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**Research Report**

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# KDI

## Policy Forum

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# Impact of Corporate Tax Cuts on Corporate Investment



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# ABSTRACT

- **There has been growing public support for a tax hike as corporate investment remains stagnant despite the recent cut in the corporate tax rate. Accordingly, this study aims to closely examine the impact of the corporate tax rate on investment.**
  - Managerial decisions, including those on investment, are based on a diverse range of factors, encompassing not only the corporate tax rate but also financial conditions and investment uncertainties. As such, corporate characteristics must be controlled, when possible, before estimating the impact of corporate tax change on investment.
  
- **An empirical analysis found that Korea's listed companies expand their investment significantly when the corporate tax rate is reduced.**
  - For the robustness of the analysis results, this study adopted various models and methodologies to analyze listed companies in 2002–2014 and found that a 1%p cut in the average effective corporate tax rate caused the investment rate to increase by 0.2%p.
  - In particular, it can be assumed that such an increase in investment may have been higher if the managements' tunneling activities were curtailed.
    - An analysis, using a structural model, revealed that in Korea, management sought private interests nine times more than their counterparts in the US, diminishing the effects of a tax cut by roughly 28% in the short run.
  
- **Therefore, the government must take a cautious approach when increasing the corporate tax rate, and also strengthen the internal and external monitoring and supervision of management to enable companies to make reasonable investment decisions.**

## 1

### Issues

- **Corporate investment remains stagnant despite the recent cut in the corporate tax rate, triggering the rallying of public opinion for an increase in the rate. Accordingly, this study aims to closely examine the impact of the corporate tax rate on investment.**
  - In 2009, the government reduced the corporate tax rate for companies with earnings of over 200 million won from 25% to 22% and in 2012, raised the tax assessment standard of the 22% maximum tax rate from over 200 million won to over 20 billion won.
  - Despite the reduction, however, overall corporate investment remains sluggish and public demand for a tax hike is growing.
    - There are expectations that an increase will help improve fiscal prudence and income distribution and also ease the tax revenue imbalance.

# 2

## Methodology and Data Used in the Empirical Analysis

- 1 In order to control the characteristics of respective companies, if possible, this study used explanatory variables commonly used in corporate finance, but characteristics such as opportunity cost and uncertainties in each company's investment may have not been completely controlled in principle.
- 2 Estimations of the average effective tax rate in the strict sense must come from the use of tax-related data, not the accounting data adopted in this study. Due to the limitations in obtaining tax-related data of respective companies from the National Tax Service, this study used their accounting data to estimate the average effective tax rate.

- However, as management-related corporate decisions on employment and investment are swayed not only by the corporate tax rate but also by various factors regarding overall financial conditions and investment uncertainties, an analysis of the actual impact of corporate tax rate changes on corporate investment should be conducted after controlling corporate characteristics.
- The following includes an empirical analysis on the impact of the average effective corporate tax rate on the corporate investment rate using the financial data of listed companies, and an examination into the impact of tunneling activities by management with regards to corporate income or cash holdings.
  - As tunneling activities can distort investment decisions, possibly diminishing the effects of a corporate tax cut, a quantitative approach is needed to analyze the impact of managements' tunneling activities on tax policy.

### ■ To conduct a more accurate analysis, this study used the unbalanced dynamic panel model, which has been commonly used in recent corporate analyses.

- For the robustness of analysis results, this study simultaneously conducted the 1st-difference GMM and system GMM and compared the results.
  - To remove any estimation bias arising from the endogeneity, the 1st-difference GMM and system GMM used the lagged level equations or differenced equations with -3 and -4 time lags as instrument variables (Arellano and Bond, 1991; Blundell and Bond, 2000).
- In addition, to maintain the conservative stance in terms of statistical significance, the standard error of coefficients was estimated using the two-step method for the covariance matrix used by Windmeijer (2005).
  - In a preliminary analysis, the two-step method for the covariance matrix is found to reduce the statistical significance of coefficients relatively further than the first-step method, helping to maintain the conservative stance towards estimates (Nam, 2015).

### ■ This study analyzed the impact of the average effective corporate tax rate on the corporate investment rate using yearly financial statements of non-financial companies listed in KOSPI in 2002-2014 from the Kis-value.

- The corporate investment rate, a dependent variable, is the rate of tangible asset investment relative to total assets and is calculated by dividing the investment in tangible assets by total assets.
  - The investment in tangible assets is calculated by adding the depreciation of tangible assets to the net increase in tangible assets.
- The explanatory variables to control the corporate characteristics used in this study are the average effective corporate tax rate, proportion of cash holdings, sales growth rate, ROE and Q value.<sup>1)</sup>
  - The average effective corporate tax rate is calculated by dividing the income tax expense from continuing operations by the net income pre-income tax from continuing operations (Kim, 2015; Hwang and Seol, 2014)<sup>2)</sup>
  - The debt ratio was calculated by dividing the total debt by total equity.
  - The proportion of cash holdings was calculated by dividing the sum of cash holdings—cash and cash equivalents, short-term securities, short-term entrusted assets to investment service companies, short-term loans, short-term loans to related parties, short-term loans to shareholders, management executives and employees, short-term financial instruments and short-term investment assets—by total assets.

# 3

## Results of the Analysis on the Corporate Tax Rate on Investment

- The sales growth rate was calculated as the growth in sales in financial statements.
- The ROE was calculated by dividing net income by total equity.
- The Q value<sup>3)</sup> was calculated by dividing the sum of the estimated corporate value from the Kis-value and total debt by total asset. The Kis-value-estimated corporate value was calculated by adding the present value of the excess margin(=net income-risk-free return) for the next five years to the net asset value.
- All models adopted dummy variables to estimate the time fixed effects.
- Lastly, to analyze the impact of the corporate tax policy on the investment of normal companies, this study excluded companies whose dependent and explanatory variables have extreme values, in accordance to certain conditions (Nam, 2015).
  - The final number of sample companies is 249, and the number of observations is 2,381.

**<Table 1> Impact of the Average Effective Corporate Tax Rate on the Investment Rate**

	1st-difference GMM				
	(1)	(2)	(3)	(4)	(5)
Debt ratio	0.075**	0.050*	0.037	0.083**	0.087**
Debt ratio (-1)	-0.030	-0.038	-0.026	-0.068**	-0.064**
Proportion of cash holdings	-0.140	-0.049		-0.149	
Proportion of cash holdings (-1)	0.034	-0.050		0.154	
Sales growth rate	0.135***	0.163***	0.164***	0.147***	0.144**
Sales growth rate (-1)	0.014	0.033	0.030	0.061*	0.038
ROE	-0.656	-0.295	-0.241		
ROE(-1)	-0.341	0.078	0.065		
Q value	0.438				
Q value (-1)	0.420				
Average effective corporate tax rate	-0.261**	-0.213	-0.213*	-0.129	-0.200*
Average effective corporate tax rate (-1)	0.020	0.013	0.045	0.023	0.063
System GMM					
Debt ratio	0.076*	0.062	0.049	0.059	0.054
Debt ratio (-1)	-0.053*	-0.058*	-0.039	-0.052	-0.040
Proportion of cash holdings	-0.364***	-0.331**		-0.313**	
Proportion of cash holdings (-1)	0.177*	0.153		0.173	
Sales growth rate	0.102**	0.108**	0.082*	0.128***	0.123**
Sales growth rate (-1)	-0.010	0.001	-0.022	0.003	-0.028
ROE	-0.460	-0.152	-0.148		
ROE(-1)	0.015	0.282**	0.240*		
Q value	0.305				
Q value (-1)	0.253				
Average effective corporate tax rate	-0.206**	-0.199*	-0.220**	-0.185*	-0.226**
Average effective corporate tax rate (-1)	0.081	0.052	0.076	-0.007	0.020

Note: 1) Figures in ( ) denote the time lag of explanatory variables.

2) \*\*\*,\*\* and \* denote statistical significance at the 1%, 5% and 10% level, respectively.

Source: Nam (2015).

3 Q value is defined as the market value against the replacement cost of asset, according to corporate finance. As the Q value approaches 1, the company has less incentive to invest additionally, and as the Q value exceeds 1, the company has more incentive to increase investment.

# 4

## Impact of Tunneling Activities by Management on the Effects of Corporate Tax Cuts

■ According to the empirical analysis results, Korea's listed companies significantly expand investment when the average real effective corporate tax rate is reduced.

- Analysis of the 1st-difference GMM and system GMM using the combination of various explanatory variables revealed a consistent finding that the average effective corporate tax rate affects the investment rate with statistical significance.
- In particular, according to the coefficient of the average effective corporate tax rate affecting the investment rate, a 1%p drop in the tax rate is estimated to cause an average 0.2%p rise in the investment rate.

■ As aforementioned, the increase in investment resulting from corporate tax cuts could have been larger if management was subject to much stronger monitoring and supervision.

- It is often the case that in recent Korea, management uses its position to legally seek private interests or even illegally use corporate assets (Box 1).
- As such, the presence of tunneling activities by management could result in a distortion of investment decisions, consequently weakening the effect of the corporate tax policy.
- To quantitatively examine the negative impact arising from such a distortion, this study analysed the impact of the reduced corporate tax rate on corporate investment and production, using a structural model.

### <Box 1> Cases of Tunneling Activities by Management

■ 'B' is a shareholder and also a part of management for 'A' company. 'B' received both wages and dividends worth several ten billion won even while 'A' company was defaulting.

- For the last four years of the company's severe default, general shareholders were paid no dividends while 'B' received several ten billion won in the name of contingent compensation and retirement pay.

■ 'D' is a shareholder and also a part of management for 'C' company. 'D' made private use of corporate cash holdings in various ways.

- 'D' set aside a multi-billion-won fund for private use by hiding away the company's cash holdings worth several ten billion won through various means including borrowed-name stocks, overseas special purpose company, etc.

■ 'F' is a shareholder and also a part of management for 'E' company. 'F' made private use of corporate cash holdings.

- 'F' created a fund worth several hundred billion won through the company's major affiliates and financed a startup investment company. Then, through the startup company, 'F' used several ten billion won for private investments.

■ According to an analysis using a structural model, the degree of tunneling is much higher among management in Korea than their counterparts in advanced countries.

- The structural model assumes that companies' accumulation of cash holdings is driven not only by financial conditions such as investment uncertainties, but also by management seeking private interests from cash holdings. This assumption was applied to the model, and the model estimated the rate of tunneling by management (Box 2).

- In Korea, management is estimated to use 0.09% of the companies' operating income and cash holdings for private interests. The figure is nine times higher than 0.01% of the US estimated by Nikolov and Whited (2014).
- This implies that Korea's internal and external mechanism to monitor and supervise management are incomplete or not functioning properly compared to those in major advanced countries.

### <Box 2> Model of Corporate Decision Making in Response to the Corporate Tax Policy

■ Nam (2015) developed a dynamic decision model to conduct a simulation and estimate the degree of tunneling by management.

- In the model, a shock to productivity in respective companies is exogenous.
  - The shock to productivity was created using the financial statements of non-financial companies listed in KOSPI.
- In response to a productivity shock, management makes decisions on employment, investment, dividend and cash holdings to maximize the sum of the value of stocks they currently hold as well as their private interests (Easterbrook, 1984; Nikolov and Whited, 2014; etc.).<sup>4</sup>
  - In the model, stock value is defined as the present value of dividend flow that the management will receive in the future. The value of private interests is defined as the present value of a certain percentage of benefits that the management will receive from the company's operating income and cash holdings every year.
- The percentage of benefits that the management receives from the company's operating income and cash holdings was estimated as the value that minimizes the statistical gap between KOSPI and the simulation in the model.
  - This methodology is intended to see how accurately the structural model can reflect or describe reality. <Table 2> confirms that the structural model in this study well describes corporate decision making in the real world.

<Table 2> Statistics from KOSPI and Structural Model

(Unit: %)

	Proportion of cash holdings	Dividend payout ratio	Proportion of dividend-paying companies	Tangible asset investment rate	Standard deviation of investment rate
KOSPI	9.08	20.37	69.97	16.08	29.75
Structural Model	9.05	20.28	70.62	16.11	29.29

Source: Nam (2015).

<Table 3> Short-term Effect of a 1%p Drop in the Structural Model's Average Effective Corporate Tax Rate

	When tunneling is possible	When tunneling is not possible
Investment rate	0.21%p increase	0.29%p increase

■ According to the simulation, the reduction in the corporate tax rate could have a positive impact on corporate investment and production. However, with the tunneling activities by management, the effect from the corporate tax cut is lower by 28%.

- A permanent 1%p decrease in the average effective corporate tax rate is found to cause corporate investment to rise 0.29%p in the short-term.
- The short-term increase in the investment rate is a mere 0.21%p when tunneling is possible, implying that the effects from the reduced average effective corporate tax rate declined 28%.

<sup>4</sup> According to corporate finance, the reason for companies accumulating cash holdings can be explained not only by the tunneling activities of management but also by the trade-off and pecking order theories (Kraus and Litzenberger, 1973; Myers and Majluf, 1984).

# 5

## Policy Implications

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- In an environment that enables tunneling, there is often an accumulation of corporate funds—made available by the tax cut—as a cash holdings in order to seek private interests. This eventually leads to a smaller expansion in investment, compared to when there are no incentives to seek private interests.
- The analysis findings also imply that in a corporate environment as today, an increase in the corporate tax rate could have an even larger negative impact on corporate investment.
  - A rise in the corporate tax rate reduces cash flow, implying that it would be desirable for companies to use cash holdings to make up for the reduction in investment. However, if there is incentive for management to seek private interests from cash holdings, they are most likely to curtail investment rather than downsize cash holdings.

- **An analysis of recent corporate data reveals that Korea’s listed companies significantly expand their investment in response to a cut in the corporate tax rate, implying that an increase in the corporate tax rate could result in a reduction in investment with statistical significance.**

- According to the analysis—with factors such as financial condition, profitability and investment uncertainties controlled—a 1%p drop in the average effective corporate tax rate leads to a 0.2%p rise in the investment rate.
  - In particular, such an increase in investment via a cut in the corporate tax rate could have been larger if tunneling by management was curtailed.
- Under the circumstances, it should be noted that a return to a higher corporate tax rate could exacerbate the tunneling activities by management, consequently leading to a deterioration in employment and investment and even weakening the effect of income distribution.

- **Therefore, the government must take caution in increasing the corporate tax rate and control the tunneling behaviour of management by strengthening the internal and external monitoring and supervision in order to encourage companies to make reasonable decisions with regards to employment and investment.**

- The monitoring and supervision of management must be enhanced by strengthening the independence and transparency of the composition and operation of the board of directors. Additionally, the requirements in appointing management executives must be reinforced to enable the formation of a responsible management board.
  - To enhance the independence of the outside director system, a critical means to monitor corporate management through the board of directors, the outside director recommendation committee should be composed of only outside directors. Information about their personal ties (schools and regional connections) to management as well as their activities should be disclosed and also taken into account when reappointing them.
  - To strengthen the accountability of management, those who have received a certain level of administrative or judicial sanctions need to be excluded from appointment.
- Also, recent corporate restructuring processes have unmasked a series of problems related to corporate disclosure, external auditing and corporate valuation systems, meaning that market regulations on external corporate monitoring must also be strengthened.



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