

A Review on the Financial Profile of Profitability for the KOSDAQ Listed Firms Headquartered in 'Chungcheong' province in the Republic of Korea

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국내 충청권 기반 KOSDAQ 상장기업들의 수익성 결정요인 분석

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Abstract From foreign and/or domestic investors' perspectives, it may be interesting to find any financial attributes or profile of the firms headquartered in 'Chungcheong' province concerning profitability, given that this subject so far drew less attention in the previous literature. This study performed three hypothesis tests on the profitability indicator by utilizing the models such as the 'panel data' one and the 'logistic' regression one, applying a modified 'Dupont' system. With respect to the major findings, the results identified that the proxies measuring leverage across the book-value(BVLEV1) and the market-value(MVLEV1) bases, were statistically significant constituents determining profitability. Another explanatory variable, SIZE, with its positive and statistically significant relationship to the indicator, represented that the firms in the province were smaller than their counterparts in the other regional areas in Korea. DRELY applying a modified 'Dupont' system, found to be the only statistically significant discriminating factor between these comparison groups. As one of the primary contributions of this study, the outcomes may be used by the financial institutions operated across the regions including Seoul Metropolitan area, when implementing their lending practices to provide funds for potential borrowers such as the firms belonging to 'Chungcheong' province.

요 약 충청권 본사 소재의 KOSDAQ 상장기업들의 재무적측면관련, 수익성 결정요인에 대한 기존의 연구결과들은 기존의 재무적이슈 연구들과 비교하여, 상대적으로 연구정도가 미약하다고 판단된다. 본 연구에서는 동 표본기업들을 중심으로 수익성 관련 가설에 대한 3가지 심층분석을 위한 검정을 수행한 결과, 다음의 종합적인 내용이 발견되었다.: 첫째, '패널자료' 모형을 활용하여 분석한 결과, 충청권 소재 기업들의 자본구조는 종속변수인 수익성에 대하여 음(-)의 유의적 상관관계를 유지하였으며, 이는 장부가와 시장가 기준의 모든 부채비율에게 공통적으로 나타나는 일관성 있는 결과였다. 또한, 동 표본기업들의 (자산크기 기준의) 대응변수는 종속변수와 양(+의) 통계적 유의성을 나타냈으며, 이에 대한 추가적인 분석으로서 두 번째 가설관련, 로지스틱 모형의 활용 결과, 동 기업들이 국내 타 지역 소재의 기업들과 비교하여 평균적으로 규모측면에서 상대적으로 작다는 결과가 도출되었다. 세 번째 가설검정에서 '수정 듀퐁시스템'을 응용한 기업들의 금융비용부담률에 대한 분석결과, 충청권 소재기업들의 동 부담률에 관한 3가지 구성요인들(차입금의존도, 차입금평균금리, 총자산회전율의 역수) 중, 첫 번째 요인인 차입금의존도 변수에서만 유일하게 양(+의) 유의성을 보였다. 이는 표본기업들이 비교기업들보다 상대적으로 높은 부채비율을 유지한다는 것을 나타냄을 의미할 수 있으며, 동 결과를 강건성 측면에서 분석할 때 첫 번째 가설에 대한 검정결과와도 수익성측면에서 일관된 논리로서 해석될 수 있다고 판단된다.

Key Words : KOSDAQ, Chungcheong Province, Profitability Indicator, Panel Data Analysis, Logistic Regression Model

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1. Introduction

This study investigates empirical issues that have received little attention in the previous literature in finance on the issues of profitability in the KOSDAQ stock market in the Korean capital market. The study by Gill et al.[1] described "... based on limited availability of (the previous) literature on the relationship between capital structure and the profitability of the firm, it has been found that capital structure impacts the profitability of the firm."Therefore, subsequent to the previous literature with less attention, this research has performed to identify any financial attributes or profile of profitability for the firms headquartered in one of the domestic regions, 'Chungcheong' Province, in the Republic of Korea.

Whether it may be a 'myth' or 'reality' on the level of leverage for the firms listed in the KOSPI market, it may particularly be worth performing an empirical research for those headquartered in the 'Chungcheong' province, based upon the following conflicting or perverse existing researches. Kim & Ham[2] described that the firms belonging to manufacturing industries of the north Chungcheong province showed their sluggish stages in the growth rate of production in the period of the post-Asian financial crisis, in comparison with the average rate of the those headquartered the other provinces. For instance, with respect to profitability, they presented that the indicators such as return of assets(ROA), profit margin, and EBIT/sales were 0.72%, 0.8%, and 6.42%, respectively, which were much lower than those of average ratios (6.78%, 6.27%, and 6.74%) from their counterparts located in the other domestic provinces. Accordingly, they suggested that the firms in the particular regional area may need two major macro-policies such as hosting overseas and domestic capital and motivating the activation of venture business to improve the financial conditions of the firms in terms of profitability and capital structure. Moreover, by analyzing with more recent data of the year of 2008, Kim[3] presented that the financial condition of the firms in the north Chungcheong area continued to decline in profitability such as -1.34% of ROA and -1.10% of profit market in the year, which was lower than those of the firms domiciled in the other regions. Lee et al.[4] also tested the relationship between labor costs as part of cost

of goods sold and a variety of profitability indices such as profit margin, EBIT/sales and return on assets for the sample firms domiciled in the north Chungcheon area. Across all differently measured proxies for profitability, they found that there were no statistically significant relationships between labor costs and the indices. They suggested that more firms in the region may need to engage in the capital-intensive industry rather than the labor-intensive one to increase their profits due to the insignificant effect of the costs on profitability, based upon the findings obtained from the study. However, Korea Institute for Health and Social Affairs[5] presented that the Chungcheong province was ranked in the 2nd place out of the total seven sub-divided provinces in Korea, in regard to the so called as 'Regional Economic Index' in 2007. To describe, the particular area showed its superiority esp., in the aspects of 'Industrial Development', 'Human Resources' and 'Innovative Capability' composing the aforementioned index in the corresponding year. Furthermore, the proportion of the 'Knowledge based' manufacturing industries in this region, was reported to be the second largest next to the Seoul metropolitan area such that the employment rate of the industries in the 'Chungcheong' province 16.% in the sample year.

Therefore, based upon the previous few researches, it may be interesting and intriguing to identify any financial components determining profitability in the 'Chungcheong' province in the present study, whose results may be effectively utilized to improve the recent trend of low profitability of the region, taking into account of its immanent potentials with knowledge based resources, as described above.

The followings are the primary motivations to conduct this particular study applying its relevant hypotheses tested:

First, it would be of interest to examine any proposed financial characteristics affecting major, but unexplored subjects theorized in modern finance. For instance, one of the prevalently studied subjects in the finance literature seemed to be the issue of capital structure across all types of capital markets such as advanced and emerging ones.[6,7,8] Contrarily, any studies to identify any financial determinants on differently measured profitability indicators, may be relatively few as described, in comparison with other subjects abundantly

researched in the finance literature.

Second, this study investigated for the firms listed in the KOSDAQ (Korea Securities Dealers Automated Quotation) which were headquartered in 'Chungcheong' province in Korea. While there seemed to be voluminous researches for the firms listed in either the KOSPI(Korea Composite Stock Price Index) or the KOSDAQ such as in [9], any further investigations focused only on the 'Chungcheong' province may also receive little attention in the previous finance literature. In other words, any previous studies on this issue may be even much less if the sample firms are geographically limited to the particular districts such as the 'Chungcheong' Province. From the perspectives of policy makers and market participants, it would be beneficial if any upcoming researches, can be performed in order to maintain academic balances between the national and the regional (or provincial) levels.

Finally, any results or outcomes of this research employing in-depth methodologies, may be utilized for a comparison purpose, which may enhance the robustness of or suggest any undiscovered implications on the results obtained from the previous studies including cross-border analyses on the profitability of a firm. To implement the procedures of this study, the panel data (or longitudinal data) model, was employed so that any statistically significant factors composing the financial profitability of the sample firms in the province may be analyzed, coupled with a subsequent hypothesis test for analyzing the ROE(return on equity) as a proxy for profitability by applying practical financial equations such as a modified 'Dupont' system.

To perform comprehensive investigations towards the objectives of this study, it employed the sample firms listed in the KOSDAQ during the six-year period from the years of 2005 to 2010, a broader period comprehending the global financial crisis originated, in large part, from the defaults on the U.S. sub-prime mortgage debts. Moreover, the proxies as dependent variables(DVs) for profitability were employed at both theoretical and practical levels such as $[EBIT(=Earnings\ before\ Interest\ and\ Taxes)/Total\ assets]$ for the panel data analysis and ROE in the Dupont analysis, respectively.

The paper consists of five sections as follows: Coupled with the first section as an introduction one elaborating on the primary motivations for this particular study, the

second section was presented to review the previous literature focusing on the issues of the proposed determinants of a firm's profitability and other related financial subjects including the capital structure, which, had also frequently been referred by many researchers in finance[10] as major researches on the subjects. Next, illustrated were the presentation on the data collection and major methodologies applied to the three hypothesis tests. Analyses and their implications on the empirical findings of this study were finally discussed in the context of modern finance theory, followed by the concluding remarks in the last section,

2. Literature Review

Myers[11] theorized that the optimal policy for maximizing the market value of a firm with no corporate taxes is not to issue debt at all, which may result in the "underinvestment problem" incurred by the shareholders of the firm. In other words, risky debt may cause the firm to abandon positive net present value(NPV) opportunities in some future states. These future states can be located in any points between the investment decision with issuing debt and without issuing one. He also argued that real options, which can be positive investment opportunities, may have limitations as security for debt claims due to their thin and imperfect secondary markets. Moreover, factors such as capital-intensity, high operating leverage, and profitability should be associated with high debt financing for assets in place.

Kester[12] compared the capital structures between U.S. and Japanese corporations. He found that there were significant differences in capital structure between the two countries on a book value basis, after controlling for other factors such as profitability, risk, growth, and size as well as industry classifications. Japanese manufacturing firms were barely higher or insignificantly different, based on each differently defined market value based leverage ratio. He also argued that some of the Japanese industries which mainly engaged in mature and heavy industries, had higher leverage than their U.S. counterparts at either book or market value.

By utilizing a linear structural model to mitigate possible measurement errors between the proxy variables,

Titman & Wessels[13] found that profitability had a significantly negative relationship with the market value based debt ratios, while growth, non-debt tax shields, volatility, and asset structure were not generally associated with the various measures of leverage. In particular, a firm's uniqueness with respect to its specialized products was found to result in a lower debt ratio. In addition, small sized firms had more short-term debt financing than large firms due to the high transaction costs when issuing long-term securities.

Kim & Ham[14] performed an empirical study to find any determinants on the six financial analysis indices including the aspects of profitability, growth, and liquidity for the firms headquartered in 'Chungbuk' regional province in Korea. In more detail, they found that both the debt ratio and grow rate among the four explanatory variables, showed their statistically significant effects possessing the negative (for debt ratio) and positive (for grow rate) relationships on profitability, respectively. On the growth rate of sales amount, the following three variables were found to be significant as possible influences: size, debt, and asset utilization ratio.

The study by Goddard et al.[15] reported their tested results on the financial profiles affecting two performance indicators such as profitability and growth of the firms belonging to the eleven European nations for the sample period from 1992 to 2000, utilizing a variance decomposition analysis(VDA). The proposed determinants entered into the models were the proxy variables measuring country, industry, corporate group, and firm effects. While the results implied that the effects arising from the firm and the corporate group proxies showed their largest contributions accounting for the variation of both the profit rate and growth rate, the magnitudes of all of the variables may be smaller in the latter one(i.e., the growth rate) than in the former one. On the effect of capital structure on profitability utilizing the U.S. sample firms, Gill et al.[16] examined the financial aspect of profitability to obtain more robust results applicable to cross-border cases. They employed three types of proxies for the independent variables for leverage such as short-term, long-term, and total debt to find any effects on the dependent variable, ROE. The other variables such as size, sales growth, and industry, were also controlled in each applied regression model. While there were positive relationships between

short-term and total debt ratios, and profitability in both the manufacturing and the service industries, the results on the long-term leverage ratio were not consistent between the two industries. However, no statistically significant relationships between profitability and the other three control variables were generally found in their study.

This study by Kim[17] tested to find any financial determinants on the capital structure for the firms listed in the KOSDAQ. Another test is performed to find any possible discriminating factors by utilizing a robust methodology, which may distinguish between the firms belonging the 'Prime section' and the 'Venture' section in terms of their financial aspects. Moreover, the null hypothesis that the changing trend or movement of a firm's capital structure with respect to its industry mean (or median) may be random, is also tested. Size(INSIZE), growth(GROWTH), market value of equity(MVE), beta(BETA) and section dummy (SECTION) showed their statistically significant effects on the market-value based leverage ratios. This study also found an interesting result, indicating that a firm belonging to each corresponding industry has a tendency for reversion toward its mean and median leverage ratios over a five-year time interval.

3. Data and Methodologies

3.1 Data Collection

The following table, [Table 1], shows major criteria to select the sample firms employed in this study.

[Table 1] Data Sampling Criteria

<ol style="list-style-type: none"> 1. The sample firms were included in the New KisValue database in the Republic of Korea. 2. The firms were listed in the KOSDAQ at the end of December 2010. 3. The corporations should be headquartered in 'Chungcheong' province and the other sample firms as a control group belonged to one the other domestic provinces for this study. 4. All the data for each corporation were available for at least 6 years (2005-2010) allowing to include a whole set of years with the period of the global financial crisis. 5. Financial and regulated industries were not included when collecting the final sample.

Moreover, major explanatory variables issued or theorized in modern finance, were employed in this study as well to examine any possible relationships with profitability as a dependent variable(DV). The followings were the primary considerations for the variables to be included in each tested model (as explanatory ones), which were also benchmarked in [18] as selection criteria for the relevant variables.

First, the independent variables(IDVs) have been selected, based upon their higher commonalities with those employed in the previous literature if possible, which usually showed their contradicting results in terms of a sign of a coefficient and a level of significance.

Second, since one of the major objectives of this study is to perform intensive analyses with three hypothesis tests described later, on the determinants of the profitability for the KOSDAQ listed firms in 'Chungcheong' province, it may be interesting, for comparison purposes, to employ the identical or similar explanatory variables to the ones tested in the previous research such as in [19]. Throughout this procedure, it was anticipated that this study may derive any new or unexplored implications from its results, thereby enhancing their robustness.

Third, all the data composing each independent variable(IDV) and dependent variable(DV) should be available from the databases such as the New KisValue as presented in <Table 1>.

Based upon the proxies measuring the IDVs and the DVs selected for this study, three hypothesis tests were performed in each s model, to account for any determinants of profitability for the manufacturing firms listed in KOSDAQ, in 'Chungcheong' province during the period of 2005 - 2010.

3.1.1 Variable Definitions

As previously described, the tested dependent variables(DVs) utilized as proxies for profitability, were employed at both the theoretical and practical levels, such as [EBIT(=Earnings before Interest and Taxes) / Total assets] and ROE (Net Income/Equity), respectively. Moreover, for the 3rd hypothesis test, another financial indicator defined as (Interest Expense/Sales), was adopted in the logistic regression analysis for further investigations on the components of a firm's financial burden. The

followings are the definitions for all the IDVs engaged in each corresponding model. of this study.

[Table 2] Independent Variable(IDV) Definitions

Definition	Proxy Variable	Measurement
Size	SIZE	Natural Log of Book value of assets at the fiscal year-end
Leverage	BVLEV1	Total liabilities / Total assets.
	MVLEV1	Total liabilities at book value / (Total liabilities plus total preferred stock at book value plus common equity at market value)
Volatility	VOLATILITY	Standard deviation of annual stock returns times the square root of total number of trading days during a fiscal year
Market- to book- value of equity	MVBV	Market value of equity / book value of equity
Growth	GROWTH	Annual average compound growth rate in sales during the sample period
Majority Ownership	MAJORSHARE	Major shareholders' ownership of KOSDAQ sample firm
Beta	BETA	Systematic risk of a sample firm
Market Value of Equity	MVE	Market value of equity
Free Cash Flow	FCF	Earnings after corporate taxes - (net changes of the amount of assets during a fiscal year)
Section	SECTION	Dummy variable categorizing a firm as '1' if in the 'prime section', otherwise '0' (i.e.,if in the 'venture section')

(Note: Most of the theoretical variables tested in [20], were re-employed in this study, for the comparison purpose and towards reinforcing their robustness, as described.)

3.2 Hypothesis Tests and Model Specifications

<The 1st Hypothesis>

This study implemented a 'panel data' (longitudinal) analysis to regress the DVs (as profitability) on the explanatory variables for the sample KOSDAQ firms headquartered in 'Chungcheong' province. The hypotheses

were postulated as follow:

H₀: The firms in KOSDAQ headquartered in 'Chungcheong' province, shows no statistically significant financial characteristics tested for profitability with utilizing a panel data analysis.

The panel data analysis employed in this study is a one-way model and can be written as follows[21]:

$$Y_{it} = b_0 + b_1X_{1it} + b_2X_{2it} + \dots + b_kX_{kit} + a_i + u_{it}$$

,where a_i is the unobserved effect.

u_{it} is the error term assumed to be independent and identically distributed.

$i = 1, 2, \dots, n$ (for each firm), and $t = 2005, 2006, \dots, 2010$.

$k =$ total number of exogenous variables, and $j = 1, 2, \dots, k$. If $Cov(X_{jit}, a_i) = 0$, a random effects model. Otherwise, a fixed effects model.

After applying a panel data analysis with the legitimate and fundamental procedures to test for the hypothesis, this research finally selected the most effective model among the pooled OLS, a fixed effects(FE) model, and a random effect(RE)s model by utilizing the appropriate test such as F test(Wald test), Breusch-Pagan(BP) Lagrange Multiplier test, and Hausman (specification) test.[22] (For reference, Park[23] summarized major criteria to select the appropriate model as the best one out of the above three types of the models.)

<The 2nd Hypothesis>

It may interesting, from a managerial perspective, to further investigate which financial attributes of a firm may increase its probability to be classified into a regional area of 'Chungcheong' province in comparison with a firm classified into the other regional areas such as Seoul metropolitan area.

H₀: Korean manufacturing firms in KOSDAQ, belonging to 'Chungcheong' province may not have different mean values based financial ratios from those of their counterparts belonging to the other regional areas in the Republic of Korea.

To test for this hypothesis, this study employed a logistic regression analysis to distinguish the firms in the province from their counterparts in the other domestic regions in respect to financial characteristics.

The basic functional form of the logistic regression model is as follows:

$$P(\text{Chungcheong}) = e^{a+\beta x} / (1 + e^{a+\beta x}),$$

,where $P(\text{Chungcheong})$ is the probability that a firm listed in the KOSDAQ will be classified as a firm headquartered in 'Chungcheong' province, which is bounded between 0 and 1.

It labels α and β as the intercept and vector of slope parameters, respectively. x is a vector of independent variables at each studied year.

The logistic regression is modeling the aforementioned probability by assigning the dummy variable $\text{Chungcheong} = 1$ (if a firm in the sample data was based on 'Chungcheong' province) and $\text{Chungcheong} = 0$, otherwise.

<The 3rd Hypothesis>

As another analysis on comprehensive compositions for the profitability of a firm belonging to 'Chungcheong' province, the 'Dupont' system and the modified 'Dupont' system in the finance theory, were adopted in the logistic regression model to investigate each component composing the system, as in [24].

(Sub-hypothesis 1)

H₀: Korean firms in the KOSDAQ stock market, headquartered in 'Chungcheong' province, may not have any statistically significant differences in its determinants(i.e., Profit Margin, Assets Turnover, Equity Multiplier) composing the 'Dupont' system in comparison with those into the other domestic regions in the Republic of Korea.

Subsequent to the above sub-hypothesis, an index for financial burden modifying the traditional 'Dupont' system, was tested to discriminate any components of the index between the firms in the province and those in the other provinces as postulated in the following:

(Sub-hypothesis 2)

H₀: Korean firms in the KOSDAQ stock market, headquartered in 'Chungcheong' province, may not have any statistically significant differences in its componentss(i.e., Debt Burden, Borrowing Cost, 1/Asset Turnover) composing the modified 'Dupont' system (=Financial Burden), in comparison with those into the other domestic provinces in the Republic of Korea.

The index for financial burden were frequently defined as follows in the finance literature with its three components :

$$\text{Financial Burden} = \text{Debt Burden} \times \text{Borrowing Cost} \times$$

(1 / Asset Turnover):

$$\text{(Interest expense/Sales)} = \text{(Liabilities/Assets)} \times \text{(Interest expense/Liabilities)} \times \text{(Assets/Sales)}$$

4. Analysis and Implications

4.1 Analyses on the Results

The followings were the descriptive statistics for the sample firms in 'Chungcheong' province with a correlation covariance matrix between the IDVs.

[Table 3] Descriptive Statistics for IDVs for the firms headquartered in the 'Chungcheong' province

IDV	Mean	Standard Deviation	Minimum	Maximum
P	0.050	0.077	-0.138	0.455
SZ	25.314	0.824	23.677	27.062
G	0.216	0.212	-0.110	0.962
M	1.591	1.560	-1.120	13.129
V	60.640	16.051	24.117	110.027
SN	0.6	0.492	0.000	1.000

[Table 4] Descriptive Statistics for IDVs for the counterparts in the other provinces

IDV	Mean	Standard Deviation	Minimum	Maximum
P	0.048	0.112	-1.76	0.568
SZ	25.298	0.997	20.011	28.900
G	0.166	0.177	-0.333	0.950
M	1.899	7.936	-17.999	254;221
V	63.714	33.185	0.000	928.803
SN	0.423	0.494	0.000	1.000

(Note): P = PFT, SZ=SIZE, G=GROWTH, M=MVBV, V=VOLATILITY, SN=SECTION

[Table 5] Pearson's Correlation Coefficient Matrix between IDVs for the firms headquartered in the 'Chungcheong' province

IDV	P	SZ	G	M	V	SN
P	1.00	0.26*	-0.10	-0.01	-0.04	0.27*
SZ	0.26*	1.00	0.33*	-0.12*	-0.03	0.60*
G	-0.10	0.33*	1.00	0.43*	0.00	0.02
M	-0.01	-0.12	0.43*	1.00	0.06	-0.06
V	-0.03	-0.03	0.00	0.06	1.00	-0.03
SN	0.27*	0.60*	0.02	-0.05	-0.03	1.00

[Table 6] Pearson's Correlation Coefficient Matrix between IDVs for the counterparts in the other provinces

IDV	P	SZ	G	M	V	SN
P	1.00	0.23*	-0.05	-0.04	-0.19*	0.23*
SZ	0.23*	1.00	0.03	-0.18*	-0.21*	0.59*
G	-0.05	0.03	1.00	0.02	0.05	0.08*
M	-0.04	-0.18*	0.02	1.00	0.02	-0.02
V	-0.19*	-0.21*	0.05	0.02	1.00	-0.19*
SN	0.23*	0.59*	0.08*	-0.02	-0.19*	1.00

(Note: * denotes a statistically significant at 5% level.)

4.1.1 Test results on the 1st Hypothesis

By utilizing the methodology of the panel data model, the best model to identify any possible determinants affecting the profitability indicator was chosen as one-way fixed effect model with the IDV for a leverage ratio of MVLEV1 as discussed in [25]. The pooled OLS model including the IDV of book-value based leverage, BVLEV1, was selected as the best one (at the 5% level of significance. In particular, the fixed effect model over a random one was finally selected, taking into account the relevant testing results such as the statistically significant fixed effect of the Wald test (at the 10% level) and the insignificant random effect resulting from the Breusch-Pagan(BP) test. The followings are the predicted equations to explain the PFT as profitability by the employed IDVs including either the book-value based IDV(BVLEV1) or the market-value based one(MVLEV1).

(1) To include a book-value based leverage ratio as a independent variable(IDV) on profitability:

(Pooled OLS model)

$$\begin{aligned} PFT_{it} = & - 1.07* - 0.16BVLEV1_{it}* \\ & + 0.05SIZE_{it}* - 0.05GROWTH_{it} \\ & + 0.01MVBV_{it} + 0.0002VOLATILITY_{it} \\ & - 0.002SECTION_{it} \end{aligned}$$

(2) To include a market-value based leverage ratio as a independent variable(IDV) on profitability: (One-way time fixed effect model)

$$\begin{aligned} PFT_{it} = & - 0.82* - 0.18MVLEV1_{it}* \\ & + 0.04SIZE_{it}* - 0.05GROWTH_{it} \\ & - 0.0004MVBV_{it} - 0.0004VOLATILITY_{it} \\ & + 0.002SECTION_{it} \end{aligned}$$

(Note: * indicates that the independent variable (IDV) is statistically significant at 5%.)

4.1.2 Test results on the 2nd Hypothesis

The following table with the market-value based leverage ratio(MVLEV1) as DV, presented the results from the logistic regression on profitability between the firms domiciled in the 'Chungcheong' province and their counterparts in the Korean capital market. For reference, the model utilizing the book-value based leverage proxy, BVLEV1, generally showed its consistent results with those shown in [Table 7] for MVLEV1. (The results with the significant BVLEV1, are available upon request from the author.)

[Table 7] The Logistic Regression Results for Profitability between the firms in 'Chungcheong' province and their counterparts with respect to MVLEV1

IDV	Coefficient	Chi-square	p-value
Intercept	12.8538	7.2442*	0.0071
MVLEV1	2.4373	11.5998*	0.0007
SIZE	-0.6512	10.5686*	0.0012
GROWTH	1.3712	6.7396*	0.0094
MVBV	-0.00645	0.2338	0.6287
VOLATILITY	-0.0136	4.2214*	0.0399
MVE	-8.58E-13	0.4481	0.5032
MAJORSHARE	-0.00991	3.4436	0.0635
SECTION	1.3078	26.9058*	< 0.0001
FCF	-2.28E-12	0.3804	0.5374
BETA	0.5691	3.7741	0.0521
Goodness of Fit		57.8013*	<0.0001

(Note 1) * : Significant at 5% level with respect to the chi-square test

(Note 2) The coefficients were estimated by the method of maximum likelihood(ML). The test for overall goodness of fit was performed by the likelihood ratio(LR) test, while the Wald test was used to test for the significance of each individual coefficient.

4.1.3 Test results on the 3rd Hypothesis

Based on the results by LR test for the overall goodness of fit on the 1st sub-hypothesis, the corresponding model was not statistically significant at the 5 % level, with only one significant component (i.e., Equity Multiplier) among the three determinants(i.e., Profit Margin, Assets Turnover, Equity Multiplier). Meanwhile, once there was any statistically significant relationship between the debt ratio and profitability as obtained from the 1st hypothesis test, it was of interest to analyze any financial factors discriminating between the firms in the province and their counterparts in the other region in regard to the financial burden. For this purpose,

a modified 'Dupont' system was employed for the 3rd hypothesis test(i.e., sub-hypothesis 2) to find any differences between the two regional areas, as described. Therefore, as in the case of the 2nd hypothesis, the logistic regression to test for the this hypothesis, is modeling a probability by assigning the dummy variable Chungcheong = 1 (if a firm in the sample was in 'Chungcheong' province) and otherwise, 'Chungcheong' = 0.

[Table 8] The Logistic Regression Results for a 'Financial Burden' between the firms in 'Chungcheong' province and their counterparts

IDV	Coefficient	Chi-square	p-value
Intercept	-2.9051	62.36*	<0.0001
DRELY	1.9718	1,3822*	0.0003
INTRATE	-8.0166	2.2677	0.1321
RATURN	0.00301	0.0017	0.9667
T2005	-0.0214	0.004	0.9493
T2006	0.0354	0.0111	0.9162
T2007	0.0177	0.0028	0.958
T2008	-0.0674	0.0401	0.8413
T2009	-0.00572	0.0003	0.9864
Goodness of Fit		13.8763**	0.85

(Note 1) *, ** significant at 5% and 10% levels, with respect to the chi-square test, respectively

(Note 2) T2005, T2006, T2007, T2008, and T2009, were dummy variables, respectively, which represent each year over the sample period, such as the year of 2005, 2006, 2007, 2008, and 2009 with the base year of 2010.

4.2 Discussion on the Implications of the Results

Regarding the 1st hypothesis test of this study, the results identified the proxies measuring the capital structures across the BVLEV1 and the MVLEV1 as statistically significant determinants affecting the profitability indicator(PFT). First, the statistically significant relationships between the capital structure (as IDV) and profitability (as DV) were also found across the debt ratios in the study by Gill et al.[26]. However, a major conflicting result was emerged from the opposite signs of the coefficients for leverage to PFT between these studies. Gill et al.[27] attributed the positive effect on profitability to the fact that interest on debt is tax deductible, resulting in a more profitable firm dependent heavily upon debt financing as its main financial option over equity one. Meanwhile, they also suggested that the high gearing ratio start eroding the profitability of a firm and (interest) tax benefits begin to decrease. This

phenomenon may closely imply the fact that an increasing cost of debt of a firm with a heavy debt burden may, in turn, result in the negative(-) relationship between the two variables for the firms domiciled in the north Chungcheong region in the Republic of Korea as tested in [28]. Consequently, based upon the researches by Kim & Ham[29] and the present study, the firms headquartered in 'Chungcheong' province including the northern provincial area, may maintain higher debt ratios beyond their levels of the optimal capital structures in the context of the 'trade-off' (capital structure) theory, which may forecast a future trend of the preference for equity financing over debt one to maximize profits.

Second, it was found a positive and statistically significant relationship between SIZE and PFT in the model, which was in contrast to the previous findings such as in [30] and [31]. While large-scale businesses and larger corporations may have little inducement to be more profitable than they can be due to any possible complications such a government intervention as described in [32], the positively significant explanatory variable of SIZE affecting PFT as the DV, may suggest that firms belonging to 'Chungcheong' province, on average, seem to be yet classified into the small or medium size firms. They may continue to extend the sizes (e.g., in assets) to enhance their profits, not lessened by the foregoing complications encountered by large entities.

Third, the growth rate in sales(GROWTH) during the tested period (2005-2010) showed no statistically significant effect on the profitability indicator for testing the 1st hypothesis of this study, whose result was consistent with the findings in [33], but different from the result of Kim & Ham[34] presenting their positive relationship each other. In his study, GROWTH as a DV, was further analyzed and found to be affected by the asset utilization of the sample firms. However, based upon the results from the logistic regression model [Table 7] to test for the 2nd hypothesis of this study, the corresponding explanatory variable, GROWTH, showed its statistically significant effect discriminating the firms between in 'Chungcheong' province and in the other regional areas. In other words, the probability to be classified into a firm in the former province is higher, if it possesses larger growth rate in sales over the tested period and vice versa. As one of the plausible explanations to account for this

phenomenon may be rationalized as follows: Myers[35] suggested that a firm with a high growth opportunity in investments in intangible assets, may face higher degree of agency cost of debt, in common with the study done by Kim & Sorensen[36] describing that faster growing firms are more likely to maintain their higher agency costs of debt by investing more in growth opportunities. Furthermore, it was hypothesized by Titman & Wessels[37] that growth opportunities may have a priori negative relation to the capital structure, due to their less ability to be evaluated as collateral. Considering the theories of these previous studies on the growth, the firms in the province which were, in large part, engaged in the I/T industries with investing in intangible assets, may face higher agency costs of debt than their counterparts in the other regions, which may increase the costs of debt from the shareholders' perspectives. Meanwhile, the proxy variable measuring the growth rate of a firm(GROWTH) was calculated on the basis of the growth of sales in this study, not of assets, since the assets-based firm size variable may be upwardly biased for firms belonging in the capital intensive industry, while it may be also downwardly biased for firms in the labor intensive one.[38]

Regarding the statistic on the proxy variable for business risk, VOLATILITY, the finding in the logistic model showed that the probability to be classified into a firm in the 'Chungcheong' province is lower, if it shows higher volatility (measured in terms of stock returns) over the sample period, or vice versa.

It may be plausible for the firms in the province to possess more stable earning streams than those of their counterparts in the other regions, even if all the firms were listed in the KOSDAQ market with a relatively short history and less mature stage, as described in [39]. Moreover, it was interesting to find that the firms in the province with a 'negative' and statistically significant component (SIZE) at the 5 % level in [Table 7], maintain lower business risk, which may not be consistent with the traditional finance theory: The theory suggests that a larger size firm may have more stable earning streams or lower volatility in returns than their counterparts, due to its superior status in information as for the firms belonging to the chaebol in Korea[40] and the intragroup trade as for the firms belonging to the keiretsu in

Japan[41]. However, as presented, the firms in the province seemed to efficiently maintain or perform their financial strategies towards the stable earning streams, even if their corporate sizes were smaller than those of their counterparts in the other regions..

Finally, among the three proposed components discriminating between the firms in 'Chungcheong' province and their control group on the financial burden, only one explanatory variable showed its significant effect to make a distinction between the two groups as in [Table 8]. In other words, DRELY defined as the ratio of liabilities to assets, was found to be the only statistically significant discriminating factor in the financial burden(=Interest expense/Sales). It indicated that the probability to be classified into a firm in the province is higher, if it keeps a higher debt ratio or relies more on liabilities based on its assets or vice versa. Therefore, taking into account the results available from all the hypothesis tests(i.e., 1st, the 2nd, and the 3rd hypotheses), it was confirmed that the firms in the province, on average, maintained a higher leverage ratio or capital structure than that of their counterparts, which may cause their lower profitability, as previously described. Since they were listed in the KOSDAQ stock market engaging mostly in I/T related industries, it may be noteworthy that the firms in the province may consider to lower their levels of leverage as also presented in [42] with taking into account the relationship between the 'Range of Earnings Chart' relating earnings per share(EPS) and earnings before interest and taxes(EBIT) as rationalized in [43].

5. Concluding Remarks

The Korean capital market is currently in the transition to be classified into the advanced market with its enlargement in trading volume and active investments by foreign institutional investors. Hence, from foreign and/or domestic investors' perspectives, it seems to be interesting to identify or investigate any financial attributes or profile of the firms in 'Chungcheong' province on profitability, given that this subject drew less attention in the previous literature, as mentioned earlier. Regarding the major findings of this study with robustness, the results first identified that the proxies measuring leverage across the

book-value and the market-value based ones, were statistically significant constituents determining the profitability indicator(PFT). Meanwhile, Osborn[44] presented in his study that '..... all the studies which found the small corporations to be most profitable were based upon samples which did not adequately reflect the considerable losses of unprofitable small firms, but rather chose those businesses, which had had individual existency over a period of time.....'(p.92) In compliance with his view, another explanatory variable, SIZE, with its positive and statistically significant relationship to PFT in the tested model, indicated that the firms in the province, on average, seem to be smaller than their counterparts in the other regional areas in Korea, so that they may still have the opportunities to expand their sizes (i.e., in assets) to enhance the profits. Moreover, this study found that DRELY in the modified 'Dupont' system, which was defined as the ratio of liabilities to assets, was analyzed in the logistic model and found to be the only statistically significant discriminating factor between the comparison groups in terms of the financial burden. The followings may be the primary contributions of this particular study to test for the corresponding hypotheses relating to investigate any possible and significant components on profitability.

First, the results obtained from this study, may be useful for interest parties at the macro- and/or the micro-level since they may be applied to the firm's financial strategies in a particular regional area to identify any potential opportunities toward the enhancement of the corresponding entity's profitability and/or management efficiency. Second, it is a hope of this study that the outcome may be effectively utilized by the domestic financial institutions operating across the regions including Seoul Metropolitan area, when analyzing and implementing their lending practices when providing funds (in the form of working capital or equipment ones) for potential borrowers including the firms belonging the province. Finally, from the perspectives of policy-makers, the results may be taken into account to prevent or minimize an unstable or unexpected financial turmoil such as in the year of 1997(Asian financial crisis) and of 2008(Global financial crisis originated primarily from the U.S. sub-prime mortgage one). Each component with its statistically significant effect on the profitability measure,

may be functioned as a control variable to enhance any geographical management efficiencies at the regional and/or the firm-level, including the firms headquartered in 'Chungcheong' province investigated in this research. Moreover, given the circumstances surrounding the dynamics of the domestic capital market in transition to its new classification enhancing towards the advanced market, newly established firms hosting foreign direct investment(FDI) may take into account the findings of this paper, when they launch regional based businesses including the I/T sectors in the domestic area of the 'Chungcheong' province.

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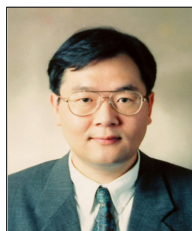
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