

DOES THE TRANSFORMATION TO HOLDING COMPANY SYSTEMS IN KOREAN CHAEBOL IMPROVE THE VALUATION INDEPENDENCE OF AFFILIATED FIRMS' COST OF DEBT?

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Abstract

Family-owned conglomerates are prevalent in most Asian countries, in which excessive control rights of their majority shareholders infringe independent managements of their affiliated firms. Less than 50% of Korean chaebol conglomerates have transformed to holding company systems to ensure independent management of affiliated firms. Empirical analyses discovered that the cost of debts in the companies which have been transformed to holding company restricting the complicated equity investment among the affiliated firms of chaebol are evaluated independently. Results imply that the negative effect from the propping of internal capital can be reduced through the fundamental change in the corporate governance.

Keywords: Chaebol, Conglomerate, Holding Company, Cost of Debts

JEL Classification: G30, M40

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1. INTRODUCTION

In family-controlled Asian conglomerate groups, majority shareholders manage firms independent of minority shareholders by interfering and keeping affiliated firms under tight control using voting rights that exceed their equity share (La Porta et al., 1999; Shleifer and Vishny, 1997). Propping is a kind of infringing independent management of affiliated firms among a conglomerate group through which internal capital support from certain affiliated firms is provided to other such firms facing financial difficulties (Friedman et al., 2003; Lamont, 1997; Shin and Stulz, 1998). The internal capital market is beneficial to affiliated firms in need of emergent funds (Bae et al., 2008; Scharfstein and Stein, 2000). In Korea, for example, when Samsung Motors was in serious financial trouble in 1999, major affiliated firms such as Samsung Electronics, and others supported it using internal funds. However, internal capital might entrench on minority shareholders in terms of the affiliate firms who provides such funds to other affiliates (Gertner et al., 1994; Hoshi et al., 1991).

This study examines whether or not affiliated firms in Korean chaebols that transformed their ownership structure into a holding company enable creditors to make more independent decisions on the cost of debt than before. Extant studies state that the arbitrary utilization of resources in affiliated firms by influential majority shareholders within a conglomerate group may result in additional entrenchment of their minority

shareholders within affiliated firms (Jiang et al., 2010; Jandik and Makhija, 2005; Khanna and Tice, 2001; Shin and Park, 1999). Korea's holding company system may improve the independence of affiliated firms' financing decisions because it restricts circular and horizontal equity investments among affiliated firms, thus considerably blocking the propping channel in a conglomerate group.

At the end of the 1990s, the Organization for Economic Cooperation and Development (OECD) and the International Bank for Reconstruction and Development (IBRD) recommended the Korean government to encourage chaebols to improve corporate governance through transformation to the holding company system. The Korean government actively introduced the shareholding company system as part of the chaebol reforms during the 1997 foreign currency crisis. According to the Monopoly Regulation and Fair Trade Act of the Korean Fair Trade Commission (KFTC), a holding company is defined to have an asset size larger than 100 billion Korean won (about USD 100 millions), and holding over 50 percent share in the equity of its affiliated firms. Holding company by its nature reveals a concern that such an entity might engage in speculation through equity investments rather than focus on actual business operations. The KFTC has introduced various measures to control holding companies. The measures primarily include restrictions on indiscreet equity investments among affiliated firms to control internal fund transfers throughout the members of a conglomerate group. This transformation provides a special environment

for verifying its effect on the cost of debt⁵. Following the recommendation, the KFTC started to control pyramid-type equity investment relationships among affiliated firms belonging to a chaebol and to restrict the purchase of stocks of affiliated firms only for the purpose of control, and not to participate in managing the original businesses.

As of April 2015, 31 groups, or 49.2 percent of 63 chaebols, had been transformed into financial or non-financial holding companies (KFTC, 2015). Furthermore, the KFTC includes the holding company system as one of six main future chaebol policies. This is because of KFTC's concern that a chaebol may support a faltering entity within the group by the internal capital market at the expense of minority shareholders. Such entrenchment occurs more severely in Korean chaebols because the independent management of an individual company is not secured (Chang and Hong, 2000). This insecurity resulted from the pursuit of a management strategy under the strong control of the conglomerate group's headquarters (Gerlach, 1992).

Consistent with our expectations, we find evidence that firms that have paid a relatively higher (lower) cost of debt before the transformation experience a corresponding increase (decrease) in it. This result suggests that the cost of debt was evaluated more independently after the transformation into the holding company system with the sample of 1,794 firm-years data in Korea. Our study contributes to the literature on corporate governance and practices in several ways. First, to the best of our knowledge, this study is the first to provide empirical evidence to prove that blocking the interdependence of equity among affiliated firms with the holding company system can improve debt market efficiency resulting from propping in Asian conglomerate groups. Second, our study provides insights for national policy makers who are interested in minimizing the harmful effects to minority shareholders of affiliated firms, arisen from bearing the cost of unfair and excessive financing. Third, this study also provides useful information for investors that the cost of debt can vary depending on the existing cost of debt when a firm is likely to transition to a holding company system.

2. THEORY AND HYPOTHESIS

2.1. Interdependent Management of Affiliated Firms in a Conglomerate Group

Prior studies also report the heightened synergies in a conglomerate group. These synergies arise from the integration of duplicate functions and sharing of tangible/intangible resources (Brush, 1996; Khanna and Palepu, 2000; Leff, 1978). These resources include debt guarantees, equity investments, and cash injections among affiliated firms. Various types of internal resources can be shared within a conglomerate group (Chang and Hong, 2000; Kim and Yi, 2006). Internal product transactions among

affiliated firms could be used efficiently to improve performance (Jin and Yon 2015). However, the results of interdependent management may not always be positive (Bertrand et al., 2002; Cheung et al., 2006). Tunneling and propping are stated in agency theory as the representative circumstances of interdependent management. Tunneling refers to the entrenchment of minority shareholders when transferring wealth from a firm to other affiliated firms that have higher cash flow rights (Lin et al., 2011; Johnson et al., 2000), whereas propping is the transfer of funds to other affiliated firms under financial pressure following the direction of majority shareholders or conglomerate headquarters (Friedman et al., 2003). In either case, the stakes of the minority shareholders of the affiliated firm are infringed. Thus, this interdependency among affiliated firms is very likely to affect the cost of debt evaluated by creditors.

When the main affiliated firms of major Korean conglomerate groups, such as Hanbo, Kia, Halla, Jinro, and Haitai, were failing during the foreign currency crisis in 1997, their condition adversely affected other affiliated firms through their equity interconnections. This harmful effect of interdependent management is primarily attributed to the majority shareholders' significant disparity between dominant voting rights over their cash flow rights over the conglomerate group (Ali et al., 2007). Interest conflicts between majority and minority shareholders of affiliated firms in a single conglomerate group have been reported frequently in the family-oriented conglomerate groups in East Asia (Jiang et al., 2010; Claessens et al., 2002; Faccio and Lang, 2002). To solve this problem, the Korean government has implemented a series of reformative policies. Examples of policies applied to date include the Regulation of Mutual Equity Investment⁶ (1987), the Regulation of New Debt Guarantee (1998), and the Regulation of Total Equity Investment⁷ (1987), among others. However, the effectiveness of these regulations was not significant enough because capital support for group members through multiple affiliate firms could nullify the regulations. The Regulation of Mutual Equity Investment prohibits mutual equity investments among affiliated firms, while the Regulation of New Debt Guarantee limits the loan guarantee for these firms. The Regulation of Total Equity Investment was unsuccessful, and abolished in 2009. As discussed, capital support for affiliate firms through equity investments has been the common practice.

2.2. Transformation of Korean Chaebols into Holding Companies

In 1999, the KFTC has introduced the holding company system into Korean firms. A new governance system was expected to improve corporate governance caused by the complicated

⁵ In the United States, the dismantling of pyramid-type conglomerate groups was attempted through the Anti-Trust Act, the tax system (double taxation on dividend income), and the Public Utility Holding Company Act (PUHCA) when these types of groups became social problems in the 1930s (Abel, 1999).

⁶ Mutual equity investment refers to the mutual investment in the stocks of companies when they are mutually keeping stocks of other companies, and such investment is entirely prohibited for a conglomerate group under Article 9 of the Fair Trade Act, regardless of the size of the mutually owned shares

⁷ The system prevents equity investments in domestic companies - regardless of whether affiliated or non-affiliated - that exceed 40 percent of the net assets only for companies of a conglomerate group having 10 trillion Korean won or more in total assets (Article 10 of the Monopoly Regulation and Fair Trade Act). Although abolished in 1997 and resurrected in 1999 through the amendment to the Fair Trade Act, the system was abolished again through the 2009 amendment.

entangled equity structure of a chaebol's affiliated firms. Previously, the holding company system had been prohibited for the reason that the holding company system is to control other companies rather than operate its own business thus eventually intensifies ownership concentration of majority shareholders. After the 1997 foreign currency crisis, however, the OECD and IBRD suggested the holding company as a new governance structure to replace the complicated equity relationships among affiliated firms.

The holding company system in Korea has created various complementary structures to address the concern of ownership concentration by majority shareholders in a conglomerate group. The system simplifies the complicated equity relationships among affiliated firms. The key features of the system include: 1) preventing excessive investments by not allowing a holding company's liabilities to exceed 100 percent of its assets; 2) forcing a holding company and its subsidiaries to hold at least a minimum of 30 percent (50 percent for an unlisted company) of the equity of an affiliated firm under its control; 3) prohibiting a non-financial holding company from owning a subsidiary in the financing industry and preventing speculative equity investments unrelated to its business; and 4) minimizing the possibility of circular equity investments by prohibiting horizontal equity investments between subsidiary companies. As a result, interdependence is expected to decline for affiliated firms of a chaebol that transforms into a holding company, as existing complicated equity investment relationships are simplified⁸. Figure 1 portrays the equity structure of the LG Group before and after its transformation into a holding company.

The KFTC suggested three policy goals for the governance structure of the holding company. The first goal is to strengthen the independent management of the affiliated firms that receive only an equity investment from its direct parent company operating in a related industry. The second is to limit propping for faltering companies within a conglomerate. The third is to strengthen the monitoring of investors, and to secure a transparent governance structure (Kim and Choi, 2014; Kwon, 2007). Concerning the second goal, independent management is expected to increase after transformation as the likelihood of transferring internal funds to affiliated firms declines. In this case, firms with high default risk and thus paying high cost of debt prior to the transformation are likely to experience a greater financial risk, eventually paying a higher cost of debt after the transformation. At the same time, firms with low default risk and thus paying low cost of debt prior to the transformation are likely to experience a lower financial risk, eventually paying lower cost of debt after the transformation.

2.3. Internal Capital Markets under the Holding Company System

The internal capital market through propping activities generally appeared in family-oriented conglomerate groups in Asia including Malaysia,

Indonesia, Thailand, and Korea, during the foreign currency crisis of 1997–1998 (Mitton, 2002). Internal capital may expedite the execution of an investment plan with a high potential rate of return. This plan may have not been adopted if internal capital support was not available because high asymmetric information existed in the external capital market (Gertner et al., 1994). In other words, unlike the procurement of external capital, the internal capital support can be provided promptly and elastically in response to the demand for additional capital (Haas and Lelyveld, 2010; Lewellen, 1971). However, the internal capital market infringes on minority shareholder stakes when a firm provides capital support to a faltering company within a conglomerate group.

An important motivation for allowing the holding company system during the 1999 foreign currency crisis was because their complicated and entangled ownership structure of equity was a considerable barrier in restructuring an insolvent company for domestic conglomerate groups. The regulations for a holding company restrict equity investments in companies other than affiliated firms under its control in the same business and block the internal capital channel. After the transformation into a holding company, the debt capital market is expected to evaluate affiliated firms within a chaebol depending on whether it has the holding company system. Prior to the transformation to a holding company system, affiliated firms in a poor financial position experience benefits through the redistribution of resources from internal capital support (Stein, 1997; Williamson, 1975) whereas counterpart firms experience disadvantage. In such a case, the capital cost of an individual company in the borrowing capital market is evaluated in a mutually dependent manner (Lin et al., 2011).

Interdependence is expected to decrease after transformation into the holding company system because horizontal equity investments are restricted among affiliated firms, and equity investments in financial and non-financial companies are also prohibited after such a transformation. As the interdependence decreases after the transformation into a holding company, the likelihood of propping weakens. If so, firms in a good financial condition are less likely to suffer from transferring their funds to faltering affiliated firms. At the same time, firms in a poor financial condition are less likely to benefit from internal capital support from affiliated firms with a relatively good financial condition. Thus, we argue that firms that paid a relatively lower cost of debt are expected to experience a further decrease in it after the transformation. At the same time, companies that paid a relatively higher cost of debt are expected to experience a further increase in it. Based on this discussion, we form the following hypothesis relating to changes in the cost of debt due to the implementation of the holding company system⁹.

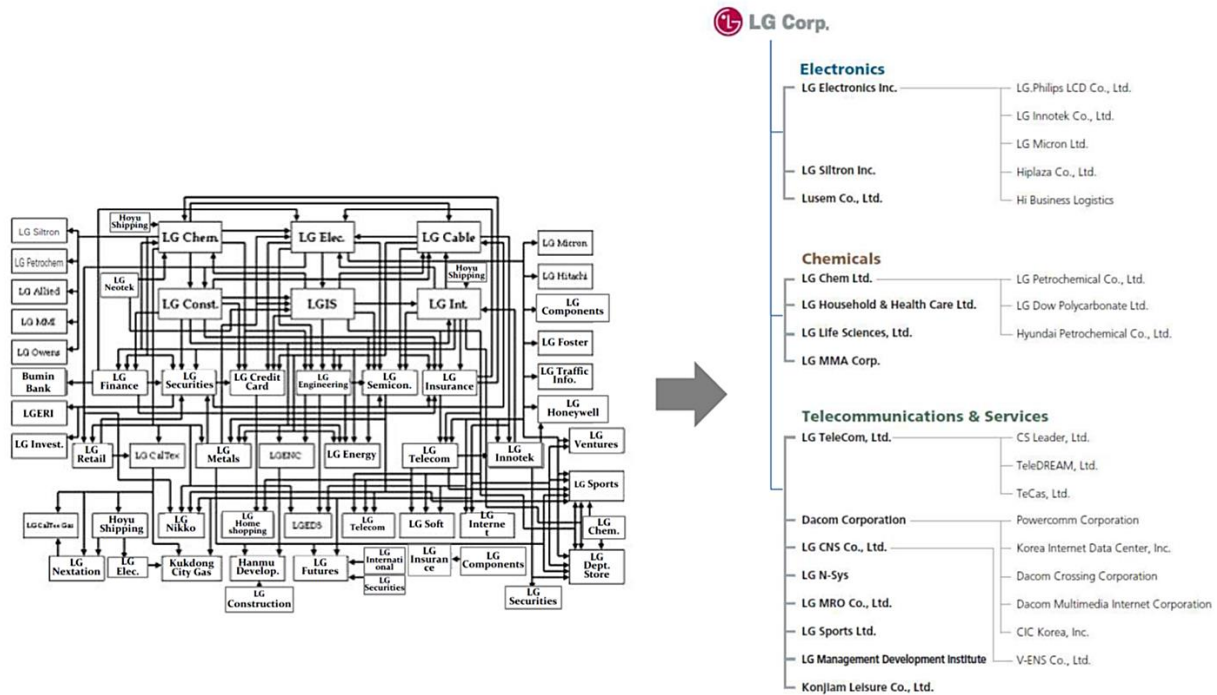
⁸ The appendix shows changes in the interdependence of the equity of affiliated firms in LG Group. The number and size of the companies receiving the equity investment were significantly reduced after the transformation into a holding company.

⁹ We acknowledge that implementing holding company system may not differentiate the affiliate firms' cost of debt if the system is just as ineffective as the similar regulations that have previously been implemented. These restrictions include the Regulation of Mutual Equity Investment (Article 9 of the Fair Trade Act), the Regulation of New Debt Guarantees (Clause 2 of Article 10 of the Fair Trade Act), and the Regulation of Total Equity Investment (Article 10 of the Fair Trade Act). We also acknowledge that although the holding company system is more direct and effective than the previous regulations, there is a chance for chaebol firms to find ways to avoid the new regulation as they have successfully done so.

Hypothesis. Ceteris paribus, subsequent to changes in the governance structure due to the transformation to the holding company system, the

cost of debt increases (decreases) for firms with high (low) cost of debt.

Figure 1. Change in LG Group equity structure before and after transformation into a holding company



Sources: Reorganized data from KFTC and the 2004 Annual Report of LG Holdings

3. MATERIAL AND METHOD

3.1. Sample Selection

Our sample includes affiliated chaebol firms that were transformed to holding companies during 2001 to 2009 (KFTC, 2009). To compare the sample firms' cost of debt before and after the transformation, 1,794 firm-year observations were selected for the period 1995 to 2011. Holding companies in Korea are classified as either financial or nonfinancial. Our sample includes only the nonfinancial holding companies. We also exclude the firms that have changed their business nature by the transformation. There have been some structural changes like spin-offs and mergers around the

timing of transformation, and those events could have changed the nature of business as well as the firm's size or name. Thus, we exclude firms if their industry code or asset size changed by more than 50 percent after the transformation. Firms like SK E&S, CJ Home Shopping, and Samsung General Chemicals are excluded because they unintentionally took the form of holding companies since their affiliates' equity values increased enough to meet a condition to be classified a holding company. Table 1 shows the procedure to derive the samples and the distribution of the sample firms by years. In total, 2,904 firm-year observations are selected from 13 chaebol groups and 205 affiliated firms. Among them 1,794 affiliates are under holding companies structures which are main concern of this study.

Table 1. Sample Selection Procedure and Sample Distribution by Year

| Panel A. Sample Selection Procedure | | Parents | Affiliates |
|--|--|---------|------------|
| Criteria | | | |
| Number of chaebol holding companies in 2009 | | 60 | 721 |
| (Financial holdings) | | (5) | (65) |
| (Non-chaebol firms) | | (42) | (374) |
| (Firms with business nature change after transformation) | | | (76) |
| (Firms of unintentional transformation) | | | (3) |
| Final sample size* | | 13 | 205 |

| Panel B. Distribution of sample firms by year | | | | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| Year | '95 | '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 | '07 | '08 | '09 | '10 | '11 | Total |
| Holding | 84 | 91 | 98 | 100 | 101 | 109 | 97 | 105 | 111 | 122 | 122 | 121 | 82 | 91 | 129 | 123 | 108 | 1,794 |
| Non-holding** | 53 | 58 | 58 | 61 | 60 | 69 | 69 | 58 | 71 | 76 | 68 | 65 | 55 | 54 | 76 | 80 | 79 | 1,110 |
| Total | 137 | 149 | 156 | 161 | 161 | 178 | 166 | 163 | 182 | 198 | 190 | 186 | 137 | 145 | 205 | 203 | 187 | 2,904 |

* Firms belonged to transformed chaebol including holdings affiliated and non-holdings affiliated firms.
 ** The firms belong to the conglomerate group that transformed into holding companies, but are not under holding companies system. The firms are used in additional test as in Table 7.

3.2. Research Model

The regression model of the following equation (1) is used to verify the influence of the chaebol firms' transformation to holding companies on the affiliates' cost of debt (COD).

$$codt = \alpha_0 + \beta_1 postt + \beta_2 codht + \beta_3 (post \times codh)t + \beta_4 codlt + \beta_5 (post \times codl)t + \beta_6 sizet + \beta_7 roat + \beta_8 lev + \beta_9 cfort + \sum industry\ dummies + \sum year\ dummies \quad (1)$$

where,

cod = cost of debt capital;

post = dummy variable, which takes the value of one for the firm-year after transformation, and zero otherwise;

codh = dummy variable that takes the value of one if the sample firm's COD before transformation is higher than the median (or the first quartile) COD value of affiliates, and zero otherwise;

codl = dummy variable that takes the value of one if the sample firm's COD before transformation is lower than the median (or the fourth quartile) COD value of affiliates, and zero otherwise;

size = natural log of total assets;

roa = return on assets (= net income ÷ assets);

lev = leverage (= liabilities ÷ assets); and

cfo = operating cash flow (= operating cash flow ÷ assets).

The variables "*codh*" and "*codl*" in Equation (1) are used to measure whether the sample firm's cost of debt has become relatively higher or lower than that of the other affiliates before the transformation. A sample firm's *codh* is one if its cost of capital is higher than the median value of all the affiliates' cost of debts. We also use a quartile criterion—a sample firm's *codh* (*codl*) is one if its cost of capital is higher (lower) than the top (bottom) 25 percent value of all the affiliates' cost of debts. Other control variables in Equation (1) are the sample firm's size, return on assets, leverage, cash flow from operations. The sample firm's cost of debt would be higher if its default risk is higher; in other words, if the sample firm's size is smaller (Sengupta, 1998),

its return on assets is lower (Francis et al., 2005) or leverage is higher (Bowman, 1979).

4. EMPIRICAL RESULTS

4.1. Univariate Analyses

Table 2 presents the descriptive statistics of the major variables before and after the transformation into the holding company. The dependence on debts (*depdebt*) decreased from 0.331 to 0.255, possibly because the amount of debt decrease due to cost of debt increase must have been larger than the amount of debt increase due to cost of debt decrease during the sample period.

Table 2. Descriptive Statistics of Variables Before and After Transformation (N=1,794)

| Panel A. Before transformation (N=1,143) | | | | | | | |
|--|--------|--------|--------|--------|--------|--------|-------|
| Variables | MIN | Q1 | Mean | Median | Q3 | Max | STD |
| <i>cod</i> | -0.057 | -0.021 | 0.013 | 0.006 | 0.042 | 0.108 | 0.047 |
| <i>depdebt</i> | 0.017 | 0.154 | 0.331 | 0.309 | 0.483 | 0.778 | 0.215 |
| <i>size</i> | 20.954 | 24.122 | 25.715 | 25.452 | 27.300 | 30.607 | 1.916 |
| <i>roa</i> | -0.184 | -0.009 | 0.017 | 0.025 | 0.063 | 0.168 | 0.083 |
| <i>lev</i> | 0.208 | 0.532 | 0.679 | 0.685 | 0.820 | 1.097 | 0.216 |
| <i>cfo</i> | -2.302 | 0.005 | 0.057 | 0.068 | 0.126 | 0.731 | 0.159 |
| <i>dpr</i> | -4.052 | 0.000 | 0.146 | 0.000 | 0.129 | 23.219 | 0.877 |
| Panel B. After transformation (N=651) | | | | | | | |
| Variables | MIN | Q1 | Mean | Median | Q3 | Max | STD |
| <i>cod</i> | -0.053 | -0.007 | 0.015 | 0.009 | 0.029 | 0.108 | 0.033 |
| <i>depdebt</i> | 0.017 | 0.094 | 0.255 | 0.226 | 0.370 | 0.778 | 0.193 |
| <i>size</i> | 22.371 | 24.818 | 26.258 | 26.275 | 27.531 | 30.796 | 1.767 |
| <i>roa</i> | -0.184 | 0.002 | 0.032 | 0.039 | 0.076 | 0.168 | 0.073 |
| <i>lev</i> | 0.208 | 0.436 | 0.562 | 0.560 | 0.655 | 1.097 | 0.197 |
| <i>cfo</i> | -0.506 | 0.015 | 0.071 | 0.068 | 0.121 | 0.953 | 0.112 |
| <i>dpr</i> | -2.398 | 0.000 | 0.257 | 0.000 | 0.229 | 44.818 | 1.860 |

Note: Variable definitions: (1) *cod* = cost of debt capital, (2) *post* = dummy variable that takes a value of 1 for firms after transformation, and 0 otherwise, (3) *depdebt* = interest - bearing debts ÷ assets, (4) *size* = natural log of total assets, (5) *roa* = return on assets (= net income ÷ assets), (6) *lev* = leverage (= liabilities ÷ assets), (7) *cfo* = operating cash flow (= operating cash flow ÷ assets), (8) *dpr* = dividend payout ratio (= dividend ÷ net income).

Table 3. Mean-Median Analysis of Variables (N=1,794)

| Variables | Before transformation (N=1,143) | | After transformation (N=651) | | Pr > t | Pr > z |
|----------------|---------------------------------|--------|------------------------------|--------|-----------|-----------|
| | Mean | Median | Mean | Median | | |
| <i>Cod</i> | 0.013 | 0.006 | 0.015 | 0.009 | 1.33 | 2.14** |
| <i>depdebt</i> | 0.331 | 0.309 | 0.255 | 0.226 | -7.73*** | -7.39*** |
| <i>Size</i> | 25.715 | 25.452 | 26.258 | 26.275 | 6.06*** | 5.59*** |
| <i>Roa</i> | 0.017 | 0.025 | 0.032 | 0.039 | 4.12*** | 3.88*** |
| <i>Lev</i> | 0.679 | 0.685 | 0.562 | 0.560 | -11.68*** | -11.33*** |
| <i>Cfo</i> | 0.057 | 0.068 | 0.071 | 0.068 | 2.18** | 0.678 |
| <i>Dpr</i> | 0.146 | 0.000 | 0.257 | 0.000 | 1.44 | 3.78*** |

1) *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

2) Refer to Table 2 for the definitions of the variables.

Table 3 shows how significantly the mean and median values of major variables changed by the transformation. The median value of *cod* significantly increased from 0.006 to 0.009, and the mean and median values of *depdebt* significantly decreased. The transformation must have increased the cost of debt, and consequently, decreased the dependence on debts.

Table 4 indicates the Pearson correlations

between the major variables. It shows no significant change in the cost of debt before and after the transformation, as *cod* does not have any correlation with *post*. The negative correlation between *depdebt* and *post* is consistent with the findings in Table 3. In addition, the negative correlation between *depdebt* and *cod* is consistent with the explanation mentioned above - firms with increased cost of debt borrowed less.

Table 4. Pearson Correlations of Variables (N=1,794)

| | <i>cod</i> | <i>depdebt</i> | <i>size</i> | <i>roa</i> | <i>Lev</i> | <i>cfo</i> | <i>Dpr</i> |
|----------------|------------|----------------|-------------|------------|------------|------------|------------|
| <i>Post</i> | 0.028 | -0.175*** | 0.139*** | 0.094*** | -0.260*** | 0.047** | 0.040* |
| <i>Cod</i> | 1.000 | -0.065*** | -0.004 | -0.199*** | 0.143*** | 0.041* | -0.064*** |
| <i>depdebt</i> | | 1.000 | -0.076*** | -0.412*** | 0.653*** | -0.290*** | -0.024 |
| <i>Size</i> | | | 1.000 | 0.090*** | -0.094*** | 0.011 | 0.078*** |
| <i>Roa</i> | | | | 1.000 | -0.450*** | 0.413*** | 0.019 |
| <i>Lev</i> | | | | | 1.000 | -0.229** | -0.040* |
| <i>Cfo</i> | | | | | | 1.000 | 0.007 |

1) *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

2) Refer to Table 2 for the definitions of the variables.

Table 5. Effect of Transformation on Cost of Debt

The dependent variable of the regression equation is *cod*, which is the cost of debt capital. The explanatory variables include (1) *post* = dummy variable that takes a value of 1 for firms after transformation, and 0 otherwise, (2) *codh* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the median (or the first quartile) COD value of the affiliates, and 0 otherwise, (3) *codl* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise, (4) *size* = natural log of total assets, (5) *roa* = return on assets (= net income ÷ assets), (6) *lev* = leverage (= liabilities ÷ assets), (7) *cfo* = operating cash flow (= operating cash flow ÷ assets).

$$cod_i = \alpha_0 + \beta_1 post_i + \beta_2 codh_i + \beta_3 (post \times codh)_i + \beta_4 codl_i + \beta_5 (post \times codl)_i + \beta_6 size_i + \beta_7 roa_i + \beta_8 lev_i + \beta_9 cfo_i + \sum industry\ dummy_i + \sum year\ dummy_i + \varepsilon_i$$

| Variables | Independent variable: Cost of debt | | | |
|-------------------------|---|----------|---|----------|
| | Panel A: Median ²⁾ criterion | | Panel B: 1 st and 4 th quartile ³⁾ criterion | |
| | Estimate | t-stat. | Estimate | t-stat. |
| <i>Intercept</i> | -0.077 | -5.49*** | -0.067 | -4.89*** |
| <i>Post</i> | -0.020 | -5.90*** | -0.008 | -2.43** |
| <i>Codh</i> | 0.020 | 11.62*** | 0.018 | 9.57*** |
| <i>post×codh</i> | 0.034 | 12.00*** | 0.030 | 9.66*** |
| <i>Codl</i> | | | -0.009 | -4.61*** |
| <i>post×codl</i> | | | -0.018 | -5.64*** |
| <i>Size</i> | 0.000 | 0.95 | 0.000 | 0.96 |
| <i>Roa</i> | -0.083 | -6.40*** | -0.081 | -6.43*** |
| <i>lev</i> | 0.032 | 6.95*** | 0.029 | 6.19*** |
| <i>cfo</i> | 0.029 | 4.51*** | 0.028 | 4.41*** |
| <i>Industry dummy</i> | Included | | Included | |
| <i>Year dummy</i> | Included | | Included | |
| Adjusted R ² | 0.3237 | | 0.3536 | |
| F-stat. | 29.60*** | | 31.65*** | |
| N | 1,794 | | 1,794 | |

1) *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

2) *codh* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the median COD value of the affiliates, and 0 otherwise.

3) *codl* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the first quartile COD value of the affiliates, and 0 otherwise; *codl* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise.

4.2. Multivariate Analyses

We use ordinary least square (OLS) regressions to test Equations (1). We do not have a multicollinearity problem since the maximum value of variance inflation factor (VIF) in the OLS models is 3.95, which is lower than the generally accepted level of 10 (Myers, 1990). Table 5 shows the OLS results of transformation effect on cost of debt. Significantly positive coefficients of ($post \times codh$), 0.020 in Panel A and 0.018 in Panel B, indicate that the transformation must have increased the cost of capital for the firms that had a relatively higher cost of capital before transformation. Also, the significantly negative coefficient of ($post \times codl$), -0.018 in Panel B, indicates that the transformation must have decreased the cost of capital for the firms with a relatively lower cost of capital before transformation.

The results in Table 5 imply that chaebol firms' creditors evaluated their cost of debt more independently after the firms adopted the transformation into the holding company system. A public policy implication from this finding is that the adoption of the holding company system is an effective way to control the practice of propping among chaebol firms.

4.3. Additional Tests

We can confirm the effectiveness of the holding company transformation if we find that firms with increased cost of debt have actually reduced their dependence on debts. It could be argued that the holding company system has an implementation shortcoming if the firms with increased cost of debts cannot reduce the amount of debts. Affiliated firms must have shifted their financing method to external financing when the introduction of the holding company system blocked the internal financing. They would have reduced the external debt financing when the external equity financing is available and favorable. They would also have reduced the external debt financing when the increase in cost of debt became larger than the increase in the benefit of debt use. Thus, the reduction in debt dependence by firms with higher cost of debt would confirm the effectiveness of the holding company transformation. Table 6 shows how the changes in cost of debt have led to the changes in use of debts by testing the regression equation (2). In equation (2), we measure the amount of interest-bearing debts by the sum of short-term borrowings, long-term borrowings, current portion

of long-term debts, and corporate bonds. We use the same explanatory variables as Equation (1). We also select the control variables, operating cash flows, and dividend payout ratio, from Francis et al. (2005) who test a similar debt dependence model.

$$\begin{aligned} depdebt_t = & \alpha_0 + \beta_1 post_t + \beta_2 codh_t + \beta_3 (post \times codh)_t \\ & + \beta_4 codl_t + \beta_5 (post \times codl)_t + \beta_6 size_t \\ & + \beta_7 roa_t + \beta_8 lev_t + \beta_9 cfo_t + \beta_{10} dpr_t + \sum industry \\ & dummies_t + \sum year dummies_t \end{aligned} \quad (2)$$

where,

$depdebt$ = dependence on debts (= interest-bearing debts \div assets);

$post$ = dummy variable, which takes the value of one for the firm-year after transformation, and zero otherwise;

$codh$ = dummy variable that takes the value of one if the sample firm's COD before transformation is higher than the median (or the first quartile) COD value of affiliates, and zero otherwise;

$codl$ = dummy variable that takes the value of one if the sample firm's COD before transformation is lower than the median (or the fourth quartile) COD value of affiliates, and zero otherwise;

$size$ = natural log of total assets;

roa = return on assets (= net income \div assets);

lev = leverage (= liabilities \div assets);

cfo = operating cash flow (= operating cash flow \div assets); and

dpr = dividend payout ratio (= dividend \div net income).

Panel A of Table 6 shows that the coefficient of high cost of debt after the transformation ($post \times codh$) is significantly negative (beta=-0.037; $p < 0.01$). The interpretation is that firms with higher cost of debt after the transformation have reduced their dependency on debts. Panel B of Table 6 shows a similar result for the same coefficient (beta=-0.072; $p < 0.01$). The result for the low cost of debt firms can be interpreted to indicate that the decrease in cost of debt after the transformation has not provided enough incentive for the firms to increase the amount of debt. On the other hand, the insignificant coefficient of ($post \times codl$) suggests that firms with lower cost of debt after the transformation have not changed their dependency on debts because they have relatively a greater ability to utilize internal financing that was used to support other affiliates before transformation.

Table 6. Effect of Transformation on Debt Dependency

The dependent variable of the regression equation is *depdebt*, which represents interest-bearing debts divided by assets. The explanatory variables include (1) *post* = dummy variable that takes a value of 1 for firms after transformation, and zero otherwise, (2) *codh* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the median (or the first quartile) COD value of the affiliates, and 0 otherwise, (3) *codl* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise, (4) *size* = the natural log of total assets, (5) *roa* = return on assets (= net income ÷ assets), (6) *lev* = leverage (= liabilities ÷ assets), (7) *cfo* = operating cash flow (= operating cash flow ÷ assets), (8) *dpr* = dividend payout ratio (= dividend ÷ net income).

$$depdebt_t = \alpha_0 + \beta_1 post_t + \beta_2 codh_t + \beta_3 (post \times codh)_t + \beta_4 codl_t + \beta_5 (post \times codl)_t + \beta_6 size_t + \beta_7 roa_t + \beta_8 lev_t + \beta_9 cfo_t + \beta_{10} dpr_t + \sum industry\ dummy_t + \sum year\ dummy_t + \varepsilon_t$$

| Explanatory variable: Dependence on debts | | | | |
|---|---|----------|--|----------|
| Variables | Panel A: Median ²⁾ criterion | | Panel B: First and fourth quintile ³⁾ criterion | |
| | Estimate | t-stat. | Estimate | t-stat. |
| <i>Intercept</i> | -0.051 | -0.89 | -0.042 | -0.75 |
| <i>post</i> | 0.057 | 3.97*** | 0.068 | 4.67*** |
| <i>codh</i> | -0.017 | -2.28** | -0.052 | -6.38*** |
| <i>post×codh</i> | -0.037 | -3.04*** | -0.072 | -5.34*** |
| <i>codl</i> | | | -0.023 | -2.80*** |
| <i>post×codl</i> | | | -0.013 | -0.93 |
| <i>size</i> | 0.002 | 0.83 | 0.002 | 1.14 |
| <i>roa</i> | -0.260 | -4.72*** | -0.290 | -5.32*** |
| <i>lev</i> | 0.578 | 29.27*** | 0.572 | 29.05*** |
| <i>cfo</i> | -0.204 | -7.36*** | -0.204 | -7.46*** |
| <i>dpr</i> | 0.000 | 0.11 | 0.001 | 0.32 |
| <i>Industry dummy</i> | Included | | Included | |
| <i>Year dummy</i> | Included | | Included | |
| Adjusted R ² | 0.4875 | | 0.5038 | |
| F-stat. | 72.06*** | | 71.02*** | |
| N | 1,794 | | 1,794 | |

1) *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

2) *codh* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the median COD value of the affiliates, and 0 otherwise.

3) *codh* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the first quartile COD value of the affiliates, and 0 otherwise; *codl* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise.

We also test whether the holding company transformation affects the firms that had been members of the chaebol affiliation, but were not transformed into the parts of the holding company system. The existence of such firms is inevitable in any holding company transformation process because financial institutions are prohibited to become members of the holding company system. When the parent company does not have enough funds to purchase the required amount of stocks issued by all its affiliated firms, some members of the affiliated firms can be excluded from the holding company system. For example, according to Figure 1 and the Appendix, the LG group who had 60 affiliated firms in 2011 before the transformation excluded eight firms from the holding company system after the transformation. Although these eight firms are excluded, their equity investment to and from other affiliates of the LG group has become substantially simplified after the transformation. Thus, if we do not find as significant

a change in cost of debt for these firms as that found in Table 6, the transformation might arguably have not been as effective as expected by the policy makers.

Table 7 reports the regression results of Equation (1) for 1,110 sample firms that had been the members of the affiliated group but were excluded from the holding company transformation. The coefficient of high cost of debt after the transformation (*post×codh*) is significantly positive (beta=0.034, p<0.01 in Panel A; and beta=0.030; p<0.01 in Panel B). The coefficient of low cost of debt after the transformation (*post×codl*) is significantly negative (beta=-0.022, p<0.01 in Panel B). The results of regression in Table 7 are very similar to those in Table 5. This implies that the introduction of the holding company system has effectively differentiated the affiliated firms' cost of debt not only for the firms that became members of the holding company, but also for the firms that did not.

Table 7. Effect of Transformation on Cost of Debt (for firms excluded from the Holding Company System)

The dependent variable of the regression equation is *cod*, which is the cost of debt capital. The explanatory variables include (1) *post* = dummy variable that takes a value of 1 for firms after transformation, and 0 otherwise, (2) *codh* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the median (or the first quartile) COD value of the affiliates, and 0 otherwise, (3) *codl* = dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise, (4) *size* = natural log of total assets, (5) *roa* = return on assets (= net income ÷ assets), (6) *lev* = leverage (= liabilities ÷ assets), (7) *cfo* = operating cash flow (= operating cash flow ÷ assets).

$$cod_t = \alpha_0 + \beta_1 post_t + \beta_2 codh_t + \beta_3 (post \times codh_t) + \beta_4 codl_t + \beta_5 (post \times codl_t) + \beta_6 size_t + \beta_7 roa_t + \beta_8 lev_t + \beta_9 cfo_t + \sum industry\ dummy_t + \sum year\ dummy_t + \varepsilon_t$$

| Independent variable: Cost of debt | | | | | |
|------------------------------------|--|-----------|--|--|----------|
| Variables | Panel A: Median ² criterion | | | Panel B: 1 st and 4 th quintile ³ criterion | |
| | Estimate | t-stat. | | Estimate | t-stat. |
| <i>Intercept</i> | -0.075 | -3.41*** | | -0.077 | -3.51*** |
| <i>post</i> | -0.020 | -4.25 *** | | -0.003 | -0.71 |
| <i>codh</i> | 0.009 | 4.34 *** | | 0.008 | 3.51*** |
| <i>post×codh</i> | 0.034 | 9.60 *** | | 0.030 | 7.40*** |
| <i>codl</i> | | | | -0.006 | -2.46** |
| <i>post×codl</i> | | | | -0.022 | -5.88*** |
| <i>size</i> | 0.001 | 1.08 | | 0.001 | 1.69* |
| <i>roa</i> | -0.103 | -5.97 *** | | -0.096 | -5.65*** |
| <i>lev</i> | 0.013 | 2.01 ** | | 0.013 | 2.15** |
| <i>cfo</i> | -0.003 | -0.39 | | -0.003 | -0.39 |
| <i>Industry dummy</i> | Included | | | Included | |
| <i>Year dummy</i> | Included | | | Included | |
| Adjusted R ² | 0.2802 | | | 0.3010 | |
| F-stat. | 15.39*** | | | 15.93*** | |
| N | 1,110 | | | 1,110 | |

1) *, **, and *** represent significance at the 10, 5, and 1 percent levels, respectively.

2) *codh* is a dummy variable that takes the value of one if the sample firm's COD before transformation is higher than the median COD value of affiliates, and zero otherwise.

3) *codh* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is higher than the first quartile COD value of the affiliates, and 0 otherwise; *codl* is a dummy variable that takes a value of 1 if the sample firm's COD before transformation is lower than the fourth quartile COD value of the affiliates, and 0 otherwise.

5. CONCLUSION

The Korean government has implemented a series of regulations for limiting internal financing within chaebol firms. The holding company system was introduced to ensure to limiting the direction of investment as well as the amount. This system does not allow horizontal equity investment, but allows only a single line of vertical equity investment. It does not replace the old regulations, but complements the old. For example, without the Regulation of New Debt Guarantee, the holding company system could not have effectively restricted the chaebol firms' internal financing as the restriction on internal equity financing could have easily been nullified by the use of internal debt financing.

We find evidence that firms that have paid a relatively higher (lower) cost of debt before the transformation experience a corresponding increase (decrease) in it. This empirical finding confirms that the introduction of the holding company system in Korea has effectively differentiated the affiliate firms' cost of debt as the capital market evaluates each firm's cost of capital more independently and objectively. This finding also suggests that a holding company system introduced in Korea reduces the interdependency among affiliated firms within a chaebol group. The findings of this study provide practical implications to regulators in other countries who contrive to figure out the solutions

for family owned conglomerate governance structure. First, the policy makers of Asian countries may introduce the holding company system to protect the minority shareholders from the common practice of propping. Second, foreign investors in Asian capital markets may expect less investment risk when they invest in the family business with holding company system than that without. The holding company system may restrict not only the adverse effect of internal financing, but also the unfair consequences of internal transactions. Thus, future studies may examine whether the holding company system limits the practice of tunneling.

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APPENDIX A

Changes in Mutual Equity Investments among Affiliated Firms: Case of LG Holdings

| Companies | Shares invested in affiliates ÷ Total equity of LG group | | | | Number of affiliates invested | | | |
|---------------------------|--|---------|------------|----------|-------------------------------|-------|------------|----------|
| | Before | After | Difference | Change | Before | After | Difference | Change |
| LG Chem | 0.04324 | 0.00849 | (0.03475) | decrease | 14 | 2 | (12) | decrease |
| LG telecom | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG Electronics | 0.18853 | 0.07721 | (0.11132) | decrease | 17 | 8 | (9) | decrease |
| LG CNS | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG Innotek | 0.00087 | 0.00029 | (0.00057) | decrease | 2 | 2 | 0 | . |
| LG MMA | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG IBM PC | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG Petrochemical | 0.00284 | 0.00000 | (0.00284) | decrease | 2 | 0 | (2) | decrease |
| LG International Corp. | 0.02467 | 0.01259 | (0.01208) | decrease | 10 | 5 | (5) | decrease |
| LG Industrial System | 0.00716 | 0.00114 | (0.00602) | decrease | 3 | 1 | (2) | decrease |
| LG Micron | 0.00052 | 0.00000 | (0.00052) | decrease | 1 | 0 | (1) | decrease |
| LG Dow | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG Academy/LGERI | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| LG Display | 0.00005 | 0.00000 | (0.00005) | decrease | 1 | 0 | (1) | decrease |
| KIDC | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| Siltron Inc. | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| Dacom Multimedia Internet | 0.00000 | 0.00000 | 0.00000 | . | 0 | 0 | 0 | . |
| Dacom | 0.01675 | 0.03882 | 0.02207 | increase | 5 | 8 | 3 | increase |

Source: OPNI (Online Provision of Enterprises Information) web DB provided by Korean Fair Trading Commission.