

# Financial Leverage of Korean Business Conglomerates "Chaebols" in the Post-Asian Financial Crisis

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## 아시아 금융위기 이후의 한국 재벌기업들의 부채비율 고찰

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**Abstract** This study is to perform several major analyses to find any differences in the leverage between the pre- and post-period of the currency crisis. Moreover, another aspect is to investigate a financial aspect which has received relatively little attention to the firms and/or industries in the emerging capital markets in comparison to those in the advanced markets. The purpose of this empirical study is to confirm whether or not, it is myth or reality that Korean business conglomerate, chaebol, firms with subsidized financing from government-owned domestic financial institutions in the pre-financial turmoil, may still maintain their higher leverage, even after the crisis. It was found that firms belonging to the chaebol in Korea maintained higher average book-value and market-value based debt ratios, relative to their counterparts not belonging to the chaebol across all of the tested models. There were positive relationships of IND3(=the chemical industry) and Ind5(=the construction industry) to the book-value leverage. This study identified that there were no differences in the explanatory variables included, between the tested models (that is, without and with including the present value of an operating lease) related to each debt ratio. Since the Korean government continue to improve the corporate governance of the domestic firms in terms of accounting transparency and corporate ownership, it would be more efficient, if utilizing this "new" ratio considering an operating lease as an effective measurement of the level of leverage. In terms of the capital structure, it may also be possible for foreign firms to utilize and benefit from the results obtained in this study when operating their new businesses in Korea, given the economic circumstances such as the ongoing progress of the Korea-America FTA or the Korea-China FTA.

**요약** 본 연구의 배경은 아시아 외환위기 발생시점 기준, 사전 및 사후 기간 상호 간의 국내 대기업들의 부채비율 변화에 대한 차이점을 발견하기 위해 분석하는 것이다. 본 연구의 목적은 정부로부터 타인자본 조달 시 상대적으로 우선순위를 유지하였다고 주장되는 재벌기업 중심의 대기업들이, 금융위기 이후에도 연구표본자료에 포함된 대응기업들과 비교에서 지속적으로 높은 부채비율을 유지하는가에 대한 가설을 검증하는 것이다. 재벌에 속하는 기업들은 평균적으로 높은 장부가 대비 그리고 시장가 대비 부채비율을 상대기업들과 비교하여, 표본기간동안 유지하였음이 판명되었고, '시간' 대응 터미변수인 2002년과 2003년의 변수들은 (장부가 기준의) 부채비율과 역(-)의 상관관계를 보였다. 새로운 회계처리기준(K-IFRS)를 고려하여, 현재까지 대차대조표의 부외항목으로만 산정되는 영업리스 금액을 자산과 부채에 새로이 포함하여 산정한 부채비율 기준으로 분석한 결과, 모델에 포함된 설명변수들 기준, 차이가 없음을 통계적으로 발견하였다. 정부는 그 동안 지속적으로 기업회계의 투명성과 기업소유구조를 중심으로 한 기업지배구조의 개선에 관한 정책을 수행하여 왔으며, '새로운' 부채비율에 대한 정의는 기업의 부채를 측정하는 점에 더욱 효율적 일 수 있다고 판단한다. 또한, 현재 진행 중인 한국-미국 간 그리고 한국-중국 간 등의 자유무역협정(FTA)이 시행될 경우, 다국적 기업들의 국내 현지법인 설립 시, 본 논문의 결과는 동 법인들이 적정 부채비율을 구성하는 점에 응용될 수 있음을 시사한다고 판단한다.

**Key Words** : Korean chaebol, Market-value, Book-value, Leverage, Japanese keiretsu, Asian Financial Crisis

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## 1. Introduction

This study examines a prolonged, but interesting issue on the possible change of the financial leverage of "Korean enterprise group", the so-called "chaebol" in the post-period of Asian financial crisis in the 2000s. Fattouh et al.[1] found in their research, that higher leverage for most Korean firms in the 1980s and 1990s, whether in the chaebols or not, might lead to unsound financial positions and thus, resulted in the firms in Korea to be vulnerable to the financial turmoil occurred in the late 1990s. Since there are few researches on this issue to date, the primary motivation to continue this study is to perform several major analyses to find any differences in the leverage between the pre- and post-period of the currency crisis. Moreover, another major focus is to investigate a financial aspect which has received relatively little attention to the firms and/or industries in the emerging capital markets in comparison to those in the advanced markets. Any changes in the leverage, have been tested for Korean chaebol firms by employing some robust methodologies for the period of the post-financial crisis. Taking into account of the implementation of the K-IFRS beginning in 2011, this study also tested a "new" debt ratio considering the operating lease, which had been rarely tested in the previous research. Given the changing environments of the Korean economy, such as the ongoing progress of the Korea-America Free Trade Agreements(FTA) or the Korea-China FTA, the results of such a comparison for a possible change of leverage between the pre-and the post-period of the crisis, may be beneficial for multinational firms headquartered in many developed and emerging nations in terms of establishing their own capital structure.

The purpose of this empirical study is to confirm whether or not, it is myth or reality that Korean chaebol firms with subsidized financing from government-owned domestic financial institutions in the pre-financial turmoil, may still maintain their higher leverage ratios even after the crisis.

This study is composed as follows: The first section examines the previous literature chronologically on the capital structure. Moreover, the general description of Korean chaebol with her domestic financial markets is assessed especially for the foreign firms. The second

section discusses the data collection and the methodologies utilizing in this study. The third section analyzes and interprets the results obtained from the models. The final section presents a summary and conclusions.

## 2. Previous Literature and The Review of the Korean Financial Markets

### 2.1 Previous Theoretical and Empirical Issues

Since the pioneering study by Modigliani-Miller (M&M) addressed that there might be no optimal capital structure for the firms in the same risk-class, assuming the perfect capital markets with no taxes[2], subsequent studies have performed to find any determinants which may consist of a firm's optimal capital structure under the imperfect markets. One of the primary study by Remmers et al.[3] indicated that industry was not a determinant of corporate leverage ratios in the manufacturing sectors in the U.S. They also argued that there were no industry differences for the Netherland and Norway, but that there were difference sfor France and Japan. Another article on industry effect by Scott & Martin[4] showed how their results describing the evident existence of inter-industry differences on capital structure, have been reinforced by employing both parametric and non-parametric approaches. In this article, the adjustments of industry mean equity ratios based on firm size differences have been performed and the results of the analysis of covariance(ANCOVA) confirmed that industry itself along with a significant size effect was a determinant of capital structure.

Myers[5] 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 "under-investment problem" incurred by the shareholders of the firm. He also indicated that real options, which may engender positive investment opportunities, might have limitations as security for debt claims due to their thin and imperfect secondary markets. Kester[6] compared the capital structures between U.S. and Japanese firms. 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 classification. Most of the Japanese firms belonging the mature and heavy industries showed higher leverage than their U.S. counterparts at either book- or market- value based ratios. Barclay et al.[7] tested an extensive empirical study to examine the determinants of corporate leverage and dividend policies from the data of 6,780 U.S. companies during the years of 1963 to 1993. Their findings showed that a company's market-to-book ratio as a proxy for investment opportunities had statistically significant negative relationship with the debt ratio. Glen & Singh[8] compared capital structures in developed and emerging markets considering 7968 firms from 44 countries (22 developed markets vs. 22 emerging markets) during the period of 1994-2000. In the study, the amount of leverage, defined as total liabilities to total assets, in the emerging markets were found to be statistically and significantly higher than those in the developed markets. They also presented that the median leverage ratio of Korean sample firms was 72% in 1994, but declined to 52% in 2000, following the 1997 financial crisis.

Park et al.[9] performed two sets of tests to analyze the differences between the chaebol firms and the non-chaebol ones and between more levered and less levered chaebols. Regarding the first result, the significant relationship was found between the investment and their growth opportunity for the chaebols, while the reverse was true for the non-chaebols. Second, they presented that more statistically significant relationships were found between the investments and the growth opportunities, as the chaebol firms decrease their levels of leverage. As one of the recent studies, Choi[10] investigated any financial differences between the rising (or survived) and the failing chaebols during the 1997 financial crisis. The paper found that there were no statistically significant differences in terms of inside ownership between the two chaebol-related groups, after controlling for the size effect. The failing group was also found that they were more diversified than their counterparts mainly due to the lower cost of borrowing, which thereby resulted in the decreasing net income. In the study by Kim & Berger[11], One of the issues concerning the level of leverage in the pre-Asian financial crisis, was investigated to find whether or not, firms belonging to the chaebol in Korea have different market-value-based debt ratio than their

counterparts not belonging to the chaebol. If this is so, there may be several managerial implications to perform a further research. Results indicate that, during the period preceding the IMF bailout, firms in the chaebol did have a higher mean leverage than their counterparts. For another issue addressed in this study, it employed logistic regression analysis to determine that firms in the chaebol appeared to possess different levels of the following characteristics: larger size measured by total sales, higher sales growth rate, lower profitability, and lower business risk, (although the latter difference was not statistically significant, only directional).

## 2.2 General Description of the Korean Capital Markets

### 2.2.1 The regulated and the unregulated domestic capital markets

The Korean capital markets are generally divided into two sections: one is composed of the regulated financial institutions and the other of the unregulated financial markets. The former is modern, more clearly structured, regulated, and statistically recorded while the latter is traditional, more competitive, and largely unstructured. [12]

According to the Bank of Korea(BOK), the central bank in Korea, regulated financial institutions were classified into four sectors: Central Bank, Banking institutions including commercial banks, and non-bank financial institutions, and the Securities market. The BOK as a central bank performed traditional monetary and credit policy by means of discount rate, reserve requirement, and open market operations. The Monetary Stabilization Bonds(MSB), which have been one of the primary instruments to control monetary demand and supply, have been issued by the central bank as one of its open market operation policies. The unregulated, domestic financial markets including the "Kye" market and curb market, had traditionally played important roles as intermediaries between enterprises and individuals to distribute capital with much higher market-determined interest rates than those of the other regulated financial institutions. One of the primary reasons why these unregulated markets continue to exist was as follows: In spite of the government's continual measures against the

unregulated markets, these markets continue to be developed, largely due to inefficient role of the regulated financial markets resulting from strong and arbitrary government control in interest rate and credit allocation policies. Even if not statistically confirmed due to the informal nature of unregulated markets, it was speculated that the volume of credit outstanding in the unregulated markets was almost half of the total volume of credit in the regulated deposit money banks in 1972.[13] Their annual lending rates were also in the range of 33.24% to 61.80% during the period of 1963 to 1978, which were more than twice as high as the nominal bank loan rates of 15.0% to 26%.

### 2.2.2 General Description of Korean Chaebol

The business conglomerate, the so-called, chaebol, in Korea is regarded as by-product of the rapid growth of the Korean economy. While there is no official definition or set of statistics regarding the chaebol, the definition that might come closest in meaning is the Monopoly Regulation and Fair Trade Act's "large enterprise group".[14] Another proxy for the definition may be the thirty largest "enterprise groups" selected by the Office of Bank Supervision and Examination (OBSE) of the Bank of Korea in the regulations relating to "Credit Operations on Enterprise Groups".

It may be worthwhile to compare the aspects between the Korean chaebol and the Japanese keiretsu which seems to be more actively researched by the western nations. Steers et al.[15] noted several differences between the Korean chaebol and the Japanese keiretsu.

(a) While most shares in the chaebol are held by family members, the ownership of the keiretsu is more diffused. (b) The chaebol is more hierarchical and centralized than the keiretsu, thus leading to large differences in managerial structure and style. (c) The nature of the business-government relationship is stronger in Korea than in Japan.

This may have managerial implications as follows[16]: Compared to the managerial structure of the Japanese keiretsu, there has been no bank in the chaebol similar to the lead bank in the keiretsu. Most borrowing for new businesses has been dependent upon the external financing through domestic banks directed by the government, while far more borrowing in Japan was derived from the lead

banks of the keiretsu groups. Despite their contributions to the rapid growth of the Korean economy, the chaebols may have certain negative impact on the economy, due to their alleged receipt of unfair priority in receiving credit and having "special" government connections.[17] Kim[18] described that Korea's ruling political elite saw the chaebol as both a liability and an asset in its quest for economic growth and political legitimacy. A Korean survey in 1990 indicated that 94.6% of those interviewed believed that the chaebol accumulated their wealth illicitly through speculation in real estate and government connections, while only 60.3% of those interviewed regarded the chaebol as positive contributors to the increase of the national economy.[19] We should remind that the "appearance" of a bias or unfairness or impropriety becomes more important than the actual facts of the situation, as is sometimes the case,

## 3. Data and Methodology

### 3.1 Data Collection

The data were constructed by utilizing the sampling criteria, described in Table 1. First, equal sample sizes of thirteen firms ranked by 2003 asset size for each industry in Korea, were selected with the following criteria: (1) The largest corporations in size (instead of using a random sampling procedure) were chosen to generate an increased likelihood of obtaining more reliable and consistent financial data, especially from a country with its developing capital markets: this reasoning was embraced and utilized in Errunza[20] and Kim & Lee[21]. Indeed, these larger companies seemed to provide more consistent data due to the high degree of their involvement in international transactions. (2) In less developed capital markets, the information asymmetries between management and outside investors, as presented in [22], may be less severe for large corporations, due to their larger number of shareholders and higher proportion of minority interests, as also argued in [23]. (3) In terms of the degree of "persistence" (staying in the same industry over the sample period), larger firms are more likely to remain in the same product lines.

The followings are the sampling criteria employed in this study:

- 1) All the data for each sample firm should be available for at least 5 years including the year of 1999 to 2003, which is the immediately following period of Asian financial crisis in 1997.
- 2) The sample firms should be listed on the Korea Exchange at the end of December 2003. They were also included in the databases of NewKisValue, DataGuide Pro, or Form 10-K.
- 3) The largest 13 corporations ranked by 2003 assets size were selected for each corresponding industry.
- 4) Only firms in each industry which had a matching definition between the U.S. SIC and the Korean SIC codes, were included.
- 5) Financial and regulated industries were not included in the sample.

This study considered the fact that many industry-classification systems in Korea are similar to those in the U.S.: The U.S. Standard Industrial Classification(SIC), is generally matched with the Korean SIC, in their structures and definitions. Since there have been several previous studies on developed capital markets that included major industries on the issue of capital structure, the results obtained in this study for Korean firms may be effectively compared to the results utilizing U.S. equivalent sample industries with their matching definitions. Moreover, 5-year sampling period were used by taking into account the results found in Bowen et al.[24] that leverage ratios of firms showed their statistically significant tendency toward mean-reversion over the period of 5-year.

[Table 1] Descriptive Statistics for the Sample Industry Leverage at Book-value\*

Year	1999	2000	2001	2002	2003
Ind.					
1	0.57** 0.56 0.13	0.56 0.61 0.16	0.50 0.57 0.18	0.47 0.50 0.20	0.46 0.50 0.20
2	0.50 0.46 0.18	0.48 0.49 0.16	0.45 0.44 0.17	0.41 0.38 0.17	0.41 0.41 0.17
3	0.61 0.67 0.17	0.61 0.64 0.22	0.62 0.65 0.23	0.63 0.65 0.25	0.61 0.66 0.21
4	0.57 0.60 0.18	0.54 0.56 0.20	0.48 0.50 0.23	0.45 0.45 0.24	0.46 0.48 0.25

5	0.69 0.66 0.11	0.68 0.64 0.11	0.67 0.68 0.12	0.62 0.64 0.11	0.61 0.61 0.12
6	0.56 0.56 0.16	0.59 0.63 0.17	0.57 0.57 0.16	0.55 0.56 0.16	0.55 0.55 0.19
SM1	0.58	0.58	0.55	0.52	0.52

\*Lev1: Leverage Ratio at Book-Value,

Ind.:industry, 1=food, 2=pharmaceutical, 3=chemical, 4=semiconductor & communication, 5=construction, 6=wholesale, SM1: mean for all sample industries,

\*\*Each cell is vertically arranged in the order of mean, median, and standard deviation for each corresponding industry in each year.

[Table 2] Descriptive Statistics for the Sample Industry Leverage at Market-value\*

Year	1999	2000	2001	2002	2003
Ind					
1	0.64** 0.69 0.16	0.75 0.77 0.15	0.66 0.73 0.21	0.61 0.64 0.23	0.59 0.62 0.22
2	0.60 0.64 0.20	0.66 0.74 0.21	0.55 0.59 0.21	0.58 0.62 0.20	0.54 0.55 0.23
3	0.75 0.72 0.17	0.79 0.87 0.19	0.72 0.87 0.25	0.75 0.87 0.26	0.69 0.82 0.29
4	0.46 0.41 0.25	0.61 0.64 0.22	0.49 0.43 0.26	0.47 0.41 0.27	0.41 0.36 0.25
5	0.84 0.86 0.13	0.90 0.93 0.09	0.82 0.86 0.13	0.83 0.85 0.13	0.78 0.85 0.16
6	0.72 0.77 0.16	0.78 0.82 0.17	0.77 0.82 0.12	0.77 0.79 0.11	0.74 0.77 0.12
SM2	0.67	0.75	0.67	0.67	0.63

\* Lev2: Leverage Ratio at Market-Value,

\*\*Each cell is vertically arranged in the order of mean, median, and standard deviation for each corresponding industry in each year.

### 3.2 Methodology

It would be useful to ask whether or not, firms belonging to a chaebol have higher or lower leverage than firms not belonging to a chaebol, following the Asian financial (or currency) turmoil in the late 1990s. So far, few studies have researched this issue. Kim & Berger[25]

presented the results that Korean firms belonging to the chaebol do have higher market value based leverage, on average, during the pre-period of the financial crisis than firms not belonging to the chaebol, given that the other independent variables in the model were held constant or controlled. Therefore, it would be very interesting for academicians and practicing managers to test whether or not, the level of leverage of firms belonging to chaebol has been indeed changed, in comparison to that of firms not belonging to chaebol. after the unprecedented financial and industrial restructuring policies were exercised by the domestic policy makers since the Asian financial crisis.

A hypothesis for the period under this study (as earlier noted: 1999-2003) may thus be postulated as follows:

**H0: Korean firms belonging to chaebol did not have different mean value based debt ratio from that of their non-chaebol counterparts, after the industrial and financial restructuring policies had been performed.**

**H1: Korean firms belonging to chaebol did have different mean value based debt ratio from their non-chaebol counterparts, after the policies had been performed.**

The hypothesis test was carried out using the multiple regression analysis. To mitigate possible econometric problems such as heteroscedasticity and autocorrelation in the error term, the multiple regression model was estimated by the stepwise regression procedure with the panel data, as suggested in Palenzuela & Bobillo[26]. It was also used to take advantage of its ability to derive a parsimonious model that was relatively free of multi-collinearity, in the sense that every variable in the final model would be guaranteed to add significant incremental predictive value. Regarding the time (year) dummy variable employed in the models, the variable was frequently utilized to account for some economic, managerial, or financial phenomena changing over time in the previous literature. Hannan and Rhoades[27] employed time dummies in their research to control for any omitted macroeconomic and other possible variables which may have effects on the level of merger activity during the years from 1971 to 1982. Bruner[28] utilized the calendar-year based time dummies to take account of

variations in a firm's debt ratio over time. Moreover, Kang[29] tested the changes of the financing sources of Japanese firms by employing the time proxy, in order to examine the monitoring role of Japanese domestic, financial institutions across the sample periods in his study:

$$\text{LEVERAGE}_{it} = b_0 + b_1\text{CBOL}_{it} + b_2\text{T00}_{it} + b_3\text{T01}_{it} + b_4\text{T02}_{it} + b_5\text{T03}_{it} + b_6\text{IND1}_{it} + b_7\text{IND2}_{it} + b_8\text{IND3}_{it} + b_9\text{IND4}_{it} + b_{10}\text{IND5}_{it} + e_{it}, \text{ where } i = 1, 2, \dots, 78 \text{ (companies), and}$$

$$t = 1999, 2000, \dots, 2003.$$

**Definitions of LEVERAGE employed in this study :**

**(1) Book-value based debt ratio:**

- 1) Total liabilities/Total Assets: (without including the industry dummy variables)
- 2) Total liabilities/Total Assets: (with including the industry dummy variables)
- 3) (Total liabilities + Present Value(PV) of Operating Lease)/(Total Assets + Present Value(PV) of Operating Lease): (with including the industry dummy variables)

**(2) Market-value based debt ratio:**

- 1) Total liabilities/(Total liabilities + Market Value of Equity + Preferred Stock): (without including the industry dummy variables)
- 2) Total liabilities/(Market value of Equity + Preferred Stock): (with including the industry dummy variables)
- 3) (Total liabilities + PV of Operating Lease)/(Total liabilities + Market Value of Equity + Preferred Stock+ PV of Operating Lease): (with including the industry dummy variables)

CBOL = 1 if a firm belongs to the chaebol.  
0, otherwise.

T00 = 1 if the year = 2000. 0, otherwise;

T01 = 1 if the year = 2001. 0, otherwise;

T02 = 1 if the year = 2002. 0, otherwise;

T03 = 1 if the year = 2003. 0, otherwise;

(Base time variable = the year of 1999)

IND1 = 1 if industry = food. 0, otherwise; IND2 = 1

if industry = pharmaceutical. 0, otherwise; IND3 = 1 if

industry = chemical. 0, otherwise; IND4 = 1 if industry

= semiconductor & communication. 0, otherwise; IND5 = 1 if industry = construction. 0, otherwise; (Base industry variable = the wholesale industry)

$e_{it}$  is the error term assumed to be normally distributed, homoscedastic, and independent.

In order to test this hypothesis, both book-value and market-value based leverage ratios were used as the dependent variables in each corresponding regression model, along with key qualitative(dummy) independent variable with 2 categories, taking on the value of 1 for a Korean firm belonging to a chaebol or 0 for a non-chaebol in this study. It also included four dummy variables for the five categories of time (the year from 1999 to 2003) with 1999 as the base year and five dummies for the six industry categories (food, pharmaceutical, chemical, semiconductor & communication, construction, and wholesale) with the latter industry as the base dummy. Among the frequently employed leverage ratios in the previous literature, this paper employed the ratio of total liabilities to total assets to estimate the level of leverage; this ratio was used in this study due to its ability to reflect a firm's dependence upon its total liabilities and a simple concept, as described similarly in Ferri & Jones[30]. Furthermore, this ratio was the only financial ratio which was normally distributed as presented in Deakin[31] and Mahmood & Lawrence[32].

Moreover, it may be interesting to find a relationship between the explanatory variables and the leverage ratio in, which is defined as (Total liabilities + PV of Operating Lease)/(Total Assets + PV of Operating Lease) as a book-value one or (Total liabilities + PV of Operating Lease)/(Total liabilities + Market Value of Equity + Preferred Stock+ PV of Operating Lease) as a market-value one. The rationale employing this "new" dependent variables which were rarely tested in the previous research, arose from the following reason: There is an ongoing consideration on the possibility of inclusion of the present value of "operating lease" as an "on-balance sheet" item (i.e. not off-balance) in the financial statements under the newly enacted and implemented K-IFRS(Korean International Financial Reporting Standards) beginning in 2011.

## 4. Analysis and Interpretations

The following regression model was obtained by the stepwise regression procedure for the Korean sample firms. (The significant levels for entry into the model and deletion from the model were both .05.)

[Table 3] Results of the Stepwise Regression on the Book-Value based Leverage Ratios (\*: Significant at  $p < .01$ )

(Model 1-1) Dependent Variable as Total liabilities/Total Assets without including the industry dummy variables: LEVERAGE = 0.51441 + 0.10950CBOL  (t-statistic) (45.02)* (5.51)*  F-value* = 30.37, $R^2 = 7.26\%$ ,  Adjusted $R^2=7.02\%$		
(Model 1-2) Dependent Variable as Total liabilities/Total Assets with including the industry dummy variables: LEVERAGE = 0.50455 + 0.08923CBOL  (t-statistic) (35.99)* (4.60)*  - 0.04731T02 - 0.05622T03  (-2.06)* (-2.45)*  + 0.08498IND3 + 0.13864IND  (3.41)* (5.66)*  F-value* = 15.78, $R^2 = 17.05\%$ , Adjusted $R^2=15.97\%$		
(Model 1-3) Dependent Variable as (Total liabilities + PV of Operating Lease)/(Total Assets + PV of Operating Lease) with including the industry dummy variables: LEVERAGE = 0.50543 + 0.09000CBOL (t-statistic) (36.01)* (4.64)* 0.04798T02 - 0.05684T03 + 0.08543IND3  (-2.09)* (-2.47)* (3.42)* + 0.13808IND5 (5.63)*  F-value* = 15.86, $R^2 = 17.11\%$ ,  Adjusted $R^2=16.03\%$		

[Table 4] Results of the Stepwise Regression on the Market-Value based Leverage Ratios (\*: Significant at  $p < .01$ )

<p>(Model 2-1) Dependent Variable as Total liabilities/(Total liabilities + Market Value of Equity + Preferred Stock) without including the industry dummy variables:</p> <p>LEVERAGE = 0.63181 + 0.07884CBOL                  (t-statistic) (42.28)* (3.29)*                  + 0.09332T00                  (3.31)*                  F-value* = 10.65, R<sup>2</sup> = 5.22%,                  Adjusted R<sup>2</sup>=4.73%</p>
<p>(Model 2-2) Dependent Variable as Total liabilities/(Total liabilities + Market value of Equity + Preferred Stock) with including the industry dummy variables:</p> <p>LEVERAGE = 0.70716 + 0.05230CBOL                  (t-statistic) (34.91)* (2,37)*                  + 0.09256T00 - 0.09021IND1                  (3.79)* (-3.05)*                  -0.13921IND2-0.25810IND4+ 0.0890IND5                  (-4.50)* (-8.80)* (3.03)*                  F-value* = 26.40, R<sup>2</sup> = 29.26%,                  Adjusted R<sup>2</sup> = 28.15%</p>
<p>(Model 2-3) Dependent Variable as (Total liabilities + PV of Operating Lease)/(Total liabilities + Market Value of Equity + Preferred Stock+ PV of Operating Lease) with including the industry dummy variables:</p> <p>LEVERAGE = 0.70729 + 0.05261CBOL                  (t-statistic) (34.93)* (2.38)*                  + 0.09245T00 - 0.08962IND1                  (3.78)* (-3.03)*                  -0.13876IND2-0.25690IND4 + 0.08901IND5                  (-4.49)* (-8.76)* (3.03)*                  F-value* = 26.27, R<sup>2</sup> = 29.16%, Adjusted                  R<sup>2</sup>=28.05%</p>

Based upon the results of the analyses described in Table 3 & Table 4, it would be more effective to divide them into three categories as follows: First, the analyses of both the book-value and the market-value based models excluding the industry dummy variables.(Model 1-1 vs.

Model 2-1) Second, the analyses of the models including the industry dummies, in which both the leverage ratios, that is, the ratios with and without taking into account the present value of operating leases, were estimated in term of their book-value.(Model 1-2 vs. Model 1-3) Third, the analyses of the models including the industry dummies, in which both leverage ratios. i.e. the ratios with and without taking into account the present value of operating lease, were estimated in term of their market-value.(Model 2-2 vs. Model 2-3)

Regarding the results of the first analyses between Model 1-1 and Model 2-1. both models showed the statistically significant results in terms of their F-value at the 1% level of significance. These results were similar to the one obtained in the study by Kim & Berger[33] which tested during the preceding period of the Asian financial crisis. In other words, the positive and significant estimated coefficients of 0.10950 and 0.07884 of the CBOL dummy variables in both models, lead to the conclusion that Korean chaebol firms, following the period of IMF bailout, may still maintain higher leverage, on average, than firms not belonging to the chaebol, on the condition that the other explanatory variables were controlled. According to Samsung Economic Research Institute[34], domestic manufacturers' debt/equity ratio, which had increased to about 400% in 1997, reduced to the level of 214.7% in 2000, the lowest one since 1968. However, this paper found that the firms belonging to the chaebol, still seemed to keep higher leverage than their counterparts not belonging to the chaebol. One of the primary implications to account for this phenomenon, may be in the context of modern finance theory, explaining that larger and more matured firms with less business risk similar to the chaebol firms, can maintain higher debt ratio than their counterparts can do. This finding may also imply that there may be a time-lag between the decrease of the leverage and the implementation of the domestic policy, especially against the chaebols, with the unprecedented massive plans such as the disposal of ailing firms and the corporate restructuring since the financial crisis. Regarding the time dummy, the coefficient of T00 in the market-value based debt model(Model 2-1), was positive and significant at the 1% level. This result showed the inverse relationship between the condition of a bullish stock market and the market



value based leverage ratio. In fact, the Korea Composite Stock Price Index(KOSPI) during the year of 2000, was relatively sluggish with the value of 504.62, in comparison to the other sample years such as 1028.07(for the year, 1999), 627.55(for the year of 2002), and 810.71(for the year, 2003), respectively.

With respect to the outcome obtained by utilizing the statistical package, both models(Model 1-2 & Model 1-3), to find their relationships to the book-value based debt ratios, consistently showed the final inclusion of the explanatory variables such as CBOL, T02, T03, IND3, and IND5. As described above, it would be worthwhile to compare the two models, given the current circumstance of the implementation of K-IFRS(Korean International Financial Reporting Standards) beginning in 2011: According to Korean Generally Accepted Accounting Principles(Korean GAAP), an operating lease was recorded as neither an asset nor a liability on the financial statements of a firm.. The amount paid to the lessor, was recorded as an expense as incurred. However, there is an ongoing consideration on the inclusion of the present value of "operating lease" as an "on-balance sheet" item (i.e. not off-balance) as in the capital(or financial) lease, under the newly enacted and implemented K-IFRS. Therefore, it would be very interesting to both academicians and the practitioners, if any differences can be found in the leverage ratios between "with" and "without" including the amount of an operating lease in the models. In conclusion, this study identified that there were no differences between the two models, in terms of the explanatory variables finally entered into each stepwise regression model with including the same time- and the same industry-dummies. This result may reveal an important implication to the policy makers and/or the practitioners that the (third) debt ratio tested in this study, which took into account the present value of the operating lease in the balance sheet(B/S), did not show any differences from the debt ratio without including the operating lease, in terms of the identification of the explanatory variables employed in the book-value based models.

If performing a more detailed analyses on the variables included in both models, the models showed the statistical significance, in terms of the F-value at 1% level and the adjusted  $R^2$  as 15.97% and 16.03%, respectively. The

negative and significant estimated coefficients for T02 and T03, can be interpreted in consistent with modern finance theory as follows: In comparison to the previous year, 2000, market expectation of the favorable domestic economy in the years of 2002 and 2003, may lead to the preference of equity financing over debt financing from a managerial perspective, which, in turn, resulted in the inverse relation between the time dummies and the book-value based debt ratio in both models. In more detail, In the early 2000s, the increase in equity capital were primarily composed of the increase in paid-in capital and capital surplus due to asset revaluation, and in retained earnings.[35] Concerning the positive relationship of IND3(=the chemical industry) and Ind5(=the construction industry) to the leverage ratio, the demand for the petrochemical products fell sharply resulted mainly from the declining demand in Asian countries including in China, due to the oil price hike since September 2000.[36] This global circumstance were likely to worsen the profits of the domestic sample firms belonging to the chemical industry, thereby resulting in the positive relationship between the book-value based debt ratio and the IND3. Traditionally, this industry maintained its higher leverage ratio among the population of all industries across developed and emerging capital markets.[37] This is the main reason why the stock movement of the construction industry, generally showed its more sensitive reaction than other industries concerning the volatility of the interest-rate. In 2000, the supply of new houses decreased, mainly due to the "restriction on the development of semi-agricultural and forest areas for environmental protection" and financial trouble of large construction companies after the post-financial crisis, which resulted in the unsound financial structure with their higher leverage ratios. (Samsung Economic Research Institute[38])

In regard to the models(Model 2-2 & Model 2-3) to test the relationship to the market-value based debt ratios, it was found that the same independent variables were finally entered, such as CBOL, T00, IND1, IND2, IND4 and IND5 across the two models. Overall, they were statistically significant, in terms of the F-value at 1% level and the adjusted  $R^2$  as 28.15% and 28.05%, respectively. Among the statistically significant and negative coefficients of IND1(=the food industry),

IND2(=the pharmaceutical industry), and IND4(=the semiconductor & communication industry), it was a relatively striking result for IND1 to have an inverse(-) relationship with the level of its leverage. According to the finance theory, firms in more mature industries are generally more leveraged than firms in high-technology industries with unstable earnings, that is, high business risk.[39] However, the results for the industry, indicating the inverse relationship, may be attributed to higher profitability among all the industries during the sample period. For example, the ratios of ordinary income to stockholders' equity for the domestic food and beverage industry in the years of 2002 and 2003, were, on average, 12.07% and 10.35%, respectively.[40] Coupled with the theoretical rationale applicable to the semiconductor & communication industry with its higher business risk, the negative relationship between IND4 and the debt ratio, may result from the fact that the export of electronic products particularly IT product, were increased rapidly, since the currency crisis.[41] For example, in 2000, the exports of PCs and mobile phones recorded US\$ 9.5 billion, a 31 % increase and US\$ 5.14 billion 48.9% increase, year on year(YoY), Therefore, higher earnings in the industry may contribute to the decrease in the debt ratios, as shown in the two models.

## 5. Concluding Remarks

This study examined a prolonged, but interesting issue on the changes of the financial leverage of "Korean enterprise group", that is, Korean "chaebol" in the post-period of Asian financial crisis.

Based upon the results of this study, it was found, for the period studied, that firms belonging to the chaebol in Korea maintained higher average book-value and market-value based debt ratios, relative to their counterparts not belonging to the chaebol across all of the six tested models. While the coefficient of T00 as a proxy for the year of 2000, in the market-value based debt model, confirmed the statistically and positively significant relationship to the level of leverage, the dummies for the years of 2002 and 2003 showed their inverse relationships with the book-value based debt ratios. Among the industry dummy variables, there were

positive relationship of IND3(=the chemical industry) and Ind5(=the construction industry) to the book-value leverage. However, the inverse relationships between IND1(=the food industry), IND2(=the pharmaceutical industry), and IND4(=the semiconductor & communication industry) and the market-value based leverage ratios, were found, as illustrated earlier. More interestingly, this study identified that there were no differences between the two models (i.e. without and with the present value of an operating lease), explaining the independent variables stayed in each stepwise regression model.

This study has some limitations. First, a relatively small number of industries (i.e. six industries) were included in this study, which had a matching definition with the U.S. SIC. This might be resulted from the small population of Korean firms in the domestic capital markets. More general results may be obtained by including a wider spectrum of industries and employing the random sampling procedure in future research. Second, it should be recalled that the similar or different results of the previous literature, in comparison with the findings in this paper, might partly result from using their own sampling criteria and different methodologies.

Despite these limitations, this paper sheds new light on the analyses of the controversial issue whether or not, Korean firms belonging to chaebol, have different mean value based debt ratio in either book-or market-value basis from their non-chaebol counterparts since the Asian currency crisis. Multinational companies headquartered in either developed or emerging nations, may consider the results derived in this study. It may be possible for foreign firms to utilize and benefit from the results in terms of the capital structure, when operating their new businesses in Korea, given the economic circumstances such as the ongoing progress of the Korea-America FTA or the Korea-China FTA. That is, they may apply the results when establishing local subsidiaries in Korea toward more interest tax shield and less bankruptcy risk. Moreover, this study employed the "new" debt ratios as the dependent variables, which had been rarely tested in the previous research, as explained.: It is defined as  $(\text{Total liabilities} + \text{PV of Operating Lease}) / (\text{Total Assets} + \text{PV of Operating Lease})$  as a book-value based ratio and  $(\text{Total liabilities} + \text{PV of Operating Lease}) / (\text{Total liabilities} + \text{Market Value of Equity} + \text{Preferred Stock} + \text{PV of$

Operating Lease) as a market-value based one. Since there is an ongoing consideration on the inclusion of an operating lease as an "on-balance sheet" item under the K-IFRS, it may also be beneficial to the academicians and the policy makers, Since the Korean government continue to improve the corporate governance of the domestic firms in terms of accounting transparency and corporate ownership, it would be more efficient to achieve this goal, if utilizing this "new" ratio as an effective measurement of the level of leverage. As described in Kim & Berger[42], when the need exists to decide the levels of leverage between funding with a lower cost of capital and maintaining the majority shareholders' ownership, corporate managers in the conglomerates in Korea or emerging capital markets may also utilize the "new" debt ratio, which is thereby under consideration by many academicians. Moreover, as found in Choi[43], the domestic policy makers need to be aware of the implications that the benefits of diversification in finance theory, may turn out to be adverse effects on a firm's growth, if the process of the capital allocation is inefficient.

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