidance degree, and other factors also have an influence on the relationship between dividend tax and capital cost, and there is little research on the relationship between dividend tax and cost of equity capital in China. Therefore, we study the influence of dividend tax reforms on the cost of equity capital and the influence mechanism, based on the natural experiments of dividend tax differentiation reform in 2012 and adjustment in 2015, with the data of Shanghai and Shenzhen A-share listed companies in China by establishing moderated mediator models.

The main contributions of this article are as follows: (1) Supplying the literature on the relationship between dividend tax and capital cost. The existing literature on the relationship between dividend tax and the cost of equity capital is based on the practice of tax reduction in the United States. There is little literature about the mechanism of the impact of dividend tax on the cost of equity capital. Based on China's fiscal and taxation policies, using financial data of A-share listed companies in Shanghai and Shenzhen from 2010 to 2016, this paper reveals the positive impact of dividend tax reform and adjustment on the company's equity capital cost and the specific mechanism, which makes up for the lack of academic research on the relationship between China's dividend tax and capital cost. (2) Providing reference and inspiration for the current implementation of tax reduction and fee reduction policies to reduce economic operating costs. This paper examines the effect of the fiscal and taxation policies to reduce the company's cost of equity capital, and regulating intermediary roles of financial leverage, dividend distribution risk-holding, and financing constraint when dividend tax reform and adjustment affect the cost of the equity capital, reveal the mechanism of dividend tax affecting the cost of the equity capital. (3) These conclusions verify the effectiveness of the reform of China's dividend tax, give evidence to the application of the Miller equilibrium theory in China, and provide empirical data for the company to control the cost of capital and the government to optimize dividend taxation system.

The balance of the paper proceeds as follows: Section II describes the institutional background of the Dividend Tax Reform of 2012 and adjustment of 2015 in China. Section III discusses the literature and develops hypotheses. Section IV describes sample formation. Section V presents our identification strategies and main empirical results. Section VI conducts robustness analyses. Section VII concludes.

## II. STUDY BACKGROUND

The Individual Income Tax Law of China, which was implemented in 1994, stipulated that the dividend tax rate was 20%. In order to promote the healthy development of the capital market, dividend tax has experienced three changes; firstly, on June 13, 2005, Chinese Fiscal Tax No. 102 was implemented, which stipulated Individual investors' taxable dividend income from listed companies is reduced by 50% and the actual tax rate of dividend tax is 10%. Secondly, on November 16, 2012, Chinese Fiscal Tax No. 85 (dividend tax reform in 2012, hereafter DTR12) was implemented, which stipulated dividend income obtained by individual investors from listed companies was taxed at 20% if the holding period was shorter or equal one month, 10% if the holding period was shorter or equal one year and longer than one month, and 5% if the holding period was longer than one year, Since January 1, 2013. And capital gains of individual investors are not taxed. Thirdly, on September 7, 2015, Chinese Fiscal Tax No. 85 (dividend tax reform in 2015, hereafter DTR15) was implemented, which stipulates dividends income obtained by individual investors from listed companies is free of tax if shares are held longer than 1 year. As statistical yearbooks of the Shanghai Stock Exchange reveal that the average share turnover rate of individual investors is nearly 80%, individual investors are the most active market participants. China's capital market is notoriously characterized by excessive speculative trading and a disproportionate percentage of short-term investors. Recent two dividend taxation reforms designed to solve this problem are unique in the world and an ideal setting to examine the effect of individual investors' tax upon the cost of equity capital. Unlike JGTRRA03 cutting dividend tax, capital gains tax, and other individual tax in the U.S. capital market, China's dividend tax reforms only change individual investors' dividend tax. However, the empirical study to date on the impact of China's dividend tax reform is few, except that Li, Liu, Ni, and Ye (2017) examine the relation between China's dividend tax reform in 2012 and corporate payout policies. With China's unique natural experiment of dividend tax reforms and distinctive capital market setting, we analyze the impact of the two dividend taxation reforms of China on the cost of equity capital.

## III. HYPOTHESES DEVELOPMENT

### A. *Individual investors' dividend tax reform and the cost of equity capital*

How shareholder-level dividend taxes affect the cost of equity capital is one important and controversial question that has long been of interest to researchers in economics, finance, and accounting. Miller (1977)

explains the relationship among income tax, capital structure, and capital cost with equilibrium model and documents that the cost of equity capital is a function of dividend tax under the condition of non-neutral taxation and that the cost of equity capital of a leveraged company is positively (negatively) correlated with dividend tax if the cost of equity capital of a company with complete equity financing is smaller (larger) than the debt interest rate. Guenther, Jung, and Williams (2005) verify the cost of capital of American public firms decreased after JGTRRA03. Dhaliwal, Krull and Li. (2007) investigated that there is a positive correlation between dividend tax and cost of equity capital using JGTRRA03. Huizinga et al. (2018) point out that the dividend tax and capital gains tax increase the cost of capital and have a negative impact on economic growth with experience data of International mergers and acquisitions.

During the period from January 1, 2013, to September 7, 2015, the 85th fiscal taxation document of China in 2012 comes into operation, the dividend of individual investors is taxed differently according to the holding period, the turnover rate of company stock is significantly reduced, and the average dividend tax burden of individual investors is reduced. Since the implementation of the 101st fiscal taxation document of China on September 7, 2015, the dividend tax rate equals 0% if the holding period is longer than 1 year, the stock market fluctuates violently and frequently, and the A-share market average risk premium is extremely low, and the capital cost of full equity financing companies is lower than the debt interest rate. According to Miller Equilibrium Model Miller (1977), we derive a conclusion that the cost of equity capital is positively related to dividend tax. Therefore, this paper proposes the following research hypothesis 1.

Hypothesis 1. The cost of equity capital of listed companies decreases after DTR12 and DTR15.

#### ***B. Individual investors' dividend tax reform, debt financing, and the cost of equity capital***

After the implementation of the 85th fiscal taxation document in 2012 and 101st fiscal taxation document in 2015, the applicable stock dividend and taxes for individual investors are reduced, the after-tax income of average dividends are increased, and the expected rate of return is required in the future is reduced. Thus, the marginal cost of corporate equity financing is reduced. When the company has financing demand, equity financing will be increased, debt financing will be reduced, and the capital structure of the company will change. Modigliani and Miller (1958, 1963) verify that the equity capital cost of leveraged companies is an increasing function of the capital structure and that the change of capital structure caused by the adjustment of taxes will definitely affect the equity capital cost. This leads to our hypothesis 2.

Hypothesis 2. Debt financing plays a mediating regulatory role when dividend tax reforms affect the cost of equity capital.

#### ***C. Individual investors' dividend tax reform, dividend payout, and the cost of equity capital***

Under the given conditions of dividend distribution, the dividend tax reduction will increase the dividend income of shareholders, shareholders are more willing to add equity investment, and the supply of equity capital will increase. Brav et al. (2008) find dividend distribution of American listed companies increased after JGTRRA03. After the implementation of China's 85th fiscal taxation document in 2012, investors reduced trading activities before the cum-dividend day and successfully lowered their dividend tax penalty, firms facing a reduction (increase) in their individual investors' dividend tax rates are more (less) likely to increase dividend payout, and such an effect is concentrated in firms where incentives of controlling shareholders and minority shareholders are aligned (Li et al. 2017). It can be seen that dividend tax is negatively correlated with dividend distribution.

Under the personal taxes conditions that the dividend tax is greater than capital gains tax which is free in China, it is beneficial for the company to pay fewer dividends. If the company distributes more dividends, investors will inevitably require a higher expected rate of return, and the cost of equity capital will increase. Stapleton and Burke (1972) believe that dividend policy is an important factor affecting the cost of equity capital under the condition that the dividend tax is greater than the capital gains tax. After the adjustment of dividend taxation reform in 2015, the overall average dividend tax burden of individual investors decreased, the dividend distribution level of companies increased, and the cost of equity capital decreased. Based on the above analysis, this paper proposes hypothesis 3.

Hypothesis 3. Dividend distribution plays a mediating regulatory role when dividend taxation reforms affect the cost of equity capital.

#### ***D. Individual investors' dividend tax reform, risk-taking, and the cost of equity capital***

Risk-taking reflects the orientation of the company's decision-making behavior, including the judgment and selection of project risks and benefits in the company's financial decision-making (Wright et al., 1996). The higher risk-taking indicates that the company prefers high-risk and high-return projects, the higher capital expenditure and research and development investment (Bargeron et al. (2010), Hilary and Hui (2009)). Dividend tax reforms in China alleviate the principal-agent problem between insiders and investors, which had a positive impact on corporate governance. Because the improvement of governance mechanism can improve the risk-bearing level of listed companies and decrease the agency costs, the company faces fewer non-systematic risks in the capital market. Specifically, when the overall average dividend tax burden reduces, the external policy risk of the company decreases, which makes the systemic risk of the company reduce. Therefore, after dividend taxation reforms, the risk-taking level of the company decreases. When the level of risk a company takes on declines (increases), the expected rate of return required by shareholders in the

future will inevitably decrease (increases), and the cost of equity capital of the company will decrease (increase). This paper proposes the research hypothesis 4.

Hypothesis 4. Risk-taking plays a mediating regulatory role when dividend taxation reforms affect the cost of equity capital.

**E. Individual investors' dividend tax reform, financing constraint and the cost of equity capital**

Financing constraint is the phenomenon that the imperfect market causes the difference of cost between internal and external financing for companies. China's capital market is not mature, the company financing channels are limited, the change of external policy environment impacts the economic agents of the capital market. According to dividend taxation reform in 2012 and in 2015, the overall average dividend tax burden of individual investors drops, potential investors are more inclined to invest in stocks when compared with bond investment interest tax of 20%, and the cost of equity financing is reduced. Therefore, the company's equity financing channels become more smoothly, and financing constraints have been eased, the supply of funds more abundant.

**IV. RESEARCH DESIGN**

**A. Sample**

In order to study the impact and mechanism of dividend taxation reforms on the cost of equity capital, this paper obtains listed companies' samples from the China Stock Market and Accounting Research (CSMAR) database. Study periods are divided into four parts: i) 2010.1-2011.12, Pre-dividend tax reform period in 2012. ii) 2013.1-2014.12, Post-reform period in 2012. iii) 2014.1-2015.6, Pre-dividend tax reform period in 2015. iv) 2016.12-2017.12, Post-reform period in 2012. In order to ensure the reliability of the conclusion, apply the following filters to this sample. First, we excluded the listed companies in the financial industry. Second, we exclude the listed companies with the abnormal cost of equity capital. Third, we omit companies missing values information for variables required in the empirical analyses. Fourth, we winsorize all continuous variables at the level of 1% and 99%. We finally get one sample consisting of 4095 observations of all A-share firms for DTR12 and another sample consisting of 5228 observations of all A-share firms for DTR15.

**B. Variables of Interest**

**a) Cost of Equity Capital Measure**

Following Dhaliwal et al. (2005) and Dhaliwal et al. (2007), we estimate implied cost of equity capital using the Ohlson-Juettner (1995) model, PEG ratio method (Easton, 2004), and Gordon Growth model, whose formulas are as follow:

$$R_{oj} = A + \sqrt{A^2 + \frac{eps_{t+1}}{P_t} \left[ \frac{eps_{t+2} - eps_{t+1}}{eps_{t+1}} - (r_f - 0.03) \right]}$$

(1)

The cost of equity capital is the price that the company with equity financing pays in the future to investors, and it is also the return rate of investment that the company requires when the company's equity capital demand equals equity capital supply reaching equilibrium. If equity capital is regarded as a product, the change of equity capital cost is determined by the company's demand elasticity for equity capital. The greater the demand elasticity is, the more sensitive the company is to the change of financing cost, which means high financing constraints. On the contrary, the lower the demand elasticity is, the less sensitive the company is to the change of financing cost, which means low financing constraints. In the imperfect capital market, the dividend taxation reforms reduce the dividend tax burden of investors, increase the expected rate of return of investors, and increase the supply of equity capital, which makes the cost of equity capital of companies with high financing constraints decrease significantly. This leads to our hypothesis 5.

Hypothesis 5: Financing constraint plays a mediating regulatory role when dividend taxation reforms affect the cost of equity capital.

$$R_{PEG} = \sqrt{(eps_{t+2} - eps_{t+1})/p_t}$$

(2)

$$R_{Gordon} = dps_{t+1}/p_t + g$$

(3)

Where  $A = (r_f - 0.03 + dps_{t+1}/p_t)/2$ ,  $r_f$  is the risk-free interest rate,  $eps_{t+1}$  is earnings per share at time t+1 forecasted by analysts,  $dps_{t+1}$  is the dividend per share at time t+1,  $P_t$  is the stock price at the end of time t,  $g$  is long-term growth rate or sustainable growth rate at time t.

**b) Explanatory Variables Measure**

Post of the explanatory variable is the dummy variable, which is defined as 0 1 if the period is before dividend taxation reform and 1 otherwise. Lev, financial leverage, is calculated as the ratio of total debt to the total asset. Div, dividend distribution, is measured by dividend payment rate. RT, risk-taking is measured by the Beta coefficient of the comprehensive market. Financial constraint (hereafter FC) is measured based on Kaplan and Zingales (1997). We estimate the comprehensive score using the scoring model of comprehensive financial indicators built on the basis of indicators that are related to financial constraints.

**c) Controlled Variables Measure**

According to previous research literature, this paper controls the following variables: enterprise-scale, rate of return on equity, book-to-market ratio, the first big shareholder stake, and industry (hereafter SZ, Roe, BM, SH, and Ind, respectively). The specific definitions of the above variables are shown in table 1.

**Table 1. The definition of Main Variables**

Variable nature	Variable code	Variable name	Variable definition
Explained variable	R	Cost of equity capital	Estimation by PEG and OJ
	post	dividend tax adjustment	Take 0 before share profit tax adjustment. Otherwise, take 1
Explaining variable	Lev	Debt financing	Total debt/ Total asset Interest-bearing liabilities/total assets
	Div	Dividend distribution	Dividend distribution Pretax cash dividend per share
	RT	Risk-taking	Risk-taking combines market quarterly Return on equity standard deviation
	FC	Financial constraint	Comprehensive financial indicator model score SA index
Control variable	SZ	Firm size	Ln(asset)
	Roe	The growth rate of return on equity	Return on equity for the current period/return on equity for the previous period -1
	BM	Book to market	End of quarter total assets/ market value
	SH	shareholding ratio	share proportion of the largest shareholder
	Ind	industry	The value of the industry is 1. Otherwise, it is 0

**B. Research Equation**

We construct the following moderating mediating variable equations to test the above research hypothesis. Regression models (1)-(5) respectively analyze the specific impact of dividend tax reforms on the cost of equity capital, financial leverage, dividend distribution, risk-taking, and financing constraint. Model (6) analyzes the mediating effects of financial leverage, dividend distribution, risk-taking, and financing constraints. Model (7) analyze the moderating effects of the above variables.

$$\begin{cases}
 R = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Industry + \varepsilon & (1) \\
 Lev = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Industry + \varepsilon & (2) \\
 Div = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Industry + \varepsilon & (3) \\
 FC = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Industry + \varepsilon & (4) \\
 Risk = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Industry + \varepsilon & (5) \\
 Rave = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Lev + \alpha_7 Div \\
 \quad + \alpha_8 FC + \alpha_9 Risk + \alpha_6 Industry + \varepsilon & (6) \\
 R = \alpha_0 + \alpha_1 Post + \alpha_2 Size + \alpha_3 Roe + \alpha_4 Share + \alpha_5 BM + \alpha_6 Lev + \alpha_7 Div \\
 \quad + \alpha_8 FC + \alpha_9 Risk + \alpha_{10} Post * Lev + \alpha_{11} Post * Div + \alpha_{12} Post * FC + \\
 \quad \alpha_{13} Post * Risk + \alpha_6 Industry + \varepsilon & (7)
 \end{cases}$$

**V. DESCRIPTIVE STATISTICS**

**Panel A: One-Way Partition of Change of Firm-Level Variables for DTR12**

Table 2 reports the descriptive statistics of firm-level variables such as the cost of equity capital, leverage, dividend, risk-taking, financial constraint, and other variables before and after DTR12 and DTR15. The mean (median) cost of equity capital is 9.3 percent (6.9 percent) in the post-reform period from 11.2 percent to 9.4 percent in the pre-reform period for DTR12 shown in panel A. The mean (median) is 9.0 percent (8.0 percent) in the post-reform period from 8.4 percent to 7.5 percent for DTR15 shown in panel B. The average cost of equity capital fell by 1.9 basis points after DTR12 and fell by 0.6 basis points after DTR15. The mean (median) probability of a firm’s leverage is 20 percent (17.9 percent) before DTR12 with a significant decrease of 1.4 percent (2.0 percent) after DTR12 versus 48.7 percent (48.3 percent) before DTR15 with a significant decrease of 1.9 percent (2.7 percent) after DTR15. On average, there is a significant increase of 2.5 percent (12.6 percent) of a firm’s risk-

taking (financial constraint) after DTR12 versus a significant increase of 0.4 percent (10.23 percent) of a firm’s risk-taking (financial constraint) after DTR15. And there are different changes of Roe, BM, SH, and SZ after both DTR12 and DTR15.

**Table 2. One-Way Partition of Change of Firm-Level Variables during DTR12 and DTR15**

Variables	Before reform 12		After reform 12		After reform 12-before reform 12	
	Mean	Median	Mean	Median	Difference of Mean	Difference of Median
R	0.112	0.094	0.093	0.069	-0.019***	-0.025***
LEV	0.200	0.179	0.186	0.159	-0.014***	-0.020**
DIV	0.266	0.206	0.283	0.220	0.016	0.014*
RT	0.719	0.518	0.894	0.620	0.025***	-0.102***
FC	0.324	0.577	0.198	0.223	-0.126***	-0.354***
Roe	0.112	0.095	0.066	0.077	-0.045***	-0.018***
BM	0.498	0.477	0.561	0.532	0.063***	0.055***
SH	37.857	36.200	35.977	34.262	-1.880***	-1.938***
HOLD	-1.778	-1.505	-1.618	-1.348	0.160***	0.157***
SZ	22.062	21.840	22.076	21.883	0.014	0.043

**Panel B: One-Way Partition of Change of Firm-Level Variables for DTR15**

According to the medians of financial leverage, dividend distribution, risk-taking, and financing constraint variables, this paper divides listed companies into high and low leverage company group, high and low dividend distribution company group, high and low risk-taking company group, high and low financing constraint company group. Panel B of Table 3 reports the changes in the cost of equity capital of companies with different financial characteristics for both

**Table 3. Comparison Across Different Groups on the Change of Cost of Capital During DTR12 And DTR15**

Corporate type	Cost of equity capital (DTR12)			Cost of equity capital (DTR15)		
	Mean before	Mean after	Mean difference	Mean before	Mean after	Mean difference
High leverage	0.118	0.070	-0.048***	0.079	0.075	-0.004***
low leverage	0.107	0.070	-0.037***	0.100	0.095	-0.005***
High dividend	0.101	0.088	-0.013***	0.100	0.080	-0.020***
low dividend	0.111	0.087	-0.024***	0.090	0.085	-0.005***
high risk	0.114	0.071	-0.043***	0.097	0.061	-0.036***
low risk	0.114	0.027	-0.087***	0.080	0.073	-0.007***
high financing constraints	0.123	0.078	0.045***	0.091	0.087	-0.015***
low financing constraints	0.107	0.067	-0.040***	0.090	0.084	-0.005***

DTR12 and DTR15. The univariate tests of the cost difference of equity capital of companies with different financial characteristics show that the cost of equity capital of companies decreased, in which high-debt financing companies and low-debt financing companies decreased by 4.8% and 3.7% respectively for DTR12 versus 0.4% and 0.5% for DTR15.

The average cost of equity capital of high-dividend distribution companies and low-dividend distribution companies decreased by respectively 1.3% and 2.4% for DTR12 versus 2% and 0.5%, respectively for DTR15. The cost of equity capital of high risk-taking companies and low risk-taking companies decreased by 4.3% and 8.7%, respectively, for DTR12 versus 3.6 % and 0.7%, respectively, for DTR15. The cost of equity capital of companies facing high financing constraints and those facing low financing constraints decreased by 4.5% and 4.0% versus 1.5% and 0.5%, respectively, for DTR15. Therefore, it is necessary to study the specific differences in the role of debt financing, dividend distribution, risk-taking, and financing constraint in the impact of DTR12 and DTR15 on the cost of equity capital.

### VI. PRIMARY REGRESSION RESULTS

Panel A of Table4 reports results from estimating Equation (1) - (7). Columns (1)–(5) show results for effect of DTR12 on Cost of Capital, debt financing, dividend distribution, financial constraint and risk taking respectively, column (6) shows results for the mediating effects of debt financing, dividend distribution, financial constraint and risk taking, and column (7) shows results for the moderating effects of debt financing, dividend distribution, financial constraint and risk-taking, in the effect DTR12 on the cost of equity. First, the coefficients on Post of R, Lev and FC are negative and significant, the coefficients on Post of Div is positive and insignificant, and the coefficients on Post of RT is positive and significant. This results are consistent with cost of equity capital, leverage and financial constraint, all decreasing and risk-taking increasing after DTR12. Second, Column (6) presents that the coefficients on Lev, FC, and RT are positive and significant. These results show debt financing, financial constraint, and risk-taking play mediating roles in the effect of DTR12 on the cost of equity capital. The results in column (7) show that the coefficients on Post, its interaction with Leverage (Lev) (Post\*Lev), and its interaction with risk-taking (Post\*RT) are positive and significant, consistent with high-leverage and high-taking firms facing higher costs of equity capital and that the coefficients on Post interaction with financial constraint (FC) (Post\*FC) are negative and significant, consistent with high financial constraint firms decreasing more in the cost of equity capital, after DTR12. These results show that the cost of equity capital fell for all firms, debt financing and risk-taking play regulated mediating roles and that the cost of capital fell less for those firms with high leverage or risk-taking.

Panel B of Table4 reports results from estimating Equation (1) - (7) for DTR15. Columns (1) - (2) indicates the coefficients on Post is negative and significant, showing significant drops in the cost of capital and leverage across DTR15; however, Columns (3) - (4) indicates the coefficients on Post is positive and significant, showing a significant rise in dividend distribution and risk-taking across DTR15. Results of columns (6) indicate that the coefficients on Lev are positive and significant, showing the mediating effects of debt financing and that the coefficients on RT are negative and significant, showing the mediating effects of risk-taking. Results of columns (7) indicate that the coefficients on Post, its interaction with debt financing (Lev) (Post\*Lev), its interaction with dividend distribution (Post\*Div), and its interaction with financial constraint (Post\*FC) are negative and significant, which means that debt financing, dividend distribution and financial constraint playing moderating roles. These results show that the cost of capital fell more for those firms with high debt financing, high dividend distribution, or high financial constraint.

**Table 4. Panel A Regression Analysis of the Change of Cost of Equity Capital during DTR12**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	ROJ	Lev	Div	RT	FC	ROJ	ROJ
Post	-0.024***	-0.021***	0.002	0.263***	-0.087***	-0.028***	-0.056***
	(-7.82)	(-4.55)	(0.07)	(4.19)	(-6.37)	(-9.89)	(-9.40)
Lev						0.069***	0.042***
						(7.24)	(3.52)
Div						-0.001	0.001
						(-0.67)	(0.14)
RT						0.029***	0.013***
						(18.98)	(4.79)
FC						0.028***	0.028***
						(8.84)	(7.18)

Post*Lev							0.051***
							(3.05)
Post*Div							-0.002
							(-0.32)
Post*RT							0.024***
							(7.50)
Post*FC							-0.001***
							(-3.16)
Hold	-0.006***	-0.019***	0.030**	0.176***	0.022***	-0.009***	-0.009***
	(-4.18)	(-8.38)	(2.53)	(5.69)	(3.25)	(-6.52)	(-6.25)
SZ	0.002*	0.019***	-0.022*	-0.000	0.027***	-0.001	-0.000
	(1.69)	(8.75)	(-1.86)	(-0.01)	(4.18)	(-0.47)	(-0.14)
RoE	-0.112***	0.002	0.009	-0.417***	0.019	-0.098***	-0.079***
	(-11.01)	(0.39)	(0.43)	(-7.51)	(1.59)	(-10.23)	(-8.04)
SH	0.000**	-0.000***	0.001	-0.004*	-0.000	0.000***	0.000***
	(1.98)	(-2.60)	(0.73)	(-1.75)	(-0.24)	(2.67)	(2.78)
BM	0.009	0.244***	0.003	-1.574***	-0.414***	0.044***	0.040***
	(1.15)	(20.20)	(0.04)	(-9.60)	(-11.59)	(5.38)	(4.83)
Constant	0.050	-0.302***	0.671**	2.226***	-0.048	0.031	0.039
	(1.48)	(-5.89)	(2.49)	(3.19)	(-0.31)	(0.99)	(1.23)
Ind	Control	Control	Control	Control	Control	Control	Control
Observations	3,115	4,189	4,189	4,189	4,189	3,115	3,115
R-squared	0.077	0.288	0.008	0.055	0.081	0.198	0.213
r2_a	0.070	0.284	0.003	0.051	0.076	0.191	0.205
F	11.67	76.59	1.550	11.12	16.70	29.27	27.82

**Panel B Regression Analysis of the Change of Cost of Equity Capital during DTR15**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>VARIABLES</b>	<b>ROJ</b>	<b>Lev</b>	<b>Div</b>	<b>RT</b>	<b>FC</b>	<b>ROJ</b>	<b>ROJ</b>
Post	-0.017***	-0.037***	0.018***	0.035***	-0.372	-0.015***	-0.005**
	(-10.901)	(-6.852)	(3.025)	(4.476)	(-1.598)	(-9.576)	(-1.974)
Lev						0.052***	0.058***
						(12.759)	(11.965)
Div						0.002	0.005
						(0.678)	(1.435)
RT						-0.011***	-0.008**



						(-3.841)	(-2.219)
FC						-0.000	-0.000
						(-0.728)	(-0.596)
Post*Lev							-0.006***
							(-2.603)
Post*Div							-0.006***
							(-2.970)
Post*RT							-0.003
							(-1.356)
Post*FC							-0.006***
							(-2.850)
Roe	-0.001***	-0.009***	0.001	0.002	1.550***	-0.001**	-0.001*
	(-3.222)	(-6.788)	(0.593)	(1.127)	(3.536)	(-1.992)	(-1.840)
Lgr	-0.014***	-0.102***	0.028***	-0.014	5.641	-0.009***	-0.008***
	(-6.054)	(-12.813)	(3.113)	(-1.217)	(0.327)	(-3.894)	(-3.422)
BM	0.001***	0.012***	-0.008***	0.006***	0.950***	0.001**	0.001**
	(3.843)	(9.685)	(-5.554)	(3.628)	(3.358)	(2.401)	(2.087)
SH	0.002	-0.010	0.073***	-0.048*	-2.785	0.002	0.000
	(0.355)	(-0.593)	(3.647)	(-1.877)	(-0.337)	(0.326)	(0.044)
SZ	0.014***	0.050***	0.039***	-0.090***	-2.676	0.011***	0.011***
	(21.323)	(22.029)	(14.842)	(-26.938)	(-0.542)	(14.187)	(14.644)
Constant	-0.215***	-0.483***	-0.802***	3.162***	0.513***	-0.154***	-0.161***
	(-6.237)	(-4.131)	(-6.009)	(18.581)	(10.292)	(-4.371)	(-4.594)
Observations	5,228	5,228	5,228	5,228	5,228	5,228	5,228
R-squared	0.153	0.293	0.062	0.176	0.002	0.180	0.184
r2_a	0.149	0.289	0.058	0.173	-0.002	0.176	0.179
F	40.90	93.55	15.00	48.49	5.13	42.28	37.88

\*\*\*, \*\* and \* mean that the regression coefficient is significant at the level of 1%, 5%, and 10%, respectively, and the values in brackets are T-test values.

#### VII. ROBUSTNESS TEST

We use the PEG model, total interest-bearing liabilities/assets, pretax cash dividend per share, and standard deviation of return on equity measures the company's equity capital cost, financial leverage, dividend distribution, and risk-bearing variables, respectively, and use SA index  $(-0.737*Size+0.043*Size^2-0.04*Ag)$  estimating financing constraint to do robustness test. The results of the robustness test are shown in table 5. As shown in table 5, there was no substantial difference between the robustness test results and regression results, and the empirical conclusions were reliable.

**Table 5. Panel A Robustness test results of the Change of Cost of Equity Capital during DTR12**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	RPEG	Lev	Div	FC	Risk	RPEG	RPEG
Post	-0.035***	-0.021***	0.002	-0.087***	0.262***	-0.033***	-0.038***
	(-20.005)	(-4.612)	(0.072)	(-6.349)	(4.176)	(-19.225)	(-16.195)
Lev						0.025***	0.024***
						(4.233)	(4.131)
Div						-0.002*	-0.008***
						(-1.725)	(-2.643)
FC						0.022***	0.024***
						(11.076)	(9.126)
RT						0.003***	0.002***
						(6.201)	(4.695)
Post*Lev							0.001*
							(1.648)
Post*Div							-0.007
							(-1.142)
Post*RT							0.013***
							(5.605)
Post*FC							-0.005**
							(-2.463)
Hold	-0.002***	-0.019***	0.030**	0.022***	0.175***	-0.003***	-0.003***
	(-2.729)	(-8.488)	(2.527)	(3.282)	(5.657)	(-3.222)	(-3.473)
SZ	0.011***	0.019***	-0.022*	0.027***	0.000	0.010***	0.009***
	(12.747)	(8.816)	(-1.858)	(4.161)	(0.012)	(11.425)	(11.232)
RoE	0.004***	0.002	0.009	0.019	-0.418***	0.005***	0.005***
	(2.726)	(0.372)	(0.430)	(1.590)	(-7.511)	(3.190)	(3.328)
SH	0.000	-0.000***	0.001	-0.000	-0.004*	0.000	0.000
	(0.676)	(-2.974)	(0.728)	(-0.144)	(-1.854)	(1.095)	(1.248)
BM	-0.040***	0.245***	0.003	-0.415***	-1.568***	-0.033***	-0.030***
	(-8.843)	(20.306)	(0.042)	(-11.632)	(-9.565)	(-6.916)	(-6.404)
Constant	-0.114***	-0.372***	0.663***	0.006	1.977***	-0.108***	-0.105***
	(-6.191)	(-7.640)	(2.598)	(0.041)	(2.992)	(-5.920)	(-5.754)

Observations	4,095	4,189	4,189	4,189	4,189	4,095	4,095
R-squared	0.167	0.285	0.008	0.081	0.055	0.200	0.208
r2_a	0.163	0.281	0.00312	0.0762	0.0504	0.195	0.202
F	38.85	79.07	1.624	17.44	11.59	40.71	36.81

Panel B Robustness test results of the Change of Cost of Equity Capital during DTR15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLE	RPEG	Lev	Div	RT	FC	RPEG	RPEG
Post	-0.018***	-0.077***	0.045***	0.005	-0.029**	-0.017***	-0.023***
	(-11.332)	(-5.894)	(5.267)	(0.387)	(-2.043)	(-10.758)	(-4.705)
Lev						0.010***	0.004**
						(6.008)	(2.228)
Div						-0.010	-0.012***
						(-0.758)	(-3.175)
RT						-0.004**	-0.002
						(-2.490)	(-1.048)
FC						-0.010	-0.009*
						(-1.206)	(-1.691)
Post*Lev							-0.031***
							(-5.355)
Post*Div							-0.005***
							(-3.011)
Post*RT							-0.007
							(-0.344)
Post*FC							-0.001*
							(-1.856)
Roe	-0.001***	-0.011***	0.002	0.002	0.008**	-0.001***	-0.001**
	(-3.183)	(-3.362)	(1.094)	(0.596)	(2.391)	(-2.638)	(-2.384)
Lgr	-0.014***	-0.094***	0.016	-0.015	0.068***	-0.012***	-0.010***
	(-5.801)	(-4.804)	(1.274)	(-0.753)	(3.255)	(-5.106)	(-4.482)
BM	0.001***	0.011***	-0.007***	0.004	-0.003	0.001***	0.001***
	(3.770)	(3.564)	(-3.408)	(1.161)	(-0.803)	(3.287)	(3.056)
SH	0.002	0.005	0.157***	-0.103**	-0.277***	0.001	0.001
	(0.472)	(0.110)	(5.601)	(-2.303)	(-6.005)	(0.160)	(0.217)
SZ	0.015***	0.107***	0.009***	-0.116***	0.073***	0.014***	0.013***
	(22.057)	(19.186)	(2.580)	(-19.832)	(12.229)	(19.429)	(18.341)
Constant	-0.224***	-1.222***	-0.082	3.476***	-0.796***	-0.206***	-0.193***

	(-6.524)	(-4.273)	(-0.441)	(11.677)	(-2.597)	(-5.967)	(-5.593)
Ind	control	control	control	control	control	control	control
Observations	5,228	5,228	5,228	5,228	5,228	5,228	5,228
R-squared	0.160	0.181	0.021	0.113	0.059	0.175	0.180
r2_a	0.157	0.178	0.0165	0.109	0.0545	0.171	0.175
F	43.19	50.15	4.819	28.86	14.10	40.81	36.81

\*\*\*, \*\* and \* mean that the regression coefficient is significant at the level of 1%, 5%, and 10%, respectively, and the values in brackets are T-test values.

## VIII. CONCLUSION

We provide the empirical investigation of the effects of dividend tax reform on a firm's cost of equity capital in China. Theory suggests that DTR12 and DTR15 should decrease the cost of equity capital. This reduction should be larger for firms with less debt financing, firms facing more severe financial constraints, and firms with low risk-taking during DTR12. This reduction should also be larger for firms with more debt financing, firms facing more severe financial constraints, and firms with high dividend distribution during DTR15. Consistent with these predictions, we find that debt financing, financial constraints, and risk-taking play mediating roles in DTR12 and that debt financing and risk-taking play mediating roles in DTR15.

The above findings not only evaluate the economic consequences of the implementation of DTR12 and DTR15 from a micro perspective but also uncover the specific mechanism of the influence of dividend taxation reform on the cost of a company's equity capital in China. In addition, it provides the theoretical basis and reference for the company to control cost and the government to optimize the tax system, which has important theoretical and practical significance.

## REFERENCES

- [1] Edward McLaney, John Pointon, Melaniethomas, Jon Tucker. Practitioners' perspectives on the UK cost of capital[J]. *The European Journal of Finance*, 10 (2) (2004) 123-138.
- [2] David A. Guenther, Boochun Jung, Michael Williams. The Effect of the 2003 Dividend Tax Rate Reduction on Corporations' Cost of Equity Capital [Z]. (2005), business.uiuc.edu.
- [3] Dan Dhaliwal, Linda Krull, Oliver Zhen Li. Did the 2003 Tax Act Reduce the Cost of Equity Capital? [J]. *Journal of Accounting and Economics*, 43(1) (2007) 121-150.
- [4] Sikes, S., R. Verrecchia. Liquidity, Investor-Level Tax Rates, and Expected Rates of Return. Working paper, University of Pennsylvania. (2012).
- [5] Zhonglan Dai, Douglas A Shackelford, Harold H. Zhang. Does Financial Constraint Affect the Relation between Shareholder Taxes and the Cost of Equity Capital? [J]. *The Accounting Review*, 88(5) (2013) 1603-1627.
- [6] Shane R. Stinson, Robert C. Ricketts. Shifts in Ownership Composition and Changes in the Implied Cost of Equity Capital for Dividend and Non-Dividend Stocks Following JGTRRA03 [J]. *The Journal of the American Taxation Association*. 38(1) (2016) 103-124.
- [8] MacDougall, G.D.A. The Benefits and Costs of Private Investment from Abroad: A Theoretical Approach [J]. *Oxford Bulletin of Economics and Statistics*, 22 (3) (1960) 189-211.
- [9] Harberger, A. C. Efficiency Effects of Taxes on Income from Capital [M]. In M. Krzyzaniak, ed., *Effects of Corporation Income Tax*, Detroit: Wayne State University Press, (1966).
- [10] Hamada, K. Strategic Aspects of Taxation on Foreign Investment Income [J]. *Quarterly Journal of Economics*, 80 (3) (1966) 361-375.
- [11] King, M. A. *Public Policy and the Corporation* [M]. London: Chapman and Hall, New York, Wiley, (1977).
- [12] Auerbach, A. J. Taxation, Corporate Financial Policy and the Cost of Capital[J]. *Journal of Economic Literature*, (21) (1983) 905-940.
- [13] Miller, M. Debt and Taxes [J]. *Journal of Finance*, 32 (2) (1977) 261-275.
- [14] Oliver Zhen Li, Hang Liu, Chenkai Ni and Kangtao Ye. Individual Investors' Dividend Taxes and Corporate Payout Policies [J]. *Journal of Financial and Quantitative Analysis*. 52(3) (2017) 963-990.