

Effect of Market Monopoly Power of Diversified Companies on Capital Structure and Speed of Capital Structure Adjustment

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ABSTRACT : This study empirically analyzed the effect of market monopoly power on capital structure and speed of capital structure adjustment of diversified companies listed on the Korea Exchange's securities market from January 1, 2000 to December 31, 2019, and the major results of the analysis are as follows; [Model 1] shows that the leverage ratio increases as the monopoly power of a company increases in the product market, and this supports the limited liability hypothesis. In [Model 2], we find that a company's debt increases when its monopoly power is at a low level, and decreases at a high level. Therefore, the limited liability hypothesis is supported when the monopoly power of a company is low in the product market, and the predatory hypothesis is supported when the monopoly power of the company is high. And [Model 3] means that a company's monopoly power in the product market increases its debt at a low level, decreases them at a medium level, and then increases it again at a high level. In other words, the limited liability hypothesis is supported when the monopoly power of a company is at a low level in the product market; the predatory hypothesis is supported at a medium level, and again the limited liability hypothesis is supported at a high level. And when we measure the leverage adjustment speed of all sample companies, the leverage adjustment speed of the companies in [Model 1], [Model 2] and [Model 3] is measured as 0.254, 0.273 and 0.281 respectively. Therefore, we can see that it takes about 4 years for companies to fully adjust the gap between the target leverage ratio and the actual leverage ratio.

KEYWORDS diversified company, market monopoly power, capital structure, speed of capital structure adjustment

Date of Submission: 22-01-2021

Date of acceptance: 06-02-2021

I. INTRODUCTION AND LITERATURE REVIEW

The ownership structure of a company is closely related to the issue of proxies of stakeholders such as shareholders, management and creditors. Among shareholders, while major shareholders can exert a powerful influence over management and the board of directors, external minority shareholders cannot. Therefore, as the concentration of ownership increases mainly with major shareholders in the center in terms of the ownership structure of a company, major shareholders may have a serious conflict of interest with minority shareholders. Debt is mostly frequently used as a source of external financing for companies, and in particular, bank loans, which are private debts, and bonds, which are public debts, are the major sources of financing in the modern world. Given the high proportion of debts as a source of external financing, it is very important to understand the determinants of a company's debt structure and differential debt selection. The most important discussion regarding corporate debt selection is the question of understanding why some companies are highly dependent on private debt such as bank loans as a source of external financing, while others use public debt such as issuing corporate bonds to raise funds.

In the limited liability hypothesis and the predatory hypothesis, the relationship between the monopoly power and capital structure of a company in the product market is measured in opposite directions. In the limited liability hypothesis, the monopoly power and capital structure of a company in the product market are measured to have a positive (+) relationship, but in the predatory hypothesis, they are measured to have a negative (-) relationship. The results of empirical studies on the two hypotheses also do not match. Rajan and Zingales (1995), Titman and Wessels (1988), and Liu et al. (2003) argue that there is a positive (+) relationship between a company's monopoly power and capital structure in the product market, but Rathinasamy et al. (2000), Zhu et

al. (2002) and others said that there is a negative (-) relationship. The previous studies mostly predicted a positive (+) or negative (+) linear relationship, but Pandey (2004) suggested that the monopoly power in the product market and the capital structure of a company appear as a cubic functional relationship due to the complex interaction between market power, proxy problem, and bankruptcy risk. In other words, when measuring a company's monopoly power in the product market by Tobin-q, companies with low or high level of monopoly power increase their debt, but companies with moderate monopoly power reduce their debt.

Fairchild (2004) presented a theoretical model in which the relationship between monopoly power and capital structure in a company's product market is a nonlinear functional system due to the conflict between the limited liability hypothesis and the predatory hypothesis, and Guo et al. (2004) argued that the relationship between the monopoly power in the product market and the capital structure of a company differs according to the type of industry because the monopoly power in the product market varies according to the type of industry. Furthermore, Guney et al. (2011) suggested that the relationship between monopoly power and capital structure in the product market of a company may be either linear or nonlinear depending on the type of industry. In this study, we analyze the effect of monopoly power on capital structure and speed of capital structure adjustment based on the preceding studies as described above, targeting diversified companies listed on the Korea Exchange's stock market from January 1, 2000 to December 31, 2019, and present policy implications.

II. MODELS AND VARIABLES

In this study, we set up a regression model as shown in Formula (1) to empirically analyze the monopoly power of diversified companies in the market and their effects on capital structure and capital structure adjustment speed. Many previous studies have suggested that there is a linear relationship between monopoly power and capital structure in a company's product market, but Pandey (2004) suggested that there is a nonlinear relationship, while Guney et al. suggested that it can be either nonlinear or nonlinear.

$$L_t = \alpha_0 + \alpha_1 Q_{t-1} + \alpha_2 Q_{t-1}^2 + \alpha_3 Q_{t-1}^3 + \alpha_4 TANG_t + \alpha_5 PROF_t + \alpha_6 SIZE_t + \alpha_7 INT_t + \alpha_8 DEFA_t + \varepsilon_t \quad (1)$$

The debt ratio (L_t) used as the dependent variable in Equation (1) is measured as [(total liabilities in t years)/(total liabilities in t years + market capitalization of equity capital in t years) according to Fama and French (2002) and Hovakimian (2006). And Tobin-q(Q), which is used as an explanatory variable, is a proxy variable that represents a company's monopoly power in the product market. Tobin-q is theoretically defined as [(market value of a company in t-1 year)/(replacement cost of an asset in t-1 year)], but since it is very difficult to collect data on the replacement cost of an asset, it is measured as [(Company i's total liabilities in t-1 year + Company i's total market capitalization in t-1 year)/(Company i's total assets in t-1 year)] according to the method of Chung and Pruitt (1994). For controlled variables, first, the tangible ratio ($TANG_t$) is measured as [(t year inventory assets + t year tangible assets)/(t year total assets)]; the profitability ratio ($PROFIT_t$) is measured as [(t year EBITDA)/(t year total assets)]; the company size ($SIZE_t$) is measured as \ln [t year total assets (1 million won)]; the interest compensation ratio ($\in T$) is measured as [(t year operating profit)/(t year interest cost)]; and the financial deficit ratio ($DEFA_t$) is measured as [(cash dividends + net investment + net working capital increase + liquid long-term debt-business cash flow after taxes)] according to the measurement method of Frank and Goyal (2003). Among the detailed items, net investment is measured as (cash outflows from investing activities-cash inflows from investing activities) in the cash flow statement, and net working capital increase is measured as (current assets-current liabilities) in the balance sheet, and business cash flow after taxes is measured in the income statement as (operating income + depreciation expense).

III. DATA AND DESCRIPTIVE STATISTICS

In this study, we select sample companies based on the following criteria from among the companies listed on the Korea Stock Exchange. First, except for companies that we cannot obtain financial and stock price data from January 1, 2000 to December 31, 2019 in KIS Value Library, FnGuide, and TS2000, we exclude financial sectors such as banking, securities, insurance, etc. from the sample companies because they differ from the general manufacturing industry in terms of aspects such as capital structures, business methods methods and government regulatory supervision. Also, during the analysis period, delisted companies are excluded from the sample companies, and during the analysis period, merged companies or companies subject to administration are excluded from the sample because there are problems with the continuity of financial data. In addition, companies with total assets of less than KRW 1 billion or without sales may generate outliers for the variables, so they are excluded from the sample companies, and for each variable, upper and lower 1% is winsorized to control the effect of outliers on analysis results. The number of firm-years of diversified companies that satisfy the above conditions is 3,958. A diversified company is defined as a company with at least two business units belonging to different standard industry classification codes under the Korean Standard Industry Classification (KSIC) (Tong, 2011).

<Table 1> shows the results of analyzing basic statistics for the characteristic variables of all sample companies. These variables are used as explanatory variables and control variables to analyze the analysis model. First, the average of the debt ratio (L), which is a capital structure variable, is 50.78%, which is higher than the median 49.42%. The explanatory variable Tobin-q has an average of 0.9505, which is asymmetrical distribution greater than the median 0.8358. Among the corporate characteristic variables that affect the debt ratio, the average of the tangible ratio (TANG) is 46.53%, which is less than the median 47.17%, and the average of the profitability ratio (PROF) is 7.18%, which is greater than the median 7.05%. The average of corporate size (SIZE) is 25.5019, which is greater than the median 25.2830, the average of the interest compensation ratio (ϵ T) is 8.18, which is greater than the median 6.05, and the average of the financial deficit ratio (DEFA) is 5.90%, which has greater distribution than the median 5.83%. And as a result of the analysis, most of the corporate characteristic variables are not significantly affected by extreme values, and the distribution of variables is a little more stable because outliers exceeding the upper and lower 1% were winsorized for each variable.

<Table 1> Basic statistics analysis

Variables	Average	Standard deviation	Median
L_t Debt ratio	0.5078	0.2613	0.4942
Q_{t-1} Tobin-q ratio	0.9605	0.5014	0.8538
$TANG_{t-1}$ Tangible ratio	0.4653	0.1940	0.4717
$PROF_{t-1}$ Profitability ratio	0.0718	0.0876	0.0705
$SIZE_{t-1}$ Company size	25.5019	1.6907	25.2830
INT_{t-1} Interest compensation ratio	8.1897	1.6014	6.0589
$DEFA_{t-1}$ Financial deficit ratio	0.0590	0.2517	0.0583

<Table 2> shows the correlation between variables as Pearson's correlation coefficient. The sign of the correlation coefficient between the dependent variable and the independent variable is generally consistent with the prediction. In particular, Tobin-q, the variable of monopoly power in a company's product market, has a significant positive (+) correlation with the leverage ratio, which is the capital structure variable, at 1%. These results suggest that as the monopoly power of a company increases, the use of debt increases. In the control variables, the tangible ratio, firm size, interest compensation ratio, and financial deficit ratio have a significant positive (+) relationship with the leverage ratio at 1-5% each, and the profitability ratio has a significant negative (-) relationship with them at 1%. In addition, there are mixed cases with and without significant correlations between independent variables.

<Table 2> Correlation analysis

Variable	L_t	Q_{t-1}	$TANG_{t-1}$	$PROF_{t-1}$	$SIZE_{t-1}$	INT_{t-1}	$DEFA_{t-1}$
L_t	1						
Q_{t-1}	0.310**	1					
$TANG_{t-1}$	0.227**	-0.113**	1				
$PROF_{t-1}$	-0.254**	0.125**	-0.034*	1			
$SIZE_{t-1}$	0.040**	0.115**	0.123**	0.144**	1		
INT_{t-1}	0.027*	0.015	0.103**	0.082**	-0.003	1	
$DEFA_{t-1}$	0.029*	-0.035	0.140**	-0.208**	0.106**	-0.019**	1

Note) ** and * indicate significance at the 1% and 5% levels (both sides), respectively.

IV. EMPIRICAL RESULTS

<Table 3> shows the results of analyzing the effect of market monopoly power of diversified companies on capital structure. [Model 1] is a model for analyzing linear relationships, [Model 2] is a model for analyzing quadratic functional relationships, and [Model 3] is a model for analyzing cubic functional relationships. As a result of the analysis, in [Model 1], Tobin-q has a significant positive (+) in 1% number on the leverage ratio, which means that as the monopoly power in the product market increases, the leverage ratio increases, and this is the evidence that the limited liability hypothesis is supported. In [Model 2], Tobin-q has a

significant positive (+) effect on the leverage ratio at 1%, and the squared variable has a significant negative (-) effect at the 1% level. In other words, Tobin-q affects the leverage ratio in the form of a quadratic function $[+Q_{t-1} ; -Q_{t-1}^2]$, and this means that debt is increased when the monopoly power of a company is low in the product market, and decrease debt when it's high. Therefore, the hypothesis of limited liability is supported when the monopoly power of a company is low in the product market, and the predatory hypothesis is supported when the monopoly power of a company is high. And in [Model 3], Tobin-q has a significant positive (+) effect on the leverage ratio at the 1% level, and the squared variable has a significant negative (-) effect on the 1% number, and the cube variable has a significant positive (+) effect at the 1% level. In other words, Tobin-q affect the leverage ratio in the form of a cubic function $[+Q_{t-1} ; -Q_{t-1}^2 ; +Q_{t-1}^3]$, and this means that in the product market, a company's monopoly power increases its debt at a low level of monopoly, reduces its debt at a moderate level, and increases its debt again at a higher level. In other words, in the product market, the limited liability hypothesis is supported if the monopoly power of a company is at the low level; the predatory hypothesis is supported at the intermediate level, and the limited liability hypothesis is again supported at the high level.

<Table 3> The effect of market monopoly power of diversified companies on capital structure

Variable	Coefficient	Company diversification		
		Model 1	Model 2	Model 3
Constant	α_0	-0.186** (-2.42)	-0.221*** (-2.99)	-0.309*** (-3.52)
Q_{t-1}	α_1	0.057*** (8.65)	0.394*** (14.86)	0.842*** (9.77)
Q_{t-1}^2	α_2		-0.169*** (-13.80)	-0.686*** (-7.88)
Q_{t-1}^3	α_3			0.172*** (6.11)
TANG _{t-1}	α_4	0.257*** (14.54)	0.306*** (15.08)	0.325*** (15.51)
PROF _{t-1}	α_5	-0.217*** (-6.94)	-0.237*** (-7.62)	-0.240*** (-7.80)
SIZE _{t-1}	α_6	0.013*** (4.62)	0.011*** (4.22)	0.009*** (4.04)
INT _{t-1}	α_7	-0.082** (-2.34)	-0.049*** (-3.59)	-0.034** (-2.18)
DEFA _{t-1}	α_8	0.025*** (2.91)	0.022*** (3.06)	0.023** (3.12)
YD		Included	Included	Included
IND		Included	Included	Included
Observation		3,958	3,958	3,958
Adjusted – R ²		0.2097	0.2864	0.3069
F – value		274.06***	364.18***	397.52***

() indicates the t-value to which the corrected standard error of White (1980) is applied, and ***, **, * indicate significance at the 1%, 5%, and 10% levels (both sides), respectively.

<Table 4> shows the results of analyzing the dynamic effects of market monopoly power of diversified companies on capital structure. As a result of the analysis, they are found to be similar to the study results in <Table 3>. In the product market, the limited liability hypothesis is supported at the low level of the company's monopoly power, the predatory hypothesis is supported at the intermediate level, and the limited liability hypothesis is again supported at the high level. When we summarize the result of applying [Model 1], [Model 2] and [Model 3] step by step, we can say that a company's monopoly power in the product market affect in the form of a cubic function not only in the static capital structure but also in the dynamic capital structure. Also, as

a result of measuring the leverage adjustment speed of all sample companies, the coefficient (β_1) of the t-1 year leverage ratio (L_{t-1}) of the companies are 0.746, 0.727 and 0.719 respectively, the leverage adjustment speed ($\theta = 1 - \beta_1$) is measured as 0.254, 0.273 and 0.281, respectively. The leverage adjustment speed (θ) as 0.254 means that when the actual leverage ratio deviates from the target leverage ratio, the gap is partially adjusted by 25.4% every year. In this case, we can see that it takes about 4 years for companies to fully adjust the gap between the target leverage ratio and the actual leverage ratio.

<Table 4> The dynamic effect of market monopoly power of diversified companies on capital structure

Variable	Coefficient	Company diversification		
		Model 1	Model 2	Model 3
Constant	β_0	0.134 (0.96)	0.076 (1.08)	0.081 (1.43)
L_{t-1}	β_1	0.746*** (24.86)	0.727*** (21.76)	0.719*** (21.03)
Q_{t-1}	β_2	0.069* (1.69)	0.152** (2.17)	0.392*** (3.98)
Q_{t-1}^2	β_3		-0.129** (-2.17)	-0.392*** (-3.99)
Q_{t-1}^3	β_4			0.116*** (3.85)
$TANG_{t-1}$	β_5	0.108*** (3.06)	0.115*** (3.12)	0.116*** (3.19)
$PROF_{t-1}$	β_6	-0.069*** (-2.87)	-0.073*** (-3.06)	-0.077*** (-3.13)
$SIZE_{t-1}$	β_7	0.021* (1.76)	0.025* (1.80)	0.027* (1.85)
INT_{t-1}	β_8	-0.083** (-2.06)	-0.045*** (-3.30)	-0.044** (-3.25)
$DEFA_{t-1}$	β_9	0.023* (1.76)	0.016* (1.68)	0.014 (1.61)
Adjustment speed (θ)	$1 - \beta_1$	0.254	0.273	0.281
YD		Included	Included	Included
IND		Included	Included	Included
Observation		3,958	3,958	3,958
Adjusted – R ²		0.2863	0.3175	0.3388
F – value		376.94***	408.42***	422.61***

() indicates the t-value to which the corrected standard error of White (1980) is applied, and ***, **, * indicate significance at the 1%, 5%, and 10% levels (both sides), respectively.

V. CONCLUSIONS AND DISCUSSION

This study empirically analyzed the effect of market monopoly power on capital structure and capital structure adjustment speed for diversified companies listed on the Korea Exchange's securities market from January 1, 2000 to December 31, 2019, and the major analysis results are as follows. [Model 1] means the leverage ratio increases as the monopoly power of a company increases in the product market, and supports the limited liability hypothesis. [Model 2] shows that a company's monopoly power increases its debt at a high level and decreases it at a low level. Therefore, the limited liability hypothesis is supported when the monopoly power of a company is low in the product market, and the predatory hypothesis is supported when the monopoly power of a company is high. And [Model 3] shows that a company's monopoly power in the product market increases its debt at a low level, reduces it at a medium level, and increases its debt again at a high level. In other words,

In the product market, the limited liability hypothesis is supported when a company's monopoly power is at a low level; the predatory hypothesis is supported at an intermediate level, and the limited liability hypothesis is again supported at a level. And as a result of measuring the leverage adjustment speed of all sample companies, the leverage adjustment speed of the companies in [Model 1], [Model 2] and [Model 3] is measured as 0.254, 0.273, and 0.281, respectively. Thus, we can see that it takes about 4 years for companies to fully adjust the gap between the target leverage ratio and the actual leverage ratio. Since this study targeted only companies listed on the Korea Exchange's securities market, and analyzed only those companies that meet strict sampling standards, there are many limitations in generalizing the interpretation of the analysis results. Therefore, we believe that it is necessary to further expand the sample companies, improve the measurement method of capital structure variables, and diversify control variables and analysis methods in future studies.

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Soeun Kim, et. al. "Effect of Market Monopoly Power of Diversified Companies on Capital Structure and Speed of Capital Structure Adjustment." *American Journal of Engineering Research (AJER)*, vol. 10(2), 2021, pp. 46-51.