

# A Test on the Pecking Order Theory of Financing : Considering Chaebol Affiliation

Jang Woo Lee\* · Hee-Young Hurr\*\*

〈abstract〉

This paper tests the validity of pecking order theory by Myers(1977) and Myers and Majluf(1984) on Korean manufacturing firms listed in the KRX for the years of 1994 to 2003. We also want to see if there is any difference in financing behavior between chaebol affiliated firms and non-chaebol affiliated firms. We develop testable hypotheses from the idea that established relationship between bank and firm mitigates the problem of information asymmetry (Kang and Lim, 2001), and thus makes it easier for firms to raise funds through banks. The test result of the first stage shows that firms prefer cash reserves to debt financing, and prefer debt to equity. Chaebol affiliated firms are found to behave as if they already exploit internal capital markets. The second stage of the test carried out by dividing debt capital into bank loans and corporate bonds also shows a consistent pattern of financing behavior. Firms are testified to prefer cash to bank loans, bank loans to corporate bonds, and corporate bonds to equity. In this case chaebol affiliation seems to make firms behave as if they already establish internal capital markets. Further analysis shows that some, though not in every case, difference of ordering around the occasion of Korean financial crisis exists. It may be from the change of attitude of Korean firms to risk, or from weakened influence of internal capital market along with strengthened market power in the post-crisis period.

Keywords : Pecking Order Theory, Equity, Leverage, Corporate Bonds, Bank Loans, Internal Cash, Chaebol Affiliation, Korean Financial Crisis

논문접수일 : 2008년 09월 12일    논문수정일 : 2009년 05월 18일    논문게재확정일 : 2009년 04월 29일

\* Corresponding author, Lee is a professor at the Department of Financial Engineering, Division of Business Administration, College of Business, Pusan National University, E-mail : jangwoo@pusan.ac.kr.

\*\* Hurr is a professor at the Department of Business Administration, College of Aviation and Management, Korea Aerospace University, E-mail : hyhur@kau.ac.kr.

## I . Motivation

The pecking order model predicts that external debt financing is driven by the internal financial deficit. It is often compared to a static tradeoff model, which predicts that each firm adjusts gradually toward an optimal debt ratio. Myers and Majluf (1984) proposed that under information asymmetry corporate financing follows certain order if information asymmetry exists in the market. It is named 'pecking order theory.' Information asymmetry arises when it is believed that management has superior information concerning corporate state to potential external investor. It says that firms prefer internal funds to external ones. They are out for external funds only in case internal funds are dried up. Among external funds debt financing is preferred to equity issue. Firms issue equity only when no more debt is available. It is because firms prefer internal funds with lower risk and cost when there exists information asymmetry in the market. Raising external funds by bonds or equity offers negative signal to the market and firms try to raise external funds only when no more internal funds are available. Especially raising external funds by equity transmits information to external investors that the stock price is overpriced.

This paper is interested in empirically testing pecking order theory systematically introduced by Myers (1977) and Myers and Majluf (1984). Korean listed firms are used as the samples. The data includes a set of cross sectional data of non-financial companies which are listed on the Korean Exchange for the periods of 1994 to 2003. Our study is differentiated in that we develop testable hypotheses according to sources of funds in the financial statement, and that we try to check the effect of the change of past, current, and future source of each fund on other source of fund.

We document that pecking order of financing is supported on the whole. The test result of the first stage shows that firms prefer cash reserves to debt capital, and prefer debt to equity. Chaebol affiliated firms are found to behave as if they are already exploiting internal capital markets. Firms are found to prefer cash to bank loans, bank loans to corporate bonds, and corporate bonds to equity. This order of preference is generally kept throughout the regression equations even when control variables are introduced with a few explainable exceptions considering chaebol affiliation or corporate decision

making systems. Section II summarizes literature survey and formulates testable hypotheses. Section III suggests research methodology. Section IV presents the results of empirical analysis. And finally, section V offers conclusion and discussion.

## II. Literature Review and Hypotheses Building

### 1. Literature Review

We have many literatures on pecking order theory. Narayanan (1988), Shyam-Sunder and Myers (1999), Fama and French (2002), and Kwack Seh Young (2004) render supportive results. Helwege and Liang (1996), Frank and Goyal (2003), Yoon Jong In and Kim Hyeong Chul (1999), and Yoon Soon Suk (2003), however report the other side. Narayanan (1988) supports pecking order theory by suggesting that issue of risky debt is more favorable compared to equity issue. He extends Myers and Majluf (1984) by allowing firms to issue risky debt. He shows that debt is attractive to firms with strong growth potential (high-quality firms), even if it is not useful as a signaling device to separate them from firms with negative NPV projects (low-quality firms).

Shyam-Sunder and Myers (1999) conjectures that if firms follow the pecking order, then in a regression of net debt issues on the financing deficit, a slope coefficient of one is observed. They find strong support for this prediction in a sample of 157 firms that had traded continuously over the period 1971 to 1989. They test traditional capital structure models against the alternative of a pecking order model of corporate financing. They show that their tests have the power to reject the pecking order against alternative tradeoff hypotheses. The statistical power of some usual tests of the tradeoff model is virtually nil.

Fama and French (2002) find evidence confirming the pecking order model but contradicting the trade-off model, more profitable firms are less levered and that firms with more investments have less market leverage, which is consistent with the trade-off model and a complex pecking order model. In their research short-term variation in investment and earnings is mostly absorbed by debt as pecking order model predicts.

Chirinko and Singha (2000), however, raise a question on the results of Shyam-Sunder

and Myers (1999) by showing that their test generates misleading inferences when evaluating plausible patterns of external financing. The results by Chirinko and Singha (2000), coupled with the power problem with the Static Tradeoff Model documented by Shyam-Sunder and Myers, indicate that their empirical evidence can evaluate neither the Pecking Order nor Static Tradeoff Models. They conclude that alternative tests are needed which can identify the determinants of capital structure and can discriminate among competing hypotheses.

Helwege and Liang (1996) test the pecking order model of capital structure by examining the financing of firms that went public in 1983 and issued securities in the years of 1984 to 1992. Their results indicate that the probability of obtaining external funds is unrelated to the shortfall in internally generated funds, although firms with cash surpluses avoid external financing. Firms that access the capital markets do not follow the pecking order when choosing the type of security to offer.

Frank and Goyal (2003) test pecking order theory of corporate leverage on a broad cross-section of publicly traded American firms for 1971 to 1998. Contrary to pecking order theory, net equity issues track the financing deficit more closely than do net debt issues. While large firms exhibit some aspects of pecking order behavior, the evidence is not robust to the inclusion of conventional leverage factors, nor to the analysis of evidence from the 1990s. Financing deficit is less important in explaining net debt issues over time for firms of all sizes. They use the method of Shyam-Sunder and Myers but obtain a result which does not support pecking order theory contrary to Shyam-Sunder and Myers.

Kwack Seh Young (2004) examines the validity of pecking order theory by analysing fund raising activities of Korean listed manufacturing firms around the occasion of Korean financial crisis. Using a panel data from 1981 to 2002 he interprets the result as it is supporting pecking order theory. He finds no outstanding difference between pre- and post Korean financial crisis.

Yoon Jong In and Kim Hyeong Chul (1999) tests pecking order theory and free cash flow hypothesis in investigating the determinants of the capital structure in Korea for the periods of 1991 to 1996. Their estimates from a panel data of the non-financial corporations suggest that while the effect of the agency cost seems important, the pecking

order is found to be not significant.

Yoon Soon Suk (2003) empirically examines whether pecking order theory and the static tradeoff theory work well for the Korean firm. The results indicate that pecking order theory fails to explain the financing policies of the Korean firms, and that it is needed to include in the financing model not only debt financing variable but also other major variables like cash inflows from investment activities and equity financing. The static tradeoff theory has a relatively high explanatory power than pecking order theory for the Korean firms. He dichotomized the sample into pre- and post-financial crisis period groups, big and small firm groups, tight and loose financial slack groups, and the results were robust irrespective of many sensitivity analyses.

Kim Pil Kyu (2006) shows that Korean firms in the fund deficit situation relies much more on long-term and short-term debt rather than on equity issues. Net debt issue variable is more closely related to the financing deficit variable. He concludes that pecking order theory is not perfect, but seems to be a useful model compared with static tradeoff theory in explaining the financing behavior of Korean firms.

## 2. Hypotheses Building

We draw testable hypotheses from the theoretical implications pecking order theory and related previous researches. Firstly, we want to check that firms prefer internal cash to debt, and debt to equity. In order for the order of preference to be preserved the following hypotheses are expected to be maintained (group-1 hypotheses) :

Hypothesis (H11) Equity is less preferred to debt and internal cash.

Hypothesis (H12) Equity is less preferred to debt.

Hypothesis (H13) Equity is less preferred to internal cash.

Hypothesis (H14) Debt is less preferred to internal cash.

If we divide debt into bank loans and corporate bonds the following hypotheses are viable. Internal cash is preferred to bank loans, corporate bonds, and equity, and the order of preference is preserved. Bank loans are easier to raise than corporate bond. Established relationship between bank and firm mitigates the problem of information

asymmetry (Kang and Lim, 2001), and thus makes it easier for firms to raise funds through banks than bond markets. Issuing bonds requires more cumbersome process and longer periods are required. That is why firms prefer bank loans to corporate bonds. In order for the order of preference to be preserved the following hypotheses are required to be maintained (group-2 hypotheses) :

Hypothesis (H21) Equity is less preferred to corporate debt, bank loans, and internal cash.

Hypothesis (H22) Equity is less preferred to corporate debt.

Hypothesis (H23) Equity is less preferred to bank loans.

Hypothesis (H24) Equity is less preferred to internal cash.

Hypothesis (H25) Corporate debt is less preferred to bank loans and internal cash.

Hypothesis (H26) Corporate debt is less preferred to bank loans.

Hypothesis (H27) Corporate debt is less preferred to internal cash.

Hypothesis (H28) Bank loans is less preferred to internal cash.

Expected signs of the coefficients of the explanatory variables in those structures of hypotheses should all be negative. We want to see chaebol affiliated firms are different from non-chaebol affiliated firms by dint of the effect of internal capital markets of chaebol affiliated firms. We also control the test by the variables which are presumed to affect corporate financial policies.

### III. Research Methodology

#### 1. The Data

In this paper we use a panel data set found in KIS-FAS and KSRI-SD. Our data set are taken from listed non-financial firms at the Korea Exchange from 1994 to 2003. Firms without the entry of sales or total assets are excluded. The number of sample firms included are 5,229. The final samples are, however, 4,105 firms because some observations are dropped out in the way we repackage the sample according to the change

of time sequences.

## 2. Analytical Model and Variables

### 1) OLS Models for Group-1 Hypotheses

OLS model for group-1 hypotheses are as follows. Note that all variables are standardized by total assets in order to reduce heteroskedasticity problem.

$$\begin{aligned} \left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{11}^1 \left(\frac{Lever}{TA}\right)_{i,t-1} + \beta_{12}^1 \left(\frac{Lever}{TA}\right)_{i,t} + \beta_{13}^1 \left(\frac{Lever}{TA}\right)_{i,t+1} \\ &+ \beta_{21}^1 \left(\frac{InC}{TA}\right)_{i,t-1} + \beta_{22}^1 \left(\frac{InC}{TA}\right)_{i,t} + \beta_{23}^1 \left(\frac{InC}{TA}\right)_{i,t+1} \\ &+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t} \end{aligned} \quad (1-1)$$

$$\begin{aligned} \left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{11}^1 \left(\frac{Lever}{TA}\right)_{i,t-1} + \beta_{12}^1 \left(\frac{Lever}{TA}\right)_{i,t} + \beta_{13}^1 \left(\frac{Lever}{TA}\right)_{i,t+1} \\ &+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t} \end{aligned} \quad (1-2)$$

$$\begin{aligned} \left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{21}^1 \left(\frac{InC}{TA}\right)_{i,t-1} + \beta_{22}^1 \left(\frac{InC}{TA}\right)_{i,t} + \beta_{23}^1 \left(\frac{InC}{TA}\right)_{i,t+1} \\ &+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t} \end{aligned} \quad (1-3)$$

$$\begin{aligned} \left(\frac{Lever}{TA}\right)_{i,t} &= \gamma_0 + \gamma_{11}^1 \left(\frac{InC}{TA}\right)_{i,t-1} + \gamma_{12}^1 \left(\frac{InC}{TA}\right)_{i,t} + \gamma_{13}^1 \left(\frac{InC}{TA}\right)_{i,t+1} \\ &+ \gamma_{CB} CB_{i,t} + \gamma_X X_{i,t} + \xi_{i,t} \end{aligned} \quad (1-4)$$

### 2) OLS Models for Group-2 Hypotheses

OLS model for group-2 hypotheses are what are following. The models here divide debt into bank loans and corporate bonds. Note that all variables again are standardized by total assets in order to avoid heteroskedasticity problem.

$$\begin{aligned}
\left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{11}^1 \left(\frac{CBond}{TA}\right)_{i,t-1} + \beta_{12}^1 \left(\frac{CBond}{TA}\right)_{i,t} + \beta_{13}^1 \left(\frac{CBond}{TA}\right)_{i,t+1} \\
&+ \beta_{21}^1 \left(\frac{BLoan}{TA}\right)_{i,t-1} + \beta_{22}^1 \left(\frac{BLoan}{TA}\right)_{i,t} + \beta_{23}^1 \left(\frac{BLoan}{TA}\right)_{i,t+1} \\
&+ \beta_{31}^1 \left(\frac{InC}{TA}\right)_{i,t-1} + \beta_{32}^1 \left(\frac{InC}{TA}\right)_{i,t} + \beta_{33}^1 \left(\frac{InC}{TA}\right)_{i,t+1} \\
&+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-1}$$

$$\begin{aligned}
\left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{11}^1 \left(\frac{CBond}{TA}\right)_{i,t-1} + \beta_{12}^1 \left(\frac{CBond}{TA}\right)_{i,t} + \beta_{13}^1 \left(\frac{CBond}{TA}\right)_{i,t+1} \\
&+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-2}$$

$$\begin{aligned}
\left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{21}^1 \left(\frac{BLoan}{TA}\right)_{i,t-1} + \beta_{22}^1 \left(\frac{BLoan}{TA}\right)_{i,t} + \beta_{23}^1 \left(\frac{BLoan}{TA}\right)_{i,t+1} \\
&+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-3}$$

$$\begin{aligned}
\left(\frac{Equity}{TA}\right)_{i,t} &= \beta_0 + \beta_{31}^1 \left(\frac{InC}{TA}\right)_{i,t-1} + \beta_{32}^1 \left(\frac{InC}{TA}\right)_{i,t} + \beta_{33}^1 \left(\frac{InC}{TA}\right)_{i,t+1} \\
&+ \beta_{CB} CB_{i,t} + \beta_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-4}$$

$$\begin{aligned}
\left(\frac{CBond}{TA}\right)_{i,t} &= \gamma_0 + \gamma_{21}^2 \left(\frac{BLoan}{TA}\right)_{i,t-1} + \gamma_{22}^2 \left(\frac{BLoan}{TA}\right)_{i,t} + \gamma_{23}^2 \left(\frac{BLoan}{TA}\right)_{i,t+1} \\
&+ \gamma_{31}^2 \left(\frac{InC}{TA}\right)_{i,t-1} + \gamma_{32}^2 \left(\frac{InC}{TA}\right)_{i,t} + \gamma_{33}^2 \left(\frac{InC}{TA}\right)_{i,t+1} \\
&+ \gamma_{CB} CB_{i,t} + \gamma_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-5}$$

$$\begin{aligned}
\left(\frac{CBond}{TA}\right)_{i,t} &= \gamma_0 + \gamma_{21}^2 \left(\frac{BLoan}{TA}\right)_{i,t-1} + \gamma_{22}^2 \left(\frac{BLoan}{TA}\right)_{i,t} + \gamma_{23}^2 \left(\frac{BLoan}{TA}\right)_{i,t+1} \\
&+ \gamma_{CB} CB_{i,t} + \gamma_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-6}$$

$$\begin{aligned}
\left(\frac{CBond}{TA}\right)_{i,t} &= \gamma_0 + \gamma_{31}^2 \left(\frac{InC}{TA}\right)_{i,t-1} + \gamma_{32}^2 \left(\frac{InC}{TA}\right)_{i,t} + \gamma_{33}^2 \left(\frac{InC}{TA}\right)_{i,t+1} \\
&+ \gamma_{CB} CB_{i,t} + \gamma_X X_{i,t} + \xi_{i,t}
\end{aligned} \tag{2-7}$$



$$\begin{aligned} \left(\frac{BLoan}{TA}\right)_{i,t} = & \delta_0 + \delta_{31}^3 \left(\frac{InC}{TA}\right)_{i,t-1} + \delta_{32}^3 \left(\frac{InC}{TA}\right)_{i,t} + \delta_{33}^3 \left(\frac{InC}{TA}\right)_{i,t+1} \\ & + \delta_{CB} CB_{i,t} + \delta_X X_{i,t} + \xi_{it} \end{aligned} \quad (2-8)$$

where, InC stands for internal cash and is proxied by accumulated profits. BLoan denotes bank loans—both short term debt and long term debt. Corporate bonds are termed by CBond. Short term debt, long term debt—the sum of which are identified as bank loans in this paper, and corporate bond are summed up to show leverage (Lever). Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. Subscripts ‘t-1, t, t+1’ each denote ‘past, present, future’ information related to the variables. We assume that past, present, and future information comprised in the related variables are reflected enough.

*CB* stands for chaebol dummies and  $X_{i,t}$  denotes control variables.  $X_{i,t}$  includes size (log of total assets), firm value (Tobin’s q-ratio), and ownership concentration. We also include year dummies and industry dummies for the purpose of controlling time series autocorrelation and industry effect. We take natural logarithm on total assets with a view to lowering heteroskedasticity problem of the residuals. Tobin’s q-ratio is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. We introduce cross-product terms using chaebol dummies when necessary.  $\xi_{it}$  expresses pure error terms with i.i.d. and mean zero distribution.

## IV. Results of Analysis

### 1. Simple Statistics and Correlation Coefficients

Simple statistics of the sample firms are suggested in <Table 1>. Among total assets sample firms have average 58.7% of total debt (Lever), 10.2% of accumulated profits (InC), 20.8% of short term and long term debt (BLoan), 6.3% of corporate bonds, and 30.7% of equity.

The fact that firms use more bank loans than corporate bonds hints on corporate preference for bank loans. Internal cash reserves (accumulated profits) show the largest

&lt;Table 1&gt; Simple statistics

InC stands for internal cash and is proxied by accumulated profits. BLoan denotes bank loans—both short term debt and long term debt. Corporate bonds are termed by CBond. Short term debt, long term debt—the sum of which are identified as bank loans in this paper, and corporate bond are summed up to show leverage (Lever). Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin's q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related people.

	N	Mean	Median	St. Dev.	Minimum	Maximum
Lever	5,229	0.587	0.603	0.195	0.043	0.999
InC	5,229	0.102	0.089	0.251	-3.744	0.826
BLoan	5,229	0.208	0.195	0.141	0.000	1.076
CBond	5,229	0.063	0.028	0.079	0.000	0.484
Equity	5,229	0.307	0.272	0.232	0.005	0.974
Q	5,229	0.914	0.897	0.332	0.103	6.810
Size	5,229	11.314	11.214	0.615	9.711	13.810
Own(%)	5,229	25.794	24.940	18.534	0.000	100.000

deviation (2.46 times of average). 796 observations (15.2%) are chaebol affiliated firms. The average Q-ratio of the sample observations is 0.914, which is close to its median (0.897). The average log of total assets is about 11.3, and the average ownership concentration is about 25.8%.

The correlation coefficients between variables are presented in <Table 2>. Leverage (Lever) is negatively correlated with equity, but is positively correlated with bank loans (BLoan) and corporate bonds (CBond). Equity is negatively correlated with leverage, bank loans, and corporate bonds, and internal cash reserves (InC).

Internal cash reserves are negatively correlated with leverage, bank loans, corporate bonds, and equity. All the coefficients are strongly significant. The correlation coefficients between bank loans and corporate bonds, however, is not significant. Negative and significant correlations imply significant difference of preference among different sources of funds.

## 2. Regression on Group-1 Hypotheses

We find significant difference of preference among different sources of funds from

&lt;Table 2&gt; Correlation Coefficients

InC stands for internal cash and is proxied by accumulated profits. BLoan denotes bank loans—both short term debt and long term debt. Corporate bonds are termed by CBond. Short term debt, long term debt—the sum of which are identified as bank loans in this paper, and corporate bond are summed up to show leverage. Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin's q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons.

	Lever	InC	BLoan	CBond	Equity	Q	Size
InC	-0.49***	1					
BLoan	0.61***	-0.32***	1				
CBond	0.38***	-0.13***	0.01	1			
Equity	-0.31***	-0.61***	-0.17***	-0.18***	1		
Q	0.29***	-0.26***	0.13***	0.09***	0.04***	1	
Size	0.21***	0.01	-0.01	0.33***	-0.19***	-0.10***	1
Own	-0.24***	0.24***	-0.11***	-0.16***	-0.05***	-0.19***	-0.04***

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

correlation analysis. Now we have checked if there exist an order of preference among different sources of funds. We want to begin it by testing if there is an order of preference among cash reserves, debt, and equity. Debt comprises bank loans and corporate bonds. After that we proceed to the next stage, where we divide debt into bank loans and corporate bonds, and check the order of preference. <Table 3> and <Table 4> testify that firms have the preference of funds in the order of reserved cash, debt, and equity.

<Table 3> shows the results of testing the order of preference among cash reserves, debt, and equity. Regression equation 1 shows that equity funds are significantly and negatively related to current and future debt capital (Lever) and cash reserves (InC). It can be interpreted that equity funds are less preferred sources of funds than debt capital and cash reserves. This preference is robust to the introduction of control variables (equation 2). Cash reserves at the past time is positively related to equity capital at the 10% level of significance, it may be because firms turn cash reserves at the past time into equity capital at the current time. This relation is robust to the introduction of control variables.

<Table 3> Testing the order of preference among cash reserves, debt, and equity (1)

InC stands for internal cash and is proxied by accumulated profits. BLoan denotes bank loans—both short term debt and long term debt. Short term debt, long term debt—the sum of which are identified as bank loans in this paper, and corporate bond are summed up to show leverage (Lever). Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : equity/total assets							
	1	2	3	4	5	6	7	8
Intercept	0.98***	1.04***	0.31***	0.96***	0.54***	1.01***	0.31***	0.99***
Lever_t-1	0.006	0.007			-0.02	-0.02		
Lever_t+0	-0.95***	-0.95***			-0.32***	-0.36***		
Lever_t+1	-0.03***	-0.03***			-0.04***	-0.05***		
InC_t-1	0.01*	1.01*						
InC_t+0	-0.90***	-0.89***						
InC_t+1	-0.008*	-0.007*						
Lever_t-1×CB_t-1			-0.01	-0.01			-0.01	-0.01
Lever_t+0×CB_t+0			-0.08***	-0.75***			-0.08***	-0.48***
Lever_t+1×CB_t+1			-0.01	-0.009			-0.004	-0.001
InC_t-1×CB_t-1			0.008	0.01				
InC_t+0×CB_t+0			-0.104	-0.69***				
InC_t+1×CB_t+1			0.105*	0.12**				
Q_t+0		0.01***		0.03***		0.08***		0.03***
Size_t+0		-0.006***		-0.05***		-0.04***		-0.06***
Own_t+0		-0.00		-0.001***		-0.001***		-0.001***
CB_t+0 (chaebol)		0.007**		0.559***		0.019**		0.334***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.898	0.898	0.094	0.160	0.163	0.214	0.093	0.145
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	1644.4	1401.1	20.4	31.2	43.3	49.8	23.2	31.3
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	1.96	1.96	1.87	1.85	1.90	1.86	1.87	1.85

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

More leverage in the past is positively and significantly related to more equity at current time. This kind of significance, however, completely disappears by introduction of control variables. Let's check equation 3 and 4. Current debt of chaebol firms is also negatively and significantly related to equity funds. Future increase of cash reserves of chaebol affiliated firms, however, is reversed to positive and significant sign. It can be interpreted that chaebol affiliated firms increase equity funds in anticipation of the increase of future cash reserves, which may be possible because they already build up internal capital market and have more flexibility in capital allocation. Introduction of control variables reinforces the significance of the coefficient of current cash reserves by chaebol affiliated firms. Equation 5 and 6 reveal that current and future increase of debt (Lever) is negatively and significantly related to equity capital. Introduction of control variables does not weaken the significance. Increase of leverage in the past, however, has no significance. Equation 7 and 8 show that future increase of leverage by chaebol affiliated firms has no significant effect on equity capital without regard to the introduction of control variables.

Equations 9 and 10 in <Table 4> current increase of cash reserves is negatively and significantly related to equity capital. Introduction of control variables does not change the level of significance. Past and future increase of cash reserves, however, have no significant effect on equity capital. Equations 11 and 12 in <Table 4> show that current increase of cash reserves of chaebol affiliated firms is also negatively and significantly related to equity capital. Introduction of control variables, however, gets rid of the significance of the coefficient of current increase of cash reserves and regains the positive and significant sign of the future increase of chaebol firms. Equations 13 and 14 in <Table 4> show that current increase of cash reserves is negatively and significantly related to debt capital, which means that reserved cash is more preferred to debt. Equations 15 and 16 testify that this kind of preference is preserved by chaebol firms. Introduction of control variables does not change the sign and significance.

In sum, <Table 3> and <Table 4> show that firms have the preference of funds in the order of reserved cash, debt, and equity. Group-1 hypotheses are all supported. Chaebol affiliated firms also keep the order, while showing a hint that they enjoy internal capital market.

<Table 4> Testing the order of preference among cash reserves, debt, and equity (2)

InC stands for internal cash and is proxied by accumulated profits. Equity is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : equity/total assets (TA)				Dep. var. : Leverage (debt/TA)			
	9	10	11	12	13	14	15	16
Intercept	0.34***	1.11***	0.30***	1.01***	0.64***	-0.09*	0.62***	-0.16***
InC_t-1	0.002	0.003			0.004	0.003		
InC_t+0	-0.50***	-0.53***			-0.41***	-0.37***		
InC_t+1	0.005	0.007			-0.002	-0.002		
InC_t-1×CB_t-1			-0.02	-0.01			0.02	0.01
InC_t+0×CB_t+0			-0.22***	-0.09			-0.35***	-0.74***
InC_t+1×CB_t+1			0.08	1.10**			0.03	0.03
Q_t+0		-0.05***		0.03***		0.06***		0.12***
Size_t+0		-0.06***		-0.06***		0.06***		0.06***
Own_t+0		0.001***		-0.001***		-0.001***		-0.001***
CB_t+0 (chaebol)		-0.009		0.01		0.01**		0.07***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.407	0.452	0.085	0.124	0.389	0.445	0.149	0.294
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	149.7	148.3	21.1	26.4	138.9	144.0	39.0	75.4
(Pr > F)	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
D.W.	1.84	1.88	1.87	1.84	1.82	1.87	1.83	1.91

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

### 3. Regression on Group-2 Hypotheses

Now we divide debt into bank loans and corporate bonds to check the detailed order of preference among reserved cash, bank loans, corporate bonds, and equity. <Table

<Table 5> Testing pecking order among cash reserves, bank loans, corporate bonds, and equity (1)

Corporate bonds are termed by CBond. BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : equity/total assets							
	1	2	3	4	5	6	7	8
Intercept	0.54***	0.99***	0.30***	1.00***	0.33***	0.89***	0.30***	1.00***
CBond_t-1	-0.05**	-0.04*			-0.09**	-0.08**		
CBond_t+0	-0.73***	-0.60***			-0.37***	-0.27***		
CBond_t+1	-0.12***	-0.12***			-0.10***	-0.13***		
BLoan_t-1	-0.01	-0.008						
BLoan_t+0	-0.60***	-0.59***						
BLoan_t+1	-0.02*	-0.02*						
InC_t-1	-0.002	0.0002						
InC_t+0	-0.66***	-0.68***						
InC_t+1	-0.003	-0.002						
CBond_t-1×CB_t-1			-0.26**	-0.24**			-0.27**	-0.25**
CBond_t+0×CB_t+0			-0.60***	-0.57***			-0.60***	-0.57***
CBond_t+1×CB_t+1			-0.18	-0.23**			-0.17	-0.23**
BLoan_t-1×CB_t-1			0.001	0.01				
BLoan_t+0×CB_t+0			-0.08	-0.13*				
BLoan_t+1×CB_t+1			-0.05	-0.05				
InC_t-1×CB_t-1			-0.03	-0.02				
InC_t+0×CB_t+0			-0.22***	-0.11				
InC_t+1×CB_t+1			0.07	0.09*				
Q_t+0		-0.04***		0.03***		0.04***		0.03***
Size_t+0		-0.03***		-0.06***		-0.05***		-0.06***
Own_t+0		0.0002***		-0.0009***		-0.001***		-0.0009***
CB_t+0 (chaebol)		-0.008		0.01		0.009		0.009
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.606	0.621	0.090	0.130	0.105	0.136	0.088	0.129
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	254.7	233.2	17.3	22.2	26.3	29.2	21.8	27.5
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	1.93	1.96	1.87	1.83	1.88	1.85	1.87	1.84

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (⇒) separates control variables.

5> to <Table 8> testify that Korean manufacturing firms have the preference of funds in the order of reserved cash, bank loans, corporate bonds, and equity.

Equation 1 in <Table 5> shows that increase of past, current, and future corporate bond, increase of current and future bank loans, and increase of current cash reserves lead to decrease of equity capital. Introduction of control variables does not change or reverse the signs and significance of the coefficients (equation 2). Equations 3 and 4 show the financing behavior of chaebol affiliated firms. Past and current increase of corporate bonds and current increase of cash reserves by chaebol firms lead to decrease of equity funds. Introduction of control variables regains the significance of the negative sign of future increase of bonds and current increase of bank loans by chaebol firms, while nullifying the significance of current increase of reserved cash and reversing and putting positive weight on the future increase of cash reserves by chaebol firms. The latter of this evidence can also be interpreted that chaebol affiliated firms increase equity funds in anticipation of the increase of future cash reserves, which may be possible because they already build up internal capital market and have more flexibility in capital allocation.

Equations 5 enlightens that past, current, and future increase of bonds lead to decrease of equity funds, which implies the corporate preference of bonds to equity. Introduction of control variables does not change or reverse the signs and significance of the coefficients (equation 6).

Equation 7 suggests that past and current increase of corporate bonds by chaebol affiliated firms leads to decrease of equity. Introduction of control variables regains the significance of the coefficient of the future increase of bonds (equation 8). Equation 9 reveals that increase of current bank loans (BLoan) is negatively and significantly related to equity financing. Introduction of control variables enforces the significance of the coefficient of the future increase of bank loans (equation 10). Past increase of bank loans has no significant effect on equity financing. Equations 11 and 12 show that bank loans of chaebol affiliated firms are not significantly related to equity financing, while revealing that introduction of control variables regains the significance of financing by means of bank loans by chaebol affiliated firms.

Equations 11 and 12 testify that current increase of cash reserves is significantly



<Table 6> Testing pecking order among cash reserves, bank loans, corporate bonds, and equity (2)  
 BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : equity/total assets							
	9	10	11	12	13	14	15	16
Intercept	0.35***	1.08***	0.30***	1.02***	0.34***	1.11***	0.30***	1.01***
BLoan_t-1	-0.02	-0.01						
BLoan_t+0	-0.18***	-0.21***						
BLoan_t+1	-0.03	-0.04**						
InC_t-1					0.002	0.003		
InC_t+0					-0.50***	-0.53***		
InC_t+1					0.005	0.007		
BLoan_t-1×CB_t-1			0.007	0.02				
BLoan_t+0×CB_t+0			-0.08	-0.14**				
BLoan_t+1×CB_t+1			-0.05	-0.05				
InC_t-1×CB_t-1							-0.02	-0.01
InC_t+0×CB_t+0							-0.22***	-0.09
InC_t+1×CB_t+1							0.08	0.10**
Q_t+0		0.04***		0.03***		-0.05***		0.03***
Size_t+0		-0.06***		-0.06***		-0.06***		-0.06***
Own_t+0		-0.001***		-0.0008***		0.0006***		-0.0008***
CB_t+0 (chaebol)		0.009		0.01		-0.009		0.01
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.098	0.145	0.085	0.125	0.407	0.452	0.085	0.124
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	24.5	31.3	18.4	23.6	149.7	148.3	21.2	26.4
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	1.88	1.85	1.87	1.83	1.84	1.88	1.87	1.84

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

related to equity financing irrespective of the introduction of control variables, which implies that cash reserves are preferred to equity by the firms. Equation 15 suggests that current increase of cash reserves by chaebol affiliated firms also leads to decrease of equity financing. Introduction of control variables regains but reverses the significance of financing by means of cash reserves by chaebol affiliated firms, which hints the existence of internal capital market among chaebol affiliated firms (equation 16).

Equation 17 <Table 7> shows that increase of current bank loans and cash reserves leads to decrease of corporate bonds, which can be interpreted to testify corporate preference of bank loans and cash reserves to corporate bonds. Past and future increase of current bank loans and cash reserves does not have any significant effect on bond financing. Introduction of control variables does not change or reverse the signs and significance of the coefficients (equation 18). Equation 19 shows the bond financing behavior of chaebol affiliated firms. Current increase of bank loans by chaebol affiliated firms leads to decrease of bond financing. On the contrary past increase of bank loans by chaebol affiliated firms lead to increase of bond financing.

Future increase of bank loans by chaebol affiliated firms has no significance. Against the hypothesis, however, current increase of cash reserves by chaebol affiliated firms leads to increase of bond financing, which recovers the expected sign with the introduction of control variables (equation 20). Future increase of cash reserves is found to lead to decrease of bond financing as is expected. Introduction of control variables reinforces the level of significance of the coefficients of current increase of bank loans and future increase of cash reserves chaebol affiliated firms (equation 20). Equation 21 <Table 7> shows that increase of current bank loans leads to decrease of corporate bonds, which can be interpreted to testify corporate preference of bank loans to corporate bonds. Past and future increase of current bank loans does not have any significant effect on bond financing. Introduction of control variables does not change or reverse the signs and significance of the coefficients (equation 22). Equation 23 and 24 show that current increase of bank loans by chaebol affiliated firms leads to decrease of bond financing, which is the same in case we introduce control variables. Against our hypothesis, past increase of bank loans is related to positive and significant increase of bonds, which phenomenon disappears with introduction of control variables, however (equation

<Table 7> Testing pecking order among cash reserves, bank loans, corporate bonds, and equity (3)

BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. All variables are standardized by total assets. Tobin's q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts 't-1, t+0, and t+1' denote 'past, present, and future' policy measures related to the variables respectively.

	Dependent variable : Corporate bonds/total assets							
	17	18	19	20	21	22	23	24
Intercept	0.07***	-0.47***	0.05***	-0.49***	0.05***	-0.48***	0.05***	-0.49***
BLoan_t-1	0.01	0.01			0.01	0.01		
BLoan_t+0	-0.07***	-0.06***			-0.03***	-0.04***		
BLoan_t+1	0.01	0.008			0.01	0.008		
InC_t-1	0.001	0.001						
InC_t+0	-0.06***	-0.05***						
InC_t+1	0.002	-0.001						
BLoan_t-1×CB_t-1			0.02**	0.02*			0.02**	0.02
BLoan_t+0×CB_t+0			-0.05**	-0.06***			-0.05**	-0.05**
BLoan_t+1×CB_t+1			-0.008	-0.009			-0.008	-0.009
InC_t-1×CB_t-1			0.02	0.01				
InC_t+0×CB_t+0			0.04*	-0.11***				
InC_t+1×CB_t+1			-0.04**	-0.05***				
Q_t+0		0.01***		0.01***		0.01***		0.01***
Size_t+0		0.04***		0.04***		0.04***		0.04***
Own_t+0		-0.0004***		-0.0004***		-0.0005***		-0.0005***
CB_t+0 (chaebol)		0.003		0.01***		0.005		0.005
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.091	0.232	0.059	0.216	0.060	0.215	0.057	0.211
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	19.7	48.7	12.7	44.5	14.8	50.0	14.2	48.7
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	2.04	2.01	2.04	2.03	2.03	2.02	2.04	2.02

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (==) separates control variables.

24). Equation 25 in <Table 8> testifies that increase of current cash reserves leads to decrease of corporate bonds, which can be interpreted to confirm corporate preference of cash reserves to corporate bonds. Past and future increase of cash reserves does not have any significant effect on bond financing. Introduction of control variables does not change or reverse the signs and significance of the coefficients (equation 26). Equation 27 suggests that current and future increase of cash reserves by chaebol affiliated firms leads to significant decrease of bond financing, implying that chaebol affiliated firms also prefer reserved cash to bonds. Introduction of control variables strengthens the significance (equation 28). Equation 29 shows that current increase of cash reserves is related to decrease of bank loans, implying that firms prefer reserved cash to bank loans. Past and future increase of cash reserves, however, does not have any significant effect on financing by bank loans. Introduction of control variables does not change or reverse the sign and significance of the coefficient (equation 30). Equation 31 shows that current increase of bank loans by chaebol affiliated firms leads to significant decrease of financing by bank loans, implying that chaebol affiliated firms also prefer reserved cash to bank loans. Past increase of bank loans by chaebol affiliated firms has no effect on financing by bank loans, while future increase of cash reserves by chaebol affiliated firms causes increase of bank loans against the hypothesis and is gaining the significance with the introduction of control variables. It may be because of that expected increase of collateral due to the expected increase of future cash reserves motivates chaebol affiliated firms to increase bank loans.

Further we dichotomize the time span into pre- and post-crisis period and compare the regression results for the purpose of examining the difference. For the first step, we examine on 'Group-1 hypotheses if there is difference of preference of corporate choice of funding behavior before and after the occasion of Korean financial crisis.<sup>1)</sup> The overall message is that the order of preference of sources of funds are alike before and after the crisis with minute exceptions. On the whole, chaebol affiliation does not

---

1) We just offer the summary of the analysis but do not show the tables here to save the space. We are ready to provide tables on request. Instead, we supply <Table 9> to <Table 11> to show the results of the comparison according to difference of periods on 'Group-2 hypotheses' immediately after the exposition.

<Table 8> Testing pecking order among cash reserves, bank loans, corporate bonds, and equity (4)

InC stands for internal cash and is proxied by accumulated profits, which is standardized by total assets. Tobin's q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts 't-1, t+0, and t+1' denote 'past, present, and future' policy measures related to the variables respectively.

	Dependent variable : Corporate bonds/total assets (TA)				Dep. var. : bank loans/TA			
	25	26	27	28	29	30	31	32
Intercept	0.06***	-0.48***	0.05***	-0.49***	0.21***	0.26***	0.20***	0.22***
InC_t-1	-0.001	-0.001			0.003	0.002		
InC_t+0	-0.04***	-0.03***			-0.20***	-0.20***		
InC_t+1	0.0001	-0.002			0.0003	0.0009		
InC_t-1×CB_t-1			0.02	0.01			0.01	0.01
InC_t+0×CB_t+0			0.05**	-0.10***			-0.31***	-0.38***
InC_t+1×CB_t+1			-0.04**	-0.05***			0.07*	0.07**
Q_t+0		0.01***				0.002		0.03***
Size_t+0		0.04***				-0.004		-0.004
Own_t+0		-0.0003***				-0.0001		-0.0006***
CB_t+0 (chaebol)		0.004				-0.002		0.02***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.076	0.219	0.057	0.214	0.181	0.181	0.079	0.097
No. of Obs.	4,105	4,105	4,105	4,105	4,105	4,105	4,105	4,105
F Value	18.9	51.1	14.2	49.8	48.7	40.4	19.5	20.1
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	2.05	2.02	2.04	2.03	1.93	1.93	1.91	1.93

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

change the statistical property of the coefficients either. It is proved that internal cash and debt are preferred to equity and internal cash is preferred to debt and that the ordering is consistently preserved. Contrary to the expectation, higher leverage now, however, is positively and significantly (at the 10% level) related with higher level of equity during the pre-crisis period. Leverage in the future does not have any significance during the

<Table 9> Comparing the order of preference among cash reserves, bank loans, corporate bonds, and equity on the Group-2 hypotheses before (1994 to 1996) and after (1999 to 2004) the financial crisis (1)

Corporate bonds are termed by CBond. BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. Equity (Equity) is proxied by common stocks outstanding plus capital surplus. All variables are standardized by total assets. q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts 't-1, t+0, and t+1' denote 'past, present, and future' policy measures respectively.

	Dependent variable : equity/total assets							
	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis
Intercept	0.96***	1.03***	0.90***	1.02***	0.91***	0.86***	0.93***	1.02***
CBond_t-1	-0.11**	-0.02			-0.06	-0.04		
CBond_t+0	-0.41***	-0.62***			-0.08	-0.33***		
CBond_t+1	-0.00	-0.16***			0.02	-0.09		
BLoan_t-1	-0.02	-0.001						
BLoan_t+0	-0.48***	-0.62***						
BLoan_t+1	-0.01	-0.006						
InC_t-1	-0.07*	0.01						
InC_t+0	-0.48***	-0.69***						
InC_t+1	-0.05	0.006						
CBond_t-1×CB_t-1			-0.04	-0.22			-0.01	-0.24
CBond_t+0×CB_t+0			-0.01	-0.85***			-0.009	-0.86***
CBond_t+1×CB_t+1			-0.20	-0.29			-0.17	-0.30
BLoan_t-1×CB_t-1			-0.008	0.02				
BLoan_t+0×CB_t+0			-0.12	-0.09				
BLoan_t+1×CB_t+1			-0.02	-0.04				
InC_t-1×CB_t-1			-0.10	0.03				
InC_t+0×CB_t+0			-0.37***	-0.09				
InC_t+1×CB_t+1			0.11	0.11*				
Q_t+0	-0.06***	-0.02***	-0.06***	0.10***	-0.06***	0.10***	-0.05***	0.09***
Size_t+0	-0.03***	-0.04***	-0.05***	-0.06***	-0.05***	-0.05***	-0.05***	-0.06***
Own_t+0	0.0004*	0.0003*	0.0006**	-0.001***	0.0008***	-0.001***	-0.0007**	-0.001***
CB_t+0 (chaebol)	-0.01	0.0005	0.01	0.03*	0.0004	0.02*	0.0006	0.02*
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.425	0.626	0.167	0.093	0.155	0.098	0.153	0.093
No. of Obs.	542	2,536	542	2,536	542	2,536	542	2,536
F Value	18.4	170.7	5.7	11.4	6.7	15.5	6.7	14.7
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	1.96	2.00	1.97	1.89	1.96	1.91	1.97	1.89

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

<Table 10> Comparing the order of preference among cash reserves, bank loans, corporate bonds, and equity on the Group-2 hypotheses before (1994 to 1996) and after (1999 to 2004) the financial crisis (2)

BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. Equity (Equity) is proxied by entries for common stocks—common stocks outstanding plus capital surplus. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : equity/total assets							
	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis
Intercept	0.93***	1.10***	0.11***	1.03***	1.01***	1.09***	0.91***	1.03***
BLoan_t-1	0.001	-0.02						
BLoan_t+0	-0.29***	-0.16***						
BLoan_t+1	0.04	-0.01						
InC_t-1					-0.04	0.01		
InC_t+0					-0.22***	-0.56***		
InC_t+1					-0.06*	0.01		
BLoan_t-1×CB_t-1			-0.003	0.03				
BLoan_t+0×CB_t+0			-0.12	-0.10				
BLoan_t+1×CB_t+1			-0.02	-0.04				
InC_t-1×CB_t-1			-0.10	0.04			-0.10	0.03
InC_t+0×CB_t+0			-0.36***	-0.86			-0.36***	-0.07
InC_t+1×CB_t+1			-0.10	0.12*			-0.10	0.12*
Q_t+0	-0.04**	0.10***	-0.06***	0.09***	-0.07***	-0.02**	-0.06***	0.09***
Size_t+0	-0.05***	-0.07***	-0.05***	-0.06***	-0.05***	-0.06***	-0.05***	-0.06***
Own_t+0	-0.0007***	-0.001***	-0.0006**	-0.001***	-0.0004	0.0006***	-0.0006**	-0.001***
CB_t+0 (chaebol)	0.004	0.01	0.01	0.02*	-0.009	0.004	0.01	0.02*
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.234	0.098	0.168	0.088	0.214	0.475	0.171	0.089
No. of Obs.	542	2,536	542	2,536	542	2,536	542	2,536
F Value	10.7	15.5	6.4	12.2	9.6	121.9	7.5	14.0
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	1.98	1.89	1.98	1.89	2.03	1.92	1.99	1.90

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (=) separates control variables.

<Table 11> Comparing the order of preference among cash reserves, bank loans, corporate bonds, and equity on the Group-2 hypotheses before (1994 to 1996) and after (1999 to 2004) the financial crisis (3)

BLoan denotes bank loans—both short term debt and long term debt. InC stands for internal cash and is proxied by accumulated profits. All variables are standardized by total assets. Tobin’s q-ratio (Q) is calculated as market value of both equity and preferred stock plus book value of debt divided by total assets. Size is obtained by log of total assets. Ownership concentration (Own) stands for the sum of number of common stocks owned by the largest shareholder and his (or her) related persons. CB stands for top 30 chaebol dummies. Subscripts ‘t-1, t+0, and t+1’ denote ‘past, present, and future’ policy measures related to the variables respectively.

	Dependent variable : Corporate bonds/total assets							
	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis	Before the crisis	After the crisis
Intercept	-0.25***	-0.51***	-0.33***	-0.52***	-0.32***	-0.52***	-0.32***	-0.52***
BLoan_t-1	-0.01	0.03***			-0.03	0.03***		
BLoan_t+0	-0.17***	-0.03***			-0.07***	-0.01*		
BLoan_t+1	-0.01	0.003			-0.01	0.006		
InC_t-1	0.01	0.006						
InC_t+0	-0.26***	-0.03***						
InC_t+1	0.003	-0.004						
BLoan_t-1×CB_t-1			0.02	0.01			0.02	0.01
BLoan_t+0×CB_t+0			-0.05	-0.03			-0.06	-0.02
BLoan_t+1×CB_t+1			0.01	-0.02			0.02	-0.02
InC_t-1×CB_t-1			-0.02	0.03				
InC_t+0×CB_t+0			-0.11	-0.10***				
InC_t+1×CB_t+1			-0.10	-0.05***				
Q_t+0	0.006	0.004	0.01	0.01***	0.02	0.01***	0.02	0.01***
Size_t+0	0.03***	0.04***	0.03***	0.05***	0.03***	0.04***	0.03***	0.05***
Own_t+0	-0.0004**	-0.0001**	-0.0008***	-0.0002***	-0.0008***	-0.0002***	-0.0008***	-0.0002***
CB_t+0 (chaebol)	-0.017**	0.01***	-0.005	0.02***	-0.009	0.01***	-0.01	0.01***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-Sq	0.259	0.233	0.119	0.226	0.131	0.223	0.118	0.220
No. of Obs.	542	2,536	542	2,536	542	2,536	542	2,536
F Value	10.4	36.0	4.6	34.7	5.8	39.4	5.2	38.6
(Pr > F)	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
D.W.	2.19	1.96	2.16	1.97	2.17	1.97	2.15	1.96

주) \*\*\*, \*\*, \* denote 1%, 5%, 10% level of significance each.

Thick line (==) separates control variables.



pre-crisis period while it still preserves strong significance after the financial crisis. Internal cash reserves by chaebol affiliated firms lose its statistical significance after the financial crisis.

<Table 9> to <Table 11> show the results of the comparison on 'Group-2 hypotheses.' Group-2 hypotheses are built for us to examine in detail the ordering of funding among internal cash, bank loans, corporate bonds, and equity. It is consistently confirmed that internal cash is preferred to bank loans, bank loans to corporate bonds, and corporate bonds to equity. <Table 9> to <Table 11>, however, reveal that in many cases the coefficients show different level of significance before and after the financial crisis though they do not show reversed signs. chaebol affiliation does not change the statistical property of the coefficients either. <Table 9> shows that present level of corporate bonds loses its significance before the crisis. Chaebol affiliated firms also show similar pattern. Equity is significantly less preferred to corporate bonds after the crisis by chaebol affiliated firms, while this relation is not significant before the crisis. On the contrary, this pattern is reversed in the case of internal cash. <Table 10> shows that bank loans and internal cash reveal the same signs. <Table 10> shows that the coefficients of bank loans have different level of significance before and after the Korean financial crisis. In <Table 11> we find that the cross product term by internal cash and chaebol dummy ( $InC_{t+0} \times CB_{t+0}$ ) gains significance after the financial crisis.

Why do Korean firms sometimes show different patterns in funding behavior around the occasion of Korean financial crisis? It can be due to change of attitude of Korean firms to risk after the financial crisis. This kind of difference in market valuation or corporate choice in financial policies are frequently observed in extant literatures performed on Korean listed firms (Baek et al.(2004), Jangwoo Lee et al.(2004), Jangwoo Lee (2006), Jangwoo Lee (2007), Bae et al.(2008)). Weakened influence of internal capital market along with strengthened market power seem to have joint-worked to reveal greater significance of the ordering of corporate funding in the post-crisis period.

## V. Conclusion and Discussion

After Myers and Majluf (1984) we analyze if there exist pecking order in the behavior

of Korean manufacturing firms. The whole sample includes 5,229 observations listed in KRX from 1994 to 2003. We also want to see if there is any difference in financing behavior between chaebol affiliated firms and non-chaebol affiliated firms. We standardize all variables by total assets with a purpose of eliminating heteroskedasticity problem. We control the regression equations by size, growth options (Q-ratio), and ownership concentration. Industry dummies, and year dummies are also introduced with a view to controlling industry effect and time series effect. Past and future measures of explanatory variables in addition to current one are put together into the regression equations for the purpose of our estimating full informational effects of them.

Implication by Myers and Majluf (1984) is that given information asymmetry firms have the preference of financing by cash, riskless debt, risky debt, and equity in the order. It is, however, difficult to differentiate riskless debt from risky debt in the financial statement. We, thus, get an idea that we would test bundle riskless debt and risky debt as debt capital, and then test if firms prefer cash to debt, and debt to equity. The second experiment is to divide debt capital into bank loans and corporate bonds, and test if firms prefer cash to bank loans, bank loans to corporate bonds, and corporate bonds to equity. Bank loans are easier to raise than corporate bond. Established relationship between bank and firm mitigates the problem of information asymmetry (Kang and Lim, 2001), and thus makes it easier for firms to raise funds through banks. Issuing bonds requires more cumbersome process and longer periods are required. That is why firms prefer bank loans to corporate bonds. The conjectures proposed above are constructed as two groups of testable hypotheses and put into regression analysis.

The test result of the first stage shows that firms prefer cash reserves to debt financing, and prefer debt to equity. The order of preference is maintained by and large even when control variables are introduced. Chaebol affiliated firms are found to behave as if they already exploit internal capital markets in that chaebol affiliated firms increase equity funds in anticipation of the increase of future cash reserves, which may be possible because they already build up internal capital market and have more flexibility in capital allocation. The second stage of the test carried out by dividing debt capital into bank loans and corporate bonds also shows a consistent pattern of financing behavior. Firms are testified to prefer cash to bank loans, bank loans to corporate bonds, and corporate

bonds to equity. This kind of order of preference is maintained throughout the regression processes even when control variables are introduced. Sometimes introduction of control variables regains but reverses the significance of financing by means of cash reserves by chaebol affiliated firms, which hints the existence of internal capital market among chaebol affiliated firms and their different financing behavior again. Though not often, but introduction of control variables appear to recover or strengthen the statistical significance of the variables, which may be closer to the reality because firms make fund raising decisions in a complicated environment and from a systems point of view considering all financial and corporate interactions.

We further the analysis to check if there exists difference of ordering around the occasion of Korean financial crisis. And we find some, though not in every case, difference exists. It may be that change of attitude of Korean firms to risk around the occasion of financial crisis brings about the results. In addition, weakened influence of internal capital market along with strengthened market power presumably brings forth greater significance of the ordering of corporate funding in the post-crisis period.

## References

- Baek, Jae-Seung, Jun-Koo Kang, and Kyung Suh Park, "Corporate Governance and Firm Value : Evidence from the Korean Financial Crisis," *Journal of Financial Economics* 71, (2004), 265-313.
- Chirinko, S. Robert, and Anuja R. Singha, "Testing Static Tradeoff against Pecking Order Models of Capital Structure : A Critical Comment," *Journal of Financial Economics* 58, (2000), 417-425.
- Fama, Eugene F. and Kenneth R. French, "Testing Trade-Off and Pecking Order Predictions About Dividends and Debt," *Review of Financial Studies* 15, (2002), 1-33.
- Fisher, E. O., R. Heinkel, and J. Zechner, "Dynamic Capital Structure Choice : Theory and Tests," *Journal of Finance* 44, (1988), 19-40.
- Frank, Murray Z. and Vidhan K. Goyal, "Testing the Pecking Oder Theory of Capital Structure," *Journal of Financial Economics* 67, (2003), 217-248.
- Helwege and Liang, "Is There a Pecking Order? Evidence from Panel of IPO Firms," *Journal of Financial Economics* 40, (1996), 429-458.
- Jangwoo Lee, "A Study on Growth Options and Debt Policies," *The Korean Journal of Financial Engineering*, 6(2), (2006), 115-133, (translated in English).
- Jang W. Lee, Bae, Sung C., and Taek Ho Kwon, "A Research on the Determinants of Diversification of Korean Firms around the Occasion of Asian Financial Crisis," *The Korean Journal of Financial Engineering*, 6(2), (Dec 2007), 275-298.
- Jangwoo Lee, Jeon Kyu An, and Choi, Seung-du, "An empirical study on the growth opportunities and debt policies of Korean firms before and after the credit crunch crisis of 1997," *Journal of the Korean Data Analysis Society*, 6(2), (2004), 539-554, (translated in English).
- Kang J. K., and Lim, Chan Woo, "Problems of bank-centered funding system : The effect of liquidity crisis of banks on firm value," *Journal of Korean Financial Studies*, 14(1), (May 2001), 161-188, (translated in Korean).
- Kim Pil Kyu, "The Financing Behavior and Financial structure Determinants of Korean Manufacturing Firms," Aug. 2006, *Working Paper*.
- Kwack Seh Young, "A Study on Pecking Order Theory," *The Korean Journal of*

- Financial Management*, (2004), 10-1 (translated in Korean).
- Myers, S. C., "Determinants of Corporate Borrowing," *Journal of Financial Economics* 5, (1977), 147-175.
- Myers, S. C. and N. S. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have," *Journal of Financial Economics* 13, (1984), 187-221.
- Narayanan, M. P., "Debt versus Equity under Asymmetric Information," *Journal of Financial and Quantitative Analysis* 23, (1988), 39-51.
- Shyam-Sunder, L. and S. C. Myers, "Testing Static Tradeoff against Pecking Order Models of Capital Structure," *Journal of Financial Economics* 51, (1999), 219-244.
- Sung C. Bae, Taek Ho Kwon, and Jang W. Lee, "Corporate Diversification, Relatedness, and Firm Value : Evidence from Korean Firms," *Asia-Pacific Journal of Financial Studies*, 37(6), (Dec. 2008), 1025-1064.
- Yoon Soon Suk, Cash from Operations, "Source of Cash Requirements and Financing Policy," *Korean Management Review*, 32(1), (2003), 203-231, (translated in Korean).
- Yoon Jong In, Kim Hyeong Chul, "An Empirical Study on the Validity of Pecking Order Theory and Free Cash Flow Hypothesis : the Case of Korean Listed Firms," *Asia-Pacific Journal of Financial Studies*, 25, (1999), 301-342, (translated in Korean).