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Searching for Growth Engine: For the Firms Belonging to the Chaebol in the Korean Capital Markets

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한국 재벌기업들의 성장 동력에 관한 재무적 결정요인 분석

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Abstract This study examined one of the contemporary issues that may be interesting to academics and practitioners regarding the driving force of the growth rate for the firms belonging to the chaebols in the Korean capital markets. With respect to the empirical results obtained from two hypothesis tests, the first hypothesis was to identify any financial determinants on the growth rate by applying both dynamic panel data and static panel data models. The debt ratios relevant to the book- and market-value showed their positive relationships with the DV of GROWTH1, along with other significant IDVs such as one-period lagged DV of GROWTH_1, SIZE1 and FOS with statistical significance. Second, by employing conditional quantile regression (CQR) analysis, the control variables, such as ROA, SMARKET, time dummy variable of F2010 and F2011, and the industry dummies of IND3 and IND10, provided evidence of their significant influences on DV of GROWTH1.

요 약 본 연구에서는 현대 재무적 측면에서 이론적 혹은 실무적으로 주요 이슈가 되고 있는 국내 자본시장에서의 재벌소속 계열기업들의 성장성관련 결정요인들에 대한 분석을 수행하였다. 2가지의 가설들이 실증적인 방법론에 의하여 검정되었는 바, 첫번째 가설관련 동 재벌기업들의 국제금융위기 이후의 표본기간 동안, 성장률에 대한 재무적 결정요인들을 동적패널분석과 정적패널분석의 방법론을 응용하여 다음과 같이 규명하였다. 즉, 장부가 기준의 성장률에 영향을 주는 요인들은 부채비율, 전 기간의 성장률, 기업규모, 그리고 외국인지분율 등이었으며, 이와 더불어 시장가 기준의 성장률에 대한 분석도 수반되었다, 두번째 가설은 조건부 분위회귀모형을 응용하여 4개의 구간별로 각 성장률관련 통제변수들에 대한 영향력을 분석하였으며, 그 결과로서 총자산수익률, 유가증권시장 유형, 2010년과 2011년의 거시경제 더미변수들, 그리고 산업더미들 중 화학업종과 유통업종의 변수들이 통계적으로 유의한 특징을 나타내었다. 국내 자본시장에서 상대적으로 높은 비중을 차지하고 있는 재벌기업들의 재무적 측면에서의 상호 비교관점을 기준으로, 금융위기 이후 현재까지 지속, 심화되고 있는 주요 재무지표들의 소수 재벌기업들 중심으로의 분포상 편중 가능성을 연구결과의 활용을 통하여 재균형 혹은 개선시킬 수 있다는 점 등이 본 연구의 기여점이라고 판단된다.

Key Words : Chaebol, Conditional Quantile Regression, Dynamic Panel Data, Global Financial Turmoil, Growth Rate

1. Introduction

The role or contribution of the Korean corporate conglomerates, the so-called as the 'chaebol', may have been prolonged arguments as major possible tractions of the export-driven economy of the nation. Even if the chaebol seems to be extimated to possess an ambivalent aspect to affect the development of the

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domestic economy [1], it may also not be underestimated on their primary roles or to contribute to the national wealth. Regarding the concept of the 'chaebol' which is regarded as by-product of the rapid growth of the Korean economy, there is no official definition on it to date.[1], Howerver, the customary definition of the so-called as chaebol may be in accordance with the meaning termed by the Fair Trae Commission (FTC) of the domestic government such one classified into a 'Large Business Group' subject to the ceiling on cross-shareholding system. For reference, Steers *et al.,*[25] elucidate primary differences between the Korean chaebol and the Japanese keiretsu as follow:

(a) While most shares in the chaebol are relatively closely held by legitimeate family members, the ownership of the keiretsu is prone to be more diffused. (b) The chaebol is more hierarchical and centralized than the keiretsu in terms of organizational structure and style. (c) The nature of the business-domestic government relationship is stronger in Korea than in Japan. There seemed to be major factors to make the conventional chaebols be rapidly developed and expanded at the macro- and the micro-levels. At the macro-level, only limited members of large business enterprises, later referred to as the chaebols, were formed to effectively implement the domestic government's economic policies inclusive of export-oriented one from the early 1960s, in return for maintaining their priorities in the credit allocation as well as favorable interest rates as presented in [26].

Once a domestic large firm was classified as a leading one in each corresponding industry it belonged to, a variety of favorable government subsidies including a lower borrowing cost from a financial institution directed by the government, seemed to be provided for the firm in the chaebol. This phenomenon may, in turn, increase the level of debt ratio in terms of the capital structure in finance, which was partly aggravated by the guarantees of obligations to get more funds from domestic banks as in [1]. On the other hand, primary cause of the growth of the chaebols in financial aspects may be rationaled by analyzing several relevant variables at the micro-level. For example, Kim & Berger [1] overall found the following financial charactersitics of Korean chaebol firms such as larger size, lower profitability, higher growth rate, and lower business risk, in comparison with those of non-chaebol firms as their counterparts. As for the cause incurring the larger may have been, to a larger extent, attributable to vertical and horizontal integrations by the chaebol firms through excessively exploiting cross-share holding structures susceptible to the so-called as 'chain bankruptcy'. Moreover, lower profitability possessed by the chaebols may also have, im part, resulted from heavy engagement in the capital-intensive industries whose profit was lower than estimated as in [24]. In correspondence with the larger size of the chaebol firms, their growth rates measured in assets or sales tended to be higher than their counterparts.[1]. Consequently, aforementioned primary sources or factors may have been linked with stereotyped financial profiles of the chaebols, which seem to be shifted to the contemporary issue as follows: The financial profile such as the profitability of the firms belonging to the conglomerates, the chaebol firms, seemed to be more skewed to the right direction or distorted in the distribution. In other words, the relevant financial indicators were likely to be more polarized among Korean chaebols to date, with being focused on only a few top-ranked ones in size for the amelioration of their financial aspects. To exemplify, it has been reported by utilizing the market data inclusive of the source from Korea Exchange that the profitability levels of sixteen chaebols of top twenty ones were eroded below to the their previous levels of the global financial crisis in 2008.[2] In consonance with this unprecedented phenomenon, the number of 501 domestic firms listed in the KOSPI (Korean Stock Price Index) were also reported the deterioration of their average profit margin as 4.7% and 4.51% for the fiscal year of 2011 and 2012, respectively, and only a few

conglomerates (i.e., four out of the twenty Korean chaebols) has recovered their profitability rates between the period of 2008 and 2011 including Samsung Group with jumping the rate up by 67.7% and Hyundai Motor Group with 22.2%. Moreover, concerning the total amount of operating profit as earnings before interest and taxes (EBIT) during the fiscal year of 2013, it was reported that the former conglomerate (Samsung Group) took its weight of 47.9% out of total amount of the EBIT, which was followed by Hyundai Motor one, SK Group, and LG Group with 21.7%, 14.3%, and 8.5%, respectively, indicating that more than 92% of the total amount was accounted for by only these four conglomerates among top ten-ranked chaebols (in terms of total asset size) during the fiscal year of 2013.[3] By taking into account the current idiosyncratic phenomenon of polarization with a stage of the overall trend of sluggish financial profiles for the majority of Korean chaebols, this study was particularly motivated to investigate any specific driving forces of growth rates (as a growth engine), for the conglomerates, which could be, to a large extent, in association with improving or recovering their profitability levels. Positively, any empirical findings obtained from the present study may be used to revert any distorted distribution of financial growth rate of the chaebol firms to more stable or balanced conditions in the domestic capital markets at the macro or corporate level, given the relatively heavy concentration on a few top-ranked chaebols in terms of financial aspects intensified in the post-period of global financial turmoil, as also presented in [4]. Major objectives of performing this study may be specified as follows: First, as being exemplified with the aforedescribed statistics, any driving forces determining the growth rates of the chaebol firms may well be logically related or applied to the amelioration of sluggish financial aspects with which most Korean large firms inclusive of the chaebol ones were overall faced. Second, any results available from the study may be compared with the results of the previous literature relevant to international and/or domestic empirical context toward enhancing their robustness and consistency. Finally, any financial characteristics identified as driving forces of growth rate for the domestic conglomerates, may be potential attraction to host higher levels of FDIs (foreign direct investments) or long-term based indirect portfolio investments, which may function as a steering gear to level up the overall financial aspects or performance of the chaebols, given the dynamics of ongoing progress of multinational agreement with associated nations such as the bilateral and trilateral FTAs (Free Trade Agreements) and/or TPPs (Trans Pacific Economic Partnerships). This study is organized as follows: Following the introduction, the second section was exposited as an intrinsic part of empirical testing procedures with data collection and model specifications. That is, two hypotheses to be subsequently tested, were postulated and analyzed in the section. And before proceeding the concluding remarks in the last section, the discussion on the empirical findings was presented with their implications in Section 3.

2. Data and Methodology

2.1 Data Collection

The data selected for this study was finalized by the criteria described below. This study confined its reference time span (or the sample period) inclusive of five years from 2008 to 2012, taking into account the possibility of reducing or mitigating any spillover effect originated from the global financial crisis of 2007 and the reinstatement policy by the domestic government of Korea Fair Trade Commission (FTC), effective March, 2009, which had classified 'Large Business Group', the so-called as a chaebol, based on the ceiling limitation of total equity investment system. Meanwhile, the sample year of 2008 was functioned or proxied as a base year whose data was to calculate an annualized year-over-year (YoY) changing rate for each corresponding variable in the models.

[Table 1] Data Selection Criteria

1. All the data for the employed variables were available for at least five years from 2008 to 2012, which was in the post-period of the global financial turmoil. 2. The sample firms were listed on the KOSPI or KOSDAQ market during the sample period. 3. They were also included in the databases of New KisValue sourced by the NICE. 4. The criteria to categorize a firm belonging to a chaeble during the sample period, were in accordance with the guidelines by the Fair Trade Commission (FTC) in the Republic of Korea, such that it was the one classified into a 'Large Business Group', subject to the ceiling on cross-shareholding system. 5. Financial and regulated industries were not included in the final sample.

Regarding the proxy variables for the dependent variable (DV) and the independent variable (IDV) employed in each corresponding model of this study, the following rationale was finally adopted to select each variable as the most appropriate proxy to be entered into the model, as in [5]. First, a theoretical variable supported in the context of modern finance theory was entered into each model to test for a corresponding hypothesis. Second, a variable empirically tested in the majority of previous literature was also employed to be compared with the derived similar or dissimilar results of this present study. It was therefore expected to reinforce robustness and consistency of any results obtained across different time and sample firms. Finally, all the data for the referenced period should be available from the database utilized for the study. The following definitions were presented for elucidating each DV and the IDVs as regressors applied to the model.

(1) Dependent Variable (DV) for Measurement of a Firm's Growth Rate

GROWTH1 = Annual change in total assets for a firm belonging to a chaebol

GROWTH2 = Annual change in total sales for a firm of a chaebol

MVA = market-value of equity minus book-value equity of a firm of a chaebol

To be specific, a firm's growth rate measured in the market-value basis (MVA) has rarely been tested in the majority of the previous researches, in comparison with the book-valued one. Logically, it was expected that higher MVA may well be associated with larger growth opportunities to produce a series of positive net present values (NPVs) in the context of finance theory, as described in [6].

(2) Independent Variable (IDV)

[Table 2] Definition for Independent Variables (IDVs)

Definition	IDV	Measurement as a Proxy
Leverage	BVLEV1	Book value of liabilities / Total assets
	MVLEV1	Book value of liabilities / [Book value of liabilities plus Book value of preferred equity plus Market value of common equity]
Growth (lagged)	GROWTH_1	One period lagged DV of GROWTH 1
Market minus book value of equity (lagged)	MVA_1	One period lagged DV of MVA
Size	SIZE1	Natural logarithm of sales amount at each fiscal year-end
Profitability	PFT	EBIT / Total assets
Market- to book-value of equity	MVBV	Market value of equity / Book value of equity
Business risk	VOLATILITY	[Standard deviation of annual stock returns] x ([Square root of total number of trading days during each fiscal year)] defined by the New Kisvalue Database.
Foreign ownership	FOS	Foreign ownership of each sample firm belonging to the chaebol
Free cash flow to the firm	FCFF	Earnings after corporate taxes - [Net changes of the amount of assets during a fiscal year]
Dividend payout	DPAYOUT	Dividend per share / Earnings per share
Return on assets	ROA	Net income / Total assets
Return on equity	ROE	Net income / Equity
Fiscal year	FYEAR	f2010= 1 if the fiscal year is '2010'. 0, otherwise. f2011 = 1 if the fiscal year is '2011'. 0, otherwise. f2012 = 1 if the fiscal year is '2012'. 0, otherwise. (Base fiscal year as f2009 = the year 2009)
Type of stock exchange	SMARKET	SMARKET = 1 if a firm belonging to the chaebol is listed in the KOSDAQ stock market. 0, otherwise.

2.2 Statistical Estimation

The following two hypotheses were postulated to identify or examine any financial determinants as possible driving forces of growth rate for the firms belonging to the chaebols in the Korean capital market in association with each corresponding methodology.

2.2.1 The 1st hypothesis test

H_0 : Firms belonging to the chaebols may not, on average, possess any financial profile or determinants to determine their growth rates in the Korean capital market during the studied period.

With the aim of enhancing robustness and consistency when implementing with a longitudinal data (or panel data), both the 'dynamic panel data (DPD)' and the 'static panel data (SPD)' analyses were employed to estimate the underlying estimators, as also presented in [7]. The DPD, so called as the 'first differenced' dynamic one, was originally developed by [8] and applied to the first hypothesis of this study, coupled with the stereotyped SPD one. To be specific, dynamic feature of the model may allow any persistent effects of the endogenous variable adopted in a model, which tends to be related with the autocorrelation issue. In comparison with the SPD estimator, Serrasqueiro[9] presented several advantageous aspects of the dynamic panel model as 1) effective control of endogeneity, 2) higher possibility to mitigate any possible collinearity among the exogenous variables, 3) any possibility to reduce omitted variable problem, and 4) any possibility to eliminate unobservable individual effects. The model specification on the DPD may be rewritten as follows, as presented in [7].

Equation1: $Y_{i,t} = a + bY_{i,t-1} + dX_{i,t} + E_{i,t}$,
$E_{i,t} = V_i + U_{i,t}$

, where Yi,t denotes the profitability index for firm i at time t. 'a' is a constant and 'b' is the coefficient of the one-period lagged dependent variable ($Y_{i,t-1}$) functioned as an instrumental variable (IV). 'd' is the vector of coefficients of a set of the exogenous variables ($X_{i,t}$). $E_{i,t}$ is a disturbance term separated by V_i as an unobserved firm specific effect and $U_{i,t}$ as an idiosyncratic error.

With respect to the legitimate estimation procedure, the DPD model was to estimate each coefficient by applying the two-step GMM (Generalized Method of Moments) after being transformed into the first differenced equation as theorized by [8] considering that any possible bias (i.e., inconsistency) may result from the inclusion of the unobserved firm effect in the disturbance. Any lagged dependent variables in the model may also create non-zero covariance as presented in [10]. As an a priori test specification done by a majority of major previous literature employing the DPD model, the conventional Sargan specification test for overidentifying restrictions was performed to examine the issue of a validity of instrumental variables (IVs), conjoined with a test for autocorrelation on the errors in the context of the first-differenced model. Moreover, another explanatory variable such as the two-period lagged dependent variable (Yi,t-2) was added to the original model (Equation 1), to account for the possibility of mitigating the second-order serial correlation in the differenced residuals, as in [7]. To recap, the following model is the 'adjusted' one (Equation 2) applied to the DPD analysis of the present research:

Equation 2: $Y_{i,t} = a + bY_{i,t-1} + cY_{i,t-2} + dX_{i,t} + E_{i,t}$,
$E_{i,t} = V_i + U_{i,t}$

Coupled with the DPD analysis, the SPD model was also analyzed for this study to enhance validity of the results postulated in the first hypothesis test. The general criteria to select the most 'appropriate' model in the analysis were presented by [11] as reported in Table 3, which had also been referred to in the previous literature inclusive of [4] and [5].

[Table 3] The Selection Criteria on the 'Static Panel Data (SPD)' Analysis

Fixed Effect (Wald test)	Random Effect (Breusch-Pagon test)	Hausman Test	Final Model Selected
A null hypothesis is accepted	A null hypothesis is accepted	(N.A.)	Pooled OLS
A null hypothesis is not accepted	A null hypothesis is accepted	(N.A.)	Fixed effects model
A null hypothesis is accepted	A null hypothesis is not accepted	(N.A.)	Random effects model
A null hypothesis is not accepted	A null hypothesis is not accepted	A null hypothesis is accepted	Random effects model, otherwise fixed effects model

2.2.2 The 2nd hypothesis test

H_0 : There may not exist any differences on statistically significant financial components across all different quantiles of growth rate of the firms belonging to the chaebols by employing conditional quantile regression (CQR) model.

As noted earlier, one of the principal objectives to perform this study was motivated by identifying any possible distortions of the financial profiles including associated growth rate disportionately polarized onthe few top-ranks chaebol firms in the Korean domestic capital market. To analyze this phenomenon with in-depth and practical statistical methodologies, it may be effectiveto utilize the conditional quantile regression (CQR) estimator developed originally by [12]. While least squares estimation may provide an convenient way to estimate conditional mean models, CQR may suggest equally a convenient method to estimate models by tilting the absolute value (yielding the median) to produce an asymmetric weighting applied to the other quantiles, as presented also in [13]. The underlying theory on the CQR estimator may be rewritten as follows[14]: Let (yi, xi), i=1,. . .,n be a sample from some population where xi is a (K x1) vector of regressors. Assuming that the Θth quantile of the conditional distribution of yi is linear in xi, the CQR model can be formulated as follows:

yi = xi′αΘ + μΘi

QuantΘ (yi | xi) ≡= {y: Fi(y | x)Θ} = xi′α

QuantΘ (μΘi | xi)= 0

, where QuantΘ (yi | xi) indicates the Θth conditional quantile of yi on the regressor vector of xi′. αΘ is the unknown vectors of parameteres to be estimated for varying values of Θ in (0,1). μΘ is the error term which is assumed to have a continuously differentiable c.d.f. FμΘ (.|x) and a density function fμΘ (.|x). Fi(.|x) denotes the conditional distribution function of y. By varying the value of Θ from 0 to 1, we trace the entire distribution of y conditional on x. The estimator for αΘ is obtained from: min $\sum_i^n \rho\theta(Yi - Xi'\alpha\theta)$

, where ρΘ(μ) is the check function as ρΘ(μ) = Θμ if μ ≥= 0, (Θ-1)μ, otherwise.

The check function described indicates that positive and negative residuals wereasymmetrically assigned varying weights according to the positive and negative residuals, and a linear programming methodologies for optimalization are applied to estimate each corresponding coefficient mayminimizing the weighted sum of absolute deviations between the dependent and the independent variables in the regression model, as described in [15].

3. Analysis and Discussion

3.1 Analysis

3.1.1 Descriptive Statistics

The following tables, Table 4 and Table 5 described the descriptive statistics for the univariate variables employed in this study.

[Table 4] Descriptive Statistics for the Sample Firms of the Chaebols during the Period of 2009 - 2012

IDV	No.	Mean	Median	STD	Min.	Max.
GR	169	0.71	0.09	11.87	-1.00	291.70
BL	169	0.55	0.57	0.19	0.07	1.31
ML	169	0.54	0.55	0.24	0.02	0.997
SZ	169	28.26	28.36	1.88	23.56	32.93
P	169	0.05	0.04	0.06	-0.34	0.24
M	169	1.38	1.03	1.45	-11.31	18.25
V	169	46.25	41.92	41.47	11.14	1012
FS	169	0.14	0.10	0.15	0	0.61

<Note> No.= Number of the Sample Firms in the chaebols, STD=Standard Deviation, GR=GROWTH1, BL=BVLEV1, ML=MVLEV1, SZ=SIZE1, P=PFT, M=MVBV, V=Volatility, FS=FOS

[Table 5] Pearson's and Spearman's Correlation Coefficient Matrices between IDVs

IDV	BL	ML	SZ	P	M	V	FS
BL	1.00	N.A.	0.35*#	-0.34*#	-0.05#	0.11*#	-0.09*#
ML	N.A.	1.00	0.25*#	-0.44*#	-0.49*#	0.03	-0.22*#
SZ			1.00	0.17*#	-0.06	- 0.10*#	0.53*
P				1.00	0.26*#	-0.11*#	0.36*#
M					1.00	0.04#	0.14*#
V						1.00	-0.14*#
FS							1.00

<Note> The numeric number in each cell indicates the correlation coefficient by the Pearson correlation estimation. The statistically significant coefficient of each IDV at the 5% level is denoted by (*) for the Pearson's test and/or (#) for the Spearman's one in the table. Moreover, it is structured to combine the two separately tested explanatory variables (i.e., BVLEV1 and MVLEV1) tested in each corresponding model, respectively.

3.1.2 Results on the 1st hypothesis test

As for the most 'appropriate' (or the best) model in terms of the DVs of both GROWTH1 and MVA to identify financial determinants of growth rate for the chaebol firms, individual fixed effects model was finally selected in the context of the SPD analysis, based on the selection criteria presented in [11]. However, there was only one statistically significant IDV (GROWTH_1) among all IDVs on the regressand of GROWTH2 (defined as annual change in total sales for a firm of the chaebol) in the corresponding fixed effects model selected as the best one. Meanwhile, Au & Yeung[16] presented that, the DPD model could be correctly specified, given the condition of the acceptance of the null hypotheses on validity of instrumental variable and existence of first-order serial correlation in terms of the first-differenced residuals. However, the majority of the DPD models tested for the DVs of the present study, did not reveal their acceptance of these assumptions which were respectively tested by the relevant statistical estimations such as the Sargan test for overidentifying restrictions and the AR(1) test. These conditions caused to negate further analysis of this study performed by the DPD model in line with effective utilization of any results available.

[Table 6] Results on the Panel Data Analysis to Identify Financial Determinants of GROWTH1

(Model 6-1) For the book-valued growth rate (GROWTH1) as a DV inclusive of BVLEV1 as an IDV		
IDV	Coefficient	A priori test results
Constant	-14.40*	• F-test (p-value < 0.0001) • Breusch-Pagan test (p-value < 0.0001) • Hausman test (p-value < 0.0001) <Note> * indicates that the independent variables (IDVs) was statistically significant at the 5% .
GROWTH1_1	-0.65*	
BVLEV1	1.14*	
MVBV	-0.0012	
PFT	-1.43	
SIZE1	0.52*	
VOLATILITY	0.0002	
FOS	2.50*	
(Model 6-2) For the book-valued growth rate (GROWTH1) as a DV inclusive of MVLEV1 as an IDV		
Constant	-14.37*	• F-test (p-value < 0.0001) • Breusch-Pagan test (p-value < 0.0001) • Hausman test (p-value < 0.0001) <Note> * and ** indicate that the independent variables (IDVs) were statistically significant at the 5% and 10% level of significance, respectively.
GROWTH1_1	-0.66*	
MVLEV1	0.65**	
MVBV	0.02	
PFT	-1.47	
SIZE1	0.53*	
VOLATILITY	0.0002	
FOS	2.53*	

[Table 7] Results on the Panel Data Analysis to Identify Financial Determinants of MVA

(Model 7-1) For the Market-valued growth rate (MVA) as a DV inclusive of BVLEV1 as an IDV		
IDV	Coefficient	A priori test results
Constant	4.29*	• F-test (p-value < 0.0001) • Breusch-Pagan test (p-value < 0.0001) • Hausman test (p-value < 0.0001) <Note> * and ** indicate that the independent variables (IDVs) were statistically significant at the 5% and 10% level of significance, respectively.
MVA_1	0.12**	
BVLEV1	+5.01E11	
MVBV	2.88E12*	
PFT	1.26E13*	
SIZE1	-1.69E12*	
VOLATILITY	-6.44E9**	
FOS	0.66E13*	
(Model 7-2) For the Market-valued growth rate (MVA) as a DV inclusive of MVLEV1 as an IDV		
Constant	2.71E13*	• F-test (p-value < 0.0001) • Breusch-Pagan test (p-value < 0.0001) • Hausman test (p-value < 0.0001) <Note> * and ** indicate that the independent variables (IDVs) were statistically significant at the 5% and 10% level of significance, respectively.
MVA_1	0.11**	
MVLEV1	-7.14E12*	
MVBV	1.10E11	
PFT	5.49E12	
SIZE1	-8.99E11*	
VOLATILITY	-5.56E9**	
FOS	1.48E13*	

3.1.3 Results on the 2nd hypothesis test

[Table 8] Results of the Hypothesis Test on Equal Coefficients of Each IDV with BVLEV1 on GROWTH1 across all Quantiles in the Model

IDV	BVLEV1	SIZE1	ROA	ROE	DPAYOUT	FOS	FCFF	SMARKET
Chi-square	6.53	2.67	3.20	0.02	5.30	1.46	0.66	4.16
p-value	0.09**	0.45	0.36	1.00	0.15	0.69	0,89	0.24

< Note> ** denotes the statistically significant at 10% level.

[Table 9] Results of the Hypothesis Test on Equal Coefficients of Each IDV with MVLEV1 on GROWTH1 across all Quantiles in the Model

IDV	MVLEV1	SIZE1	ROA	ROE	DPAYOUT	FOS	FCFF	SMARKET
Chi-square	4.42	1.04	1.61	0.08	1.88	2.25	0.26	3.97
p-value	0.22	0.79	0.66	0.99	0.60	0.52	0.97	0.26

[Table 10] Results of the Estimated Coefficient of Each IDV on the DV of GROWTH1 in Ordinary Least Square (OLS) and Conditional Quantile Regression (CQR) Models

IDV	OLS	Q(20%)	Q(40%)	Q(60%)	Q(80%)
constant	-1.07 (-1.08)	-0.32* (0.29)*	-0.10 (-0.13)	0.003 (-0.11)	0.07 (0.04)
BLVEV1 (MVLEV1)	0.53** (0.5 9)*	-0.08 (-0.10)*	-0.004 (-0.03)	0.03 (0.05)	0.16* (0.03)
SIZE1	0.03 (0.02)	0.01** (0.01)**	0.004 (0.01)	0.001 (0.01)	-0.002 (0.002)
ROA	0.44 (0.44)	0.52* (0.55)*	0.66* (0.65)*	0.64* (0.45)*	0.30 (0.31)**
ROE	0.01 (0.01)	0.004 (0.004)	0.004 (0.004)	0.01 (0.01)	0.01 (0.01)
DPAYOUT	-0.001 (-0.001)	-0.0001 (0.0001)	-0.0001 (-0,0001)	-0.0002 (-0.0001)	0.001 (0.001)
FOS	-0.07 (0.13)	0.07 (0.04)	0.03 (0.01)	0.04 (-0.03)	-0.01 (-0.004)
FCFF	-3.18E-14 (-3.27E-14)	-0.0001 (-0.0001)	-0.0001 (-0.0001)	-0.0001 (-0.0001)	-0.0001 (-0.0001)
SMARKET	0.11 (0.15)	0.04 (0.03)	0.04** (0.04)**	0.05** (0.06)*	0.11* (0.12)*
F2010	0.23** (0.24)*	0.03 (0.03)**	0.04* (0.04)*	0.06* (0.06)*	0.08* (0.07)*
F2011	0.01 (0.01)	0.002 (0.01)	0.03* (0.03)*	0.04* (0.04)*	0.07* (0.06)*
F2012	0.13 (0.13)	0.01 (0.02)	-0.01 (-0.01)	-0.01 (-0.02)	-0.03 (-0.02)
IND2	0.22 (0.25)	0.01 (0.001)	0.01 (0.01)	-0.01 (-0.004)	0.09 (0.06)
IND3	0.15 (0.20)	-0.03 (-0.03)	0.05** (0.05)**	0.05** (0.05)*	0.07** (0.07)**
IND4	0.20 (0.35)	0.09 (0.06)	0.04 (0.03)	0.09 (0.09)	0.06 (0.07)
IND5	0.08 (0.12)	-0.01 (-0.01)	0.01 (0.007)	0.003 (0.002)	0.01 (0.01)
IND6	0.07 (0.10)	0.06 (0.06)	0.04** (0.04)**	0.0007 (-0.01)	-0.02 (-0.05)
IND7	-0.03 (-0.01)	0.04** (0.03)	-0.002 (-0.001)	0.0007 (001)	-0.04 (-0.04)
IND8	0.56* (0.54)*	-0.02 (-0.04)	0.01 (0.01)	0.01(0.02)	0.01 (0.01)
IND9	-0.08 (-0.11)	-0.01 (-0.01)	0.005 (0.01)	-0.01 (0.005)	-0.04 (-0.02)
IND10	0.09 (0.10)	0.02 (0.02)	0.05* (0.05)*	0.06* (0.06)*	0.09** (0.11)*
IND11	0.04 (0.14)	-0.13 (-0.15)	-0.17 (-0.17)	-0.06 (-0.05)	-0.004 (0.001)
IND12	0.10 (0.12)	0.01 (-0.0003)	-0.005 (-0.004)	0.002 (0.006)	-0.04 (-0.04)
IND13	0.23 (0.15)	0.03 (0.05)	0.06 (0.07)	0.03 (0.03)	-0.01 (-0.02)
IND14	0.21 (0.28)	0.04 (0.02)	0.002 (-0.002)	-0.004 (0.004)	-0.01 (-0.02)
IND15	0.21 (0.27)	0.003 (-0.01)	-0.05 (-0.05)	-0.08 (-0.11)	-0.10 (-0.02)

<Note1> The numeric number in parentheses indicates the estimated coefficient of each IDV when employing the market-valued leverage ratio (MVLEV1) substituting for the book-valued leverage one (BVLEV1) as an IDV. The symbols of * and ** denote their statistically significant at 5% and 10% levels, respectively.

<Note2> The results of the estimated Coefficient of each IDV on the DV of MVA in OLS and CQR models as notated in Table 11, were not provided due to the limitations of space, but they are available from the author upon request.

3.2 Discussion

Regarding the implied interpretations on the empirical findings of the first hypothesis test, the followings were the discussion relevant to the statistically significant components on the tested growth rates for the Korean chaebol firms during the referenced time period. On the results of the model utilizing the GROWTH1 as DV, four out of the seven IDVs were identified as statistically significant proxies to determine the growth rate of the chaebol-firms as reported in (Model 6-1) & (Model 6-2) of [Table 6]. Both the coefficients of the leverage ratios in terms of the book- and market-values implied their significance on the DV as statistically presented above, coupled

with other IDVs such as one-period lagged GROWTH_1 for the growth rate, SIZE1 for a firm's size, and FOS as a proxy for foreign ownership. First, the positive associations of the capital structures measured by market- and book-value bases with GROWTH1 may suggest that the chaebol firms were likely to raise their capital by utilizing more debt financing relative to equity financing to support their growth drivers measured by a book-value during the studied period. Kim & Ham[17] rationalize in their study that there was a positive and statistically significant realtionship between the response variable of growth rate and debt ration at book-value. Consequetly, they suggested that debt financing from domstic financial institutions including commercial banks, may accordingly increase as the asset size of a regional firm in Korea was enlarged to boost its sales. One of the implications may be the rationale in finance that growth rate seemed to be positively proportional to leverage at the firm level, due to the easier accessibility of debt financing than equity funds, as found in [18]. Another explanation may also arise from the fact that the sample firms of this study were mostly populated in the manufacturing industries being primarily equipped with 'assets in place' relative to those belonging to the service industries, in which external financing in pursuit of lower cost of debt was easier to be obtained from the foreign and domestic capital markets, as described in [19]. Second, Goddard et. al.[20] presented that any inter-temporal persistency of growth was weak or negligible such that the firm and corporate group effects made less contributions to the variations of growth than those to the profitability in analysis. However, the findings of the persistent effect of one-year time lagged IDV (GROWTH_1) on the DV as GROWTH across the models, (Model 6-1 & Model 6-2) of Table 6 may suggest that there would be any systematic or consistent variation in persistence of growth rate for the firms belonging to the chaebol, which was contradictory to the outcome of [20] utilizing the sample data of eleven EU member nations. In association with this phenomenon, one may analyze that firms belonging to the chaebols, may, on average, continue to maintain their conventional growing policies during the inter-temporal sample period, in order to augment their size in total assets through horizontal or vertical integration as in the case of U.S. banking industry, as described in [1]. Third, there was a positively and strong linkage between a firm' size and GROWTH1, indicating that annual growth rate seemed to be higher for a large-size firm than its counterpart (i.e., a small one) among the chaebol firms. One of the driving forces on the proportional growth rate with large size may become possible by taking advantage of an inverse relationship with unobservable credit risk, resulting in utilizing lower cost of debt than its counterpart (i.e., small size chaebol firm), as in [21]. This phenomenon also revealed a logical reasoning that the associated positive relationship between a firm's size and its profitability may be attributed to a higher level of bargaining power of its customers who may theoretically keep a put option exercised against an efficiency of a product qualilty controlled by the chaebol firms, as described in [1]. Finally, there were consistent and pervasive evidences of the positive influence of FOS (measuring the proportion of foreign ownership) on the growth rate of a chaebol firm across the book-and the market-valued bases. These findings were consistent to the results from [22] and [4]. This linkage may be attributable to the possibility of reducing agency cost of equity incurred by management inefficiencies such as moral hazard, and enhancing management competence by exercising any presumed superior information of foreign institutional investors operating businesses in a broader spectrum of multinational markets, as in [22]. On the other hand, concerning the results of the model utilizing the MVA as a regressand, a majority of explanatory variables among the aforementioned seven IDVs revealed their statistically significant effects on the DV of the market-valued growth rate as reported in (Model 7-1) & (Model 7-2) of [Table 7]. First, a chaebol firm's

business risk (VOLATILITY) showed its negative linkage with MVA across the models inclusive of either BVLEV1 or MVLEV1 during the referenced time period. This persistent outcome may be in accordance with the modern finance theory, positing that a firm with larger volatility of earning streams (i.e., business risk), may have higher cost of equity, which may, in turn, bring about more discounted present value of a market value of equity incorporated in MVA. As theorized in modern finance, the higher cost of equity is estimated from a perspective of a Korean chaebol firm, which may be fundamentally derived from a larger systematic risk in the security market line (SML), the more discounted intrinsic value of stock for a Korean chaebol firm may be expected in the context of the 'discounted dividend model', ceteris paribus. Finally, profitability (PFT) and market-to book-value ratio (MVBV) were found to have their statistically positive impacts on the market value based growth rate employing BVLEV1 as in (Model 7-1). The direction for each coefficient of these IDVs was commensurate with the predicted sign postulated in finance theory as well. In other words, lower cost of capital to sustain a firm's higher growth rate may be available through internal financing supported by higher operating income or profitability, which may generally be consistent with the Myers' pecking order theory. Moreover, lower profitability was likely to possess a positive (+) difference between the portfolio returns with a high and a low ratio of book- to market-valued equity, as also found in [23]. Therefore, the positive relationship between the growth rate and MVBV in this study may indicate that a chaebol firm with high investment opportunities in terms of real options, may generate upward and foreseeable net present values (NPVs), thereby causing higher market based growth rate, as in [7].

With respect to the results of the 2nd hypothesis test applying conditional quantile regression (CQR) model, each coefficient for the identical list of the IDVs was estimated across the four different quantiles such as the 20th, 40th, 60th, and 80th quantile on GROWTH1 in Table 10 and on MVA, (whose table was not reported in the paper due to space limitations as previously desribed), respectively. In addition, the hypothesis tests on equal coefficients of each IDV were implemented, as reported in [Table 8] and Table 9, respectively. The estimated coefficients tested for all of the four quantiles were graphically presented in [Figure 1] of APPENDIX, being estimated with the 95% confidence interval with (resampled) bootstrapping replications functioned in the Statistical Analysis System (SAS) package. For a comparison purpose, the legitimate OLS estimates were reported along with those results obtained from the CQR analyses for reference. The latter methodology may possess more comparative and analytical advantages over OLS one which may be only focusing on the central tendency of distribution (to estimate a conditional mean model) and not account for possibility that any influence of each IDV would be discerned across different levels of the DV of concern, as illustrated in [14]. From the theoretical and practical perspectives, it was plausible to adopt the CQR application to test for the second hypothesis, given the ongoing situation of the domestic markets associated with the possibility of distortion of financial profile in the distribution among the chaebol firms, as described earlier. On the financially significant determinants to affect the book-valued GROWTH1, the estimated coefficients in the CQR model such as ROA for profitability, SMARKET for a proxy for the type of stock exchange showed their predominatly strong effects across the majority of the tested qunatiles Table 10, along with other significant control dummies representing the industry classifications (IND3 and IND10) and the macro-economic variables (F2010 and F2011).

Regarding the statistically significant elements affecting the level of the book-value based DV as GROWTH1, the estimated coefficients on ROA, SMARKET, time dummies of F2010 and F2011, and industry dummies of IND3 and IND10, showed their

discriminating effects on the DV at the majority of the quantiles as presented in [Table 10]. First, ROE which may measure profitability from the point of shareholders revealed its insignificant effects across all quantiels in the CQR analysis, while another measure ROA was found to be positive and significant impact on the DV. Second, regarding the time dummy variable proxied for the domestic capital market conditions at the macro level, more investments in total assets may be made in the years 2010 and 2011 for the chaebol firms as showed by the positive (+) signs of coefficient, indicating that an upward trend of domestic economic or financial aspect was expected in accordance with a stage of global economic recovery after the passage of the financial unstable period in 2007. Interestingly, only two out of the total fifteen sample industries, (that is, IND3 as the chemical industry and IND10 as the wholesale & retail one) showed their positive relationships with the book-valued growth rate of the chaebol firms with statistical significance, while these strong industry influences were not presented in the 20th quantile located in the lowest end. As for the positive relationship between IND3 and GROWTH1 evidencing that the chaebol firm engaged in the chemical industry may have a higher growth rate than its counterpart operating in other sample industries, this observation seemed to be consistent with the previous empirical findings such as in [4]. Through recovering from a recessionary or stagnant period on profitability of the Korean firms engaged in the capital-intensive industries including the chemical one in the 1980s.[24] Kim[7] presented that Korean domestic large firms continued to improve their profits and possess higher level of profitability than ever, as the industry began to emerge into a mature stage of business with its relatively stable earning streams. The enhanced profitability of this study in terms of ROA, may cause a majority of the chaebol firms in the corresponding industries to precipitate or extend investments during the investigated period, which was related with higher growth rate of total assets to be located in the upper quantiles in the distribution. In line with the positive relationship of the industry dummy as IND10 to the DV of GROWTH1, similar rationale or logic to the aforementioned macro-economic proxy for time dummy, seemed to be applied to the result. In other words, IND10 as the wholesale & retail industry may have increased its asset-size to activate business operations in the anticipation of the economic recovery after the passage of the drastic recession largelyl caused by the U.S. subprime mortgage turmoil, as presented. Third, in the context of modern finance theory, the predicted sign of estimate on the dummy variable (SMARKET) which may account for the type of domestic stock exchange listed, showed the positive and significant impact at the majority of quantiles. Firms listed in the KOSDAQ market may possess more investment opportunities than their counterparts in the KOSPI market [5], which may, in turn, commensurate with higher present value of growth opportunities (PVGO) representing the positive relationship with GROWTH1.

With regards to the statistically significant effects on the level of the market-value based DV as MVA, the estimated coefficients on MVLEV1, SIZE, FOS, IND8 (as the business service industry), and IND10, overall revealed their strong and persistent influences on the DV across the majority of all quantiles. There were negatively significant relationships between MVA and MVLEV1 as the market-value based leverage ratio at all categorized quantiles, along with the same OLS result. Second, SIZE1 significantly influencing on MVA overall showed its contradicting or opposite directions between the upper and lower quantiles. That is, the rationale on the positive (+) relationship for the large size chaebol firms located in the upper quantiles (i.e., the 60th and the 80th ones of this study) was previously suggested by a higher level of bargaining power from its customers and an inverse relationship caused by any unobservable credit risk, as previously mentioned. Furthermore, it may also be worth noting

that the insignificant impacts of SIZE1 on the book-valued growth rate of GROWTH1 across almost all quantiles as in Table 10 may also be brought about by the relatively broad range of the 95% confidence limits as the quantiles were moved to the lower and upper scales, as in [14].

4. Concluding Remarks

The study investigated of one of the current subjects which may be of concern from the perspectives of academics and practitioners on the driving force or determinant of growth rate for the firms belonging to the chaebols in the Korean capital markets. Any results obtained from the study may be empirically used to rebalance or improve the current financial aspects of the chaebol firms, given the unprecedented financial distortions polarized on a few top-ranked chaebols in size, after the passage of the global financial turmoil, as discussed. With respect to the results of the first hypothesis tested in this study with applying both dynamic panel data (DPD) and static panel data (SPD) models, both the debt ratios relevant to the book- and market-value showed their positive relationships with the DV of GROWTH1, along with other significant IDVs such as one-period lagged DV of GROWTH_1, SIZE1 and FOS with statistical significance, while a majority of regressors inclusive of VOLATILITY, MVBV, and PFT among the seven IDVs were found to be statistically important on MVA as a determinant of the market-value based growth rate for the Korean chaebol firms in the domestic capital market. Second, through employing conditional quantile regression (CQR) analysis to test for the second hypothesis, the control variables such as ROA, SMARKET, time dummy variable of F2010 and F2011, and industry dummies of IND3 and IND10, provided evidence of their significant influences on the DV of GROWTH1, while the estimated coefficients on MVLEV1, SIZE1, FOS, IND8 and IND10, also indicated their pervasive and prominent effects on the DV of MVA across the majority of the distinctive quantiles, as presented above.

In spite of the weaknesses of the present study associated with empirically inconsistent findings which may result from utilizing different time span with disparate sample data in the context of international and/or domestic research methodology, it may shed new light on the possible identification of any driving forces to determine the growth rate of the Korean chaebol firms in the domestic capital market, being measured in the book-value basis as well as the market-value one. Moreover, further investigations may be warranted in the subject of the historical growth of the chaebol firms in the domestic market backing to the early 1960s, in comparison with the present study which was focusing on the empirical issue of identifying any financial determinants of the growth rate of the firms *status quo,* after the global financial turmoil, as described earlier. However, this extended study may also require the availability of the data to trace from the effects of the current growth rate of the chaebol firms to their historical causes at the macro-level. To recap, the analytical identification or results available from the presemt study may be expected to be a financial catalyst which may contribute to rebalancing or stabilizing the aforementioned financial distortions faced by the Korean chaebol firms. This would, prevent or mitigate the possibility of reoccurrence of any unpleasant but, plausible financial instability which had been, at intervals, caused by the external and internal economic events at the macro or micro level.

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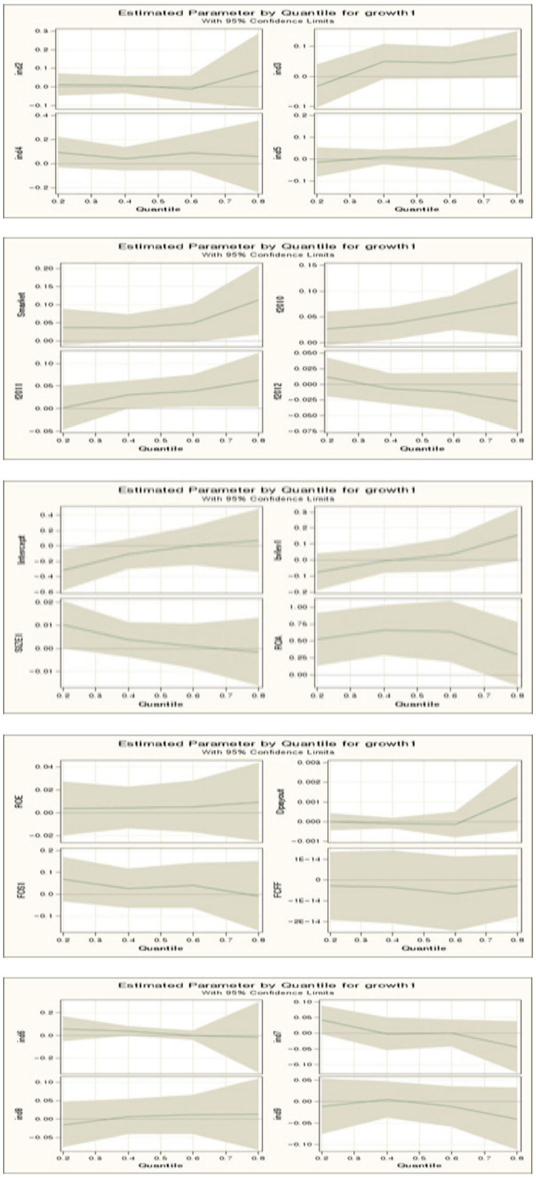
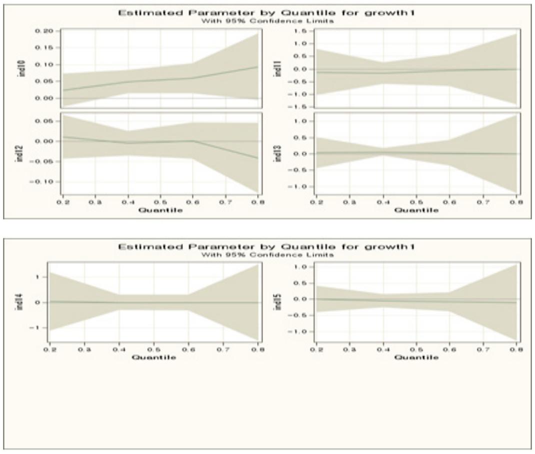
Appendix

[Fig. 1] Estimated Parameter by Quantile Regression Analysis on the DV of GROWTH1 Inclusive of BVLEV1 With 95% Confidence Limits





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