Compensation structure of family business groups

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Abstract

We examine executive compensation structures with a focus on family business groups in Korea. Our results show that Korean family business groups provide 60% more total compensation to CEOs who are family members than to professional CEOs. This excessive increment is not based on performance-contingent payments, but on fixed payments. Our propensity score matching and difference-in-differences analyses robustly support these results. Further, the excessive compensation of family CEOs is not explained by their contribution to internal capital markets or their managerial talents as members of founding families. The evidence indicates rent extraction through executive compensation in family business groups.

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1. Introduction

The compensation levels of top management have received much attention in the corporate finance literature.[1] A growing body of studies concentrates particularly on the executive compensation structure in family firms (McConaughy, 2000; Barontini and Bozzi, 2010; Croci et al., 2012, Gomez-Mejia et al., 2003; Michiels et al., 2013). This focus stems from a distinct type of agency problem that occurs in family firms between controlling family shareholders and minority shareholders, and from the prevalence of family firms around the world. However, most of the papers studying executive compensation in family firms examine samples from North America and Europe. In addition, there is little investigation of the executive compensation structure in business groups. In this paper, we investigate the CEO compensation structure with a focus on family-oriented business groups in Korea.

The firms in the family business groups in Korea, called chaebols, differ from the family firms in Western countries, as they are not only family firms, but also business group firms. Business groups have pyramidal or cross-holding ownership structures through which controlling shareholders can have considerably higher control rights than indicated by their cash flow rights. Although this complex ownership structure is an economically efficient tool for controllers, its negative side is that the ownership disparity between control and cash flow rights increases the incentives of controlling shareholders to expropriate the wealth of minority shareholders (Lemmon and Lins, 2003). Therefore, although some papers argue that business group affiliation has advantages, such as the sharing of resources (Shin and Park, 1999; Chang

[1] Goergen and Renneboog (2011) provide comprehensive literature reviews on executive compensation.

and Hong, 2000; Almeida et al., 2015), most of the previous papers present evidence of expropriation channels through which the controlling shareholders transfer firms' wealth to their family's pockets. For example, this expropriation may occur through decisions relating to mergers and acquisitions (Bae et al., 2002) and security offerings (Baek et al., 2006), under which, these firms agree to suboptimal deals that enrich their family wealth rather than the wealth of minority shareholders. Evidence is also presented that the controlling families increase family wealth by transferring the capital resources of group-affiliated firms with low cash flow rights to other affiliated firms with high cash flow rights (Bae et al., 2008).

Although several such expropriation channels have been identified, the executive compensation structure has not yet been studied because of a lack of executive compensation data for family business groups. However, if the group firms hire family CEOs and provide them with excessively high levels of total compensation, this channel is likely to represent the most direct channel for such expropriation. In 2013, the Financial Investment Services and Capital Markets Act in Korea was amended to require that compensation information for individual directors be disclosed in annual reports.[2] Thus, we can employ panel data on CEO compensation with a sample that covers the fiscal years from 2013 to 2016 to examine the issue of expropriation through family CEO compensation.

In the literature, there are two competing arguments regarding the compensation structure for family CEOs. First, the *alignment effects* argument (Shleifer and Vishny, 1997) states that because there is an alignment of interests between family CEOs and other shareholders, family CEOs are unlikely to receive excessive compensation packages that can harm shareholder

[2] For the details of the amendment, see Kim et al. (2017).

values. However, the opposing argument based on *entrenchment effects* (Bertrand and Schoar, 2006; Morck and Yeung, 2003) is that there can be a conflict of interest between the controlling families and other shareholders, such that the families are expected to enrich their own wealth by expropriating wealth from minority shareholders by setting the CEO compensation structures at an excessively high level. As the expropriation incentives induced by ownership disparity between cash flow and control rights that exist in business groups support the argument for a conflict of interest between controlling families and other shareholders, we expect that *entrenchment effects* will occur in family business groups.

More specifically, we expect that family shareholders in business groups use executive compensation packages as a means to expropriate wealth from minority shareholders in the following ways. First, family CEOs will receive more total compensation than non-family CEOs. Second, because families wish to expropriate such wealth regardless of firm performance, they set excessive salaries for family CEOs rather than setting excessive bonuses, which would be contingent on performance. Therefore, third, the payments of family CEOs will not be strongly linked to performance because their pay represents not only compensation for their contribution to firm performance, but also a channel of expropriating wealth from the firm. Fourth, under the *entrenchment effects* argument, two possible effects are expected in terms of compensation for professional, non-family CEOs. One is that professional CEOs may be offered excessive compensation as a premium for their loyalty to the controlling families and for allowing the families to expropriate firm resources; this situation has been found to occur in Italy (Barontini and Bozzi, 2010). Alternatively, professional CEOs may not be offered excessive compensation by family shareholders because such compensation would be regarded as a loss of the wealth that could be transferred to the family's private pockets. In Korea, the

latter expectation is more plausible because of the lack of developed labor markets for CEOs. It is hard to find an evidence of professional CEOs who moved as CEOs from one business group to another business group. It seems that there may be a lack of alternative options for professional CEOs given the rigid CEO markets among business groups, which limits the power of non-family CEOs to request higher compensation. Therefore, we conjecture that the controlling families in Korea use their bargaining power on top managerial contracts and the incentives of professional CEOs to ask for excessive payments in exchange for overlooking expropriation can be suppressed. Thus, in summary, we hypothesize that, in Korean family business groups, family CEOs will receive higher total compensation by excessive salary, that their pay will not be linked to performance, and that professional, non-family CEOs will not receive excessive compensation.

Given these hypotheses, our analysis focuses on a comparison of the compensation structure between family CEOs and professional CEOs in chaebol firms. We supplement it with a comparison of family CEOs in chaebol firms and CEOs in non-chaebol firms, and a comparison between the professional CEOs in chaebol and non-chaebol firms, as non-chaebol firms are considered to have lesser expropriation incentives compared with chaebol firms.

Our empirical results show that family CEOs in chaebol firms do receive excessive total CEO compensation. The total compensation set by chaebol firms for family CEOs is 60% higher than their compensation of professional CEOs, which is an enormous difference. This difference results from significantly higher salaries, rather than bonuses, for family CEOs. Our propensity matching score procedures confirm the findings. Further, using difference-in-differences (DiD) settings, we examine CEO turnover events when a firm changes from a family CEO to a professional CEO, and vice versa. We find that, in the year following a CEO

turnover, the total compensation set by chaebol firms is 113% higher when the turnover involves a shift from a professional CEO to a family member CEO, and 77% lower when the turnover involves a shift from a family member CEO to a professional CEO. The adjustments in total compensation after these CEO turnovers largely involve a change in salaries. Further, we find that the degree to which total compensations are performance contingent is weaker for family CEOs in chaebol firms than for either non-chaebol CEOs or professional CEOs in chaebol firms.

We perform several robustness tests to check the alternative arguments to the *entrenchment effects* argument. First, one counterargument is that excessive compensation of family CEOs may be the result of their contribution to controlling internal capital markets within the business group. In relation to this argument, we find that family CEOs in the business groups are more likely to be hired in firms that are central to internal capital markets, where this centrality is indicated by firms with a large number of ownership links to other affiliated firms or firms in the group that are larger in size. However, if we add the centrality measures to our base regression on total compensation, the size of the coefficient of the family CEO variable remains the same. We note that one of our centrality measures, which is the ownership links to affiliated firms, is significantly and positively related to total compensation and salaries of CEOs in the business groups. This implies that, although CEO salaries do involve compensation for contributions to internal capital markets, this factor does not explain the excessive compensation of family CEOs in Korean family business groups.

Another argument is that the total compensation of family CEOs in chaebol firms may be less performance contingent than that of other CEOs because the family CEOs have large shareholdings. In other words, if the private earnings of the family CEOs from the firm are

already highly contingent on firm performance because of their large shareholdings in the firm, then the family CEOs would prefer a fixed payment in their total compensation package. To address this issue, we examine whether the bonuses of family CEOs are associated with their ownership levels. The results indicate an insignificant relationship between the ownership of family CEOs and any of their compensation measures.

The final counterargument is that the excessive total compensation of family CEOs results from their unique knowledge as founders, or as the successors of founders, of the business groups. However, we do not find significant differences in industry-adjusted firm performance between family CEO firms and professional CEO firms. Overall, our robustness tests support the *entrenchment effects* theory as an explanation of the excessive compensation of family CEOs in family business groups.

This paper contributes to the executive compensation literature on business groups and family CEOs. Although business groups are globally prevalent and play a core part in economic development in a number of countries, there are few investigations of the determinants of their executive compensation structures. Cai and Zheng (2016) show that executive compensation in group-affiliated firms is influenced by the relative performance of other group-affiliated firms. Our evidence shows that executive compensation structure in business groups is influenced by family membership and centrality in internal capital markets. Moreover, our paper contributes to the literature on executive compensation in family firms by providing evidence that contrasts with the findings of the existing literature. Croci et al. (2012) and McConaughy (2000) find that *alignment effects* result in lower total compensation for family CEOs than for professional CEOs in continental Europe and the US, respectively. However, our evidence on family business groups in Korea supports the existence of *entrenchment effects*.

This difference may be the result of strong incentives for expropriation in family business groups, as well as the weak corporate governance system in Korea. To our knowledge, this is the first paper to show that executive compensation is used as a tool for expropriation in family business groups.

The study of Amoako-Adu et al. (2011) is closely related to ours. They study CEO compensation structures in family firms with large ownership disparities, which may increase the expropriation incentives of controlling shareholders. Amoako-Adu et al. investigate the compensation structure of closely held Canadian firms with dual-class shares. They find that family executives in dual-class firms receive higher total compensation than do those in single-class firms, which is similar to our findings regarding family CEOs in business groups. However, in their study, the higher compensation level in the dual-class firms is based on higher bonuses and stock options, which supports the optimal contract theory (Gomez-Mejia and Wiseman, 1997). Our case—in which the higher compensation of family CEOs is based on salaries—is more consistent with managerial power theory (Arye et al., 2003). The difference may arise from the lack of a monitoring system for excessive compensation of family CEOs in Korea.

This paper proceeds as follows. The next section describes our data. Section 3 presents our empirical models and results. Section 4 concludes.

2. Data

In 2013, a new regulation for mandatory disclosure of compensation by listed firms was introduced in Korea. Before the reform, listed firms were only required to disclose the sum of

payments for all directors on boards. The 2013 reform requires listed firms to disclose the compensation structure of individual directors who receive a total compensation of more than 500 million Korean won in the fiscal year. Based on this disclosure requirement, we can collect Korean CEO compensation data from 2013 to 2016. The data on individual CEO compensation are retrieved from the TS2000 database, which is widely used in the corporate finance literature for studying Korean firms (Almeida et al., 2015; Kim et al., 2016).

Our sample includes all CEOs of industrial firms in the Korea Composite Stock Price Index market of the Korea Exchange. In line with preceding studies, we exclude financial firms and holding firms, as their firm-level covariates are not comparable with industrial firms. As indicated above, if CEOs receive less than 500 million Korean won as total compensation, their compensation structures are not publicly disclosed and, therefore, these firms are also excluded from our sample. If a firm has more than two CEOs, we select the CEO who receives the highest total compensation. We categorize our sample into chaebol and non-chaebol firms based on the classification of the Korea Fair Trade Commission. In addition, we divide our chaebol firms into family CEO firms and professional CEO firms based on the information disclosed by the Korea Fair Trade Commission regarding whether a director in a chaebol firm is a family member. Further, in our main multivariate regression analyses, we exclude the firm-year observations of firms experiencing a CEO turnover during the year because such firms may be experiencing an unobservable firm-specific shock; this follows the data processing procedures in the compensation literature (Craighead et al., 2004). However, using the turnover observations, we can perform a DiD analysis as a robustness test.

In Table 1, we report the number of industrial firms in Korea that disclose CEO compensation structures. Among the 2,438 firm-year observations, we find 906 observations disclosing their

CEO compensation structure, representing about 37% of the total. As chaebol firms are relatively larger in size than non-chaebol firms, their CEOs are more likely to be paid above 500 million Korean won. Therefore, Table 1 shows that the ratio of disclosures in chaebol firms is higher than the ratio in non-chaebol firms. In total, 65% of chaebol observations disclose the CEO compensation structure, compared with only 27% of non-chaebol observations. Moreover, among the 420 chaebol observations disclosing CEO compensation information, 189 involve family CEOs, and 231 involve professional non-family CEOs.

[Insert Table 1 here]

The main variables we use to measure the CEO compensation structure are the total compensation, salary, and bonus. Only a few CEOs receive stock options. We calculate fair values of the options based on the method of Black and Scholes (1973) and include the calculated value in the bonus variable. No CEOs in our sample receive other forms of compensation, such as long-term incentive plans, as these are not commonly used in Korea.

Industry-adjusted performance measures of the return on assets (ROA), annual stock returns, and sales growth are used to test the CEOs' managerial talents. Moreover, firm-level and CEO-level variables such as sales, the market to book ratio, stock volatility, beta, research and development (R&D) intensity, equity ratios of the previous year, and CEO tenure are employed as controls. The definitions of the controls are as follows: the market to book ratio is the ratio of the market value of the shareholders' equity plus the book value of liability to the book value of total assets; stock volatility is the annualized value of the standard deviation of the market model regression of weekly stock prices; beta is a measure for systematic risk, which is derived from the capital asset pricing model estimation; R&D intensity is measured by R&D

expenditure divided by sales; and the equity ratio is the ratio of the book value of equity to the book value of total assets. Table 2 reports the means and medians as descriptive statistics of the variables. To lessen the effect of outliers, we trim each variable at its 1st and 99th percentiles by year.

[Insert Table 2 here]

3. Empirical models and results

3.1 Univariate tests

We present the results of our univariate tests between chaebols and non-chaebols, and between family CEOs and professional CEOs in chaebol firms, in the last two columns on the right-hand side of Table 2. Although our main interest is in the comparison between family CEOs and professional CEOs in chaebols, it is noteworthy that chaebol firms and non-chaebol firms show significant differences in almost all of our firm-level and CEO-level variables, except for industry-adjusted sales growth and R&D intensity. Importantly, chaebol firms and non-chaebol firms are significantly different in firm size, which is measured by sales. Chaebol firms are roughly 10–12 times larger than non-chaebol firms in terms of sales. Therefore, when comparing CEO compensation between chaebol and non-chaebol firms, it is necessary to use a multivariate setting with control variables, including firm size. Moreover, our univariate analysis results show that the performance of chaebol firms is significantly lower than that of non-chaebol firms, as measured in terms of ROA, industry-adjusted ROA, annual stock returns, and industry-adjusted annual stock returns. Beta is measured to control for the systematic risk of a firm and it is significantly higher for chaebol firms. Stock volatility is employed to measure

firm-specific risk. We find significantly higher stock volatility for non-chaebol firms than for chaebol firms. The equity ratio of the previous year is used as one of the control variables for firm performance models. The previous year's equity ratio is significantly lower for chaebol firms than for non-chaebol firms.

The last column in Table 2 shows our univariate comparisons of the variables between the firms with family CEOs and the firms with professional CEOs among the chaebol firms. We find that chaebol firms pay twice as much total compensation to family CEOs as they do to professional CEOs, which is significant at the 1% level, whereas the two subgroups of the chaebol firms (those with family CEOs versus those with professional CEOs) are not different in firm size. Also, it appears that the higher total compensation received by the family CEOs is largely driven by fixed salary payments. Despite this, the chaebol firms with family CEOs do not perform better in any of the firm performance measures. For ROA and industry-adjusted ROA, the chaebol firms with family CEOs have significantly lower mean values than the firms with professional CEOs at the 10% and 5% significance levels, respectively. The results seem to imply that family CEOs are paid at opportunistically high levels in chaebol firms. It should also be noted that CEO tenure is significantly longer for family CEOs than for professional CEOs in chaebol firms.

3.2 Levels of compensation, chaebols, and family CEOs

In this section, we use a multivariate setting to examine whether and by how much family CEOs in chaebol firms are paid excessively. We employ three dependent variables: the natural logarithms of total compensation, salary, and bonus. Note that in order to include some cases with zero bonus, we perform log transformation after adding one to bonus values. Our main

independent variable of interest is a dummy variable for chaebol firms or family CEOs. The coefficients of the main dummy variables show how chaebol firms set their CEO compensation structures compared with non-chaebol firms, and how compensation packages for family CEOs differ from those for professional CEOs in chaebol firms. Following previous research (Conyon and He, 2011; Croci et al., 2012), the regression model also includes control variables for ln(sales), market to book ratio, CEO tenure, R&D intensity, beta, and stock volatility. Industry and year dummies are included in the model and, when using only the chaebol sample, chaebol group dummies are also employed in the regression model. Therefore, our base regression model, shown in Equation (1), is as follows:

$$Compensation_{\mathrm{it}} = \beta_1 Chaebol_{\mathrm{i}}(or\ \ Family\ \ CEO_{\mathrm{i}}) + \boldsymbol{\gamma X_{it}} + Industry\ \ Dummies + Year\ \ Dummies + (Group\ \ Dummies) + \varepsilon_{\mathrm{it}} \quad (1)$$

The empirical results of our multivariate regressions are reported in Table 3. In models (1)–(3), the results indicate that total compensation, salary, and bonus are not significantly different between chaebols and non-chaebols. That is, the large mean difference in the compensation levels between chaebol and non-chaebol firms found in Table 2 is explained by our control variables. We argue that chaebol firms do not receive excessive compensation packages on average.

In the next models, (4)–(9), we divide the chaebol sample into family CEOs and professional CEOs, and compare the compensation mix between the two chaebol subsamples and the non-chaebol sample. The results in models (4) and (5) show that chaebol firms with professional CEOs provide significantly less total compensation and salaries to CEOs than do non-chaebol firms at the 1% level. Models (7) and (8) indicate that family CEOs in chaebol firms receive

significantly higher total compensation and salaries than do non-chaebol CEOs at the 1% level. As shown in the results of models of (6) and (9), the bonus levels are not statistically different between family CEOs in chaebol firms and CEOs in non-chaebol firms, or between professional CEOs in chaebols and CEOs in non-chaebol firms, respectively.

More importantly, in models (10)–(12), we compare compensation structures between family CEOs and professional CEOs in chaebol firms. We find that the estimated coefficient for family CEOs in model (10) is significantly positive, measuring 0.7455 at the 1% significance level, indicating that family CEOs receive, on average, 75% more total compensation than do professional CEOs in chaebol firms, which is economically significant. Moreover, family CEOs receive 81% more salary than do professional CEOs, as per model (11), whereas the bonus levels are not statistically different in model (12). This implies that the higher total compensation of family CEOs is not based on performance-based payments, but rather on fixed payments. This supports the argument for the existence of *entrenchment effects* rather than *alignment effects* in family business groups. We argue that the controlling families of chaebol firms set an opportunistically high level of fixed payments in their family CEOs' compensation packages to expropriate the firms' wealth for their family wealth.

[Insert Table 3 here]

If CEO compensation is a more complicated rather than a linear function of our control variables, the multivariate regression above may not adequately control for the effects of these variables on compensation packages. To address this issue, we perform propensity score matching procedures based on the control variables used in the previous regressions. In Panel A of Table 4, we match chaebol firms with non-chaebol firms in the same industry-year

category. We add an interaction term between ln(sales) and tenure in the model specification to satisfy the balancing property of propensity score matching. Among 670 firm-year observations, the procedure finds about 50 one-to-one peers for which the differences in propensity scores do not exceed 1%. The low number of matched peers may be the result of a large gap in sales between chaebol and non-chaebol firms. If we neglect the balancing property by excluding ln(sales) and the interaction term from the list of the variables for matching, the number of matched peers increases to 144. The results of Panel A in Table 4 indicate that total compensation, salary, and bonus are not different between chaebol firms and non-chaebol firms, which is consistent with our multivariate results in Table 3.

In Panel B, we find that professional CEOs in chaebol firms receive less total compensation and salary than CEOs in non-chaebol firms, which is consistent with our multivariate tests. However, the differences are insignificant. We conjecture that multivariate regressions do not capture the non-linearity of the relationship between our control variables and the CEO compensation mix. On the other hand, in Panel C, when matching between chaebol firms with family CEOs and non-chaebol firms, we find that family CEOs in chaebol firms receive 55% more total compensation than do CEOs in non-chaebol firms. This difference is significant at the 5% level. The higher total compensation of the family CEOs is driven by fixed salary payments.

Importantly, Panel D shows evidence of the significant influence of family CEOs on the compensation package in chaebol firms. Family CEOs receive 60% more total compensation than do professional CEOs, and the difference is significant at the 1% level. This gap is driven by salary, as bonus levels are not statistically significantly different between family CEOs and professional CEOs. Therefore, our empirical results from both the multivariate regressions and

the propensity score matching procedures consistently show that family CEOs in chaebol firms receive excessive total compensation through excessively high fixed payments.

[Insert Table 4 here]

We employ another empirical strategy, the DiD approach, to measure the influence of family CEOs in chaebol firms on compensation packages. In this strategy, we measure compensation changes before and after CEO turnover when a firm changes from a professional CEO to a family CEO, and compare this with the change of compensation before and after CEO turnover when a firm changes from a professional CEO to another professional CEO. Then, this procedure is robust to unobservable heterogeneity and the turnover shocks on CEO compensation can be controlled. In a similar way, we also employ the setting of CEO turnovers in the case of a shift from a family CEO to a professional CEO. However, the counterfactual case, turnovers involving a shift from a family CEO to another family CEO, are not found in the dataset. Therefore, although it is not a perfect DiD setting, we employ the change in compensation for family CEOs during normal periods as the counterfactual. In this design, when interpreting the result, we need to take into account the fact that a turnover shock may bias the estimated coefficients downward. Our DiD regression model is set as follows:

$$\Delta Compensation_{\mathrm{k}} = \beta_1 D_{\mathrm{k}} + + \boldsymbol{\gamma} \Delta \boldsymbol{X}_{\mathbf{k}} + \varepsilon_{\mathrm{it}} \qquad (2)$$

where D indicates the dummy for a turnover involving a shift from a professional CEO to a family CEO, or the dummy for a turnover involving a shift from a family CEO to a professional CEO. We add the previously employed control variables in difference forms to take into account the influence of structural changes in firms experiencing turnover on the change in CEO compensation.

The results of our DiD analyses are reported in Table 5. The result of model (1) shows that when chaebol firms change from a professional CEO to a family member CEO, they increase total CEO compensation by 112%, compared with the compensation change that occurs when changing from one professional CEO to another professional CEO. The results in models (2) and (3) indicate that the significantly increased total compensation accompanying the turnover from a professional CEO to a family CEO does not occur through performance-based payments, but rather through an increase in the fixed salary payments. The salary level is increased by 87% when chaebol firms change their CEO from a professional to a family member, compared with the change from one professional to another.

In models (4)–(6), we also find significant changes in the CEO compensation mix before and after a CEO turnover involving a shift from a family member to a professional. The estimated coefficient of the dummy variable in model (4) is negative at −0.7651 and significant at the 1% level. It indicates that compared with the compensation changes that occur for a family CEO in normal periods, chaebol firms reduce CEO compensation by 77% more for such a CEO turnover (from a family CEO to a professional CEO). The results in models (5) and (6) show that it is a decrease in salary that drives the decrease in total compensation in this situation. Note that, because the counterfactual is a compensation change in normal periods, which is not a perfect counterfactual for a DiD setting, part of this 77% reduction may be the result of a firm-specific shock that has motivated the CEO turnovers. However, the size of the compensation reduction is similar to that in the multivariate regression results. In sum, the results in Table 5 support the existence of excessive compensation of family CEOs in chaebol firms, which is consistently found in the previous results in Tables 3 and 4. The excessive compensation is not explained by the characteristics of firms with family CEOs, but appears to

be the result of the expropriation incentives of the family CEOs, in line with the *entrenchment effects* argument.

[Insert Table 5 here]

3.3 Performance-contingent compensation, chaebols, and family CEOs

In the literature, the degree to which CEO compensation is performance contingent is widely investigated as a measure of how effectively the compensation structure is designed (Craighead et al., 2004; Firth et al., 2006). In this section, we examine whether the compensation of Korean CEOs is performance contingent. The results reported in the previous sections suggest that family CEOs in chaebol firms receive higher fixed salary payments than do CEOs in non-chaebol firms or professional CEOs in chaebol firms. We claim that this is because chaebol families expropriate firms' wealth through the CEO compensation channel. Therefore, we expect that the CEO compensation structure of chaebol firms with family CEOs will be less performance contingent than that of non-chaebol firms or chaebol firms with professional CEOs. To explore this, we employ a fixed effect panel regression model, as show in Equation (3):

$$ln(total\ \ compensation)_{\mathrm{it}} = \alpha_i + \beta_1 Performance_{\mathrm{it}} + \boldsymbol{\gamma X_{it}} + Year\ \ Dummies + \varepsilon_{\mathrm{it}}. \quad (3)$$

We employ four commonly used measures of firm performance: ROA, ln(sales), ln(net income), and annual stock returns (Angelis and Grinstein, 2015). Control variables include R&D intensity, beta, and stock volatility. In addition, we regress the panel models with year and firm fixed effects. More specifically, we perform the regression analyses with the three categories of firms used in previous settings: non-chaebol firms, chaebol firms with professional CEOs,

and chaebol firms with family CEOs. The results are reported in Table 6. In models (1)–(4), we examine whether and how performance measures are correlated with the total compensation of CEOs in non-chaebol firms. We find that the growth of total CEO compensation in non-chaebol firms is highly correlated with sales growth. In model (2), the estimated coefficient of ln(sales) on total compensation is significantly positive, measuring 0.9686 at the 1% significance level. The other performance measures do not display significant correlations with the total compensation of non-chaebol CEOs.

The results for professional CEOs in chaebol firms are reported in models (5)–(8). We find that ROA and ln(sales) have positive and significant coefficients in models (5) and (6), respectively. The significant correlation between ROA and total compensation is found only in this category. We note that the size of the coefficient of ln(sales) in model (6) is about one half of the coefficient for non-chaebol firms, and the difference is significant at the 1% level.

The results for family CEOs in chaebol firms are shown in models (9)–(12). As found in model (10), ln(sales) is the only performance measure significantly correlated with the total compensation of family CEOs in chaebol firms. The size of the coefficient is similar to that for professional CEOs in chaebol firms, and about half of that for the non-chaebol case, with the difference being significant at the 10% level. Across all three categories of firms, net income and market performance are not correlated with the total compensation of CEOs. In sum, compensation structures for family CEOs in chaebol firms are significantly less performance contingent than those of CEOs in non-chaebol firms and professional CEOs in chaebol firms, as the growth of their total compensation is only correlated with the growth of ln(sales), and the correlation is relatively low.

[Insert Table 6 here]

3.4 Robustness tests

3.4.1. Internal capital markets

In this section, we examine some alternative arguments to the *entrenchment effects* theory that could explain the empirical results presented in the sections above. One alternative argument is that the excessive compensation of family CEOs is a means of rewarding them for operating the business group's internal capital markets. The literature argues that one advantage of family business group structures is the efficient operation of internal capital markets (Yiu et al., 2007; Carney et al., 2011; Almeida et al., 2015). For instance, Almeida et al. (2015) find evidence that chaebol groups efficiently transferred cash into group-affiliated firms with high investment opportunities. If family CEOs work in firms that are central to the internal capital markets, they could legitimately request rewards for their contribution to the management of internal capital markets, which may explain their excessive compensation levels. To examine this argument, we first test whether family CEOs are employed in firms that are central to internal capital market operations of the business groups. To measure this, we develop two dummy variables. The first takes a value of one if a firm has more ownership links or shareholding relationships with affiliated firms than the median within its chaebol group, and zero otherwise. The second takes a value of one if a firm is larger in size than the median within its business group, given that the larger firms tend to be responsible for internal capital market operations. Then, we perform logit regressions with the two dummies as dependent variables and the family CEO dummy as an independent variable. The results reported in models (1) and (2) of Table 7 show that family CEOs are significantly more likely to work in firms that are central to internal

capital markets. In particular, when we recalculate the marginal effect from the coefficient in the logit regression, model (1) shows that the probability of family CEOs working in firms with high ownership links is 10.08% higher than that of professional CEOs doing so. Similarly, the result of model (2) indicates that if a CEO is a family member, he/she is 20.48% more likely to work in a large firm in the group.

Second, based on the above finding, we examine whether the excessive compensation of family CEOs is the result of their contribution to internal capital market operations. Our strategy is to input the centrality dummy variables into the main regression models, which are the models (10)-(12) in Table 3, and check whether the coefficients for family CEOs on compensation variables are statistically significant. If the excessive compensation of family CEOs is the result of their contribution to internal capital markets, the family CEO coefficient is expected to be insignificant in the models with the centrality dummy variables. The results are reported in models (3)–(8) in Table 7. Our results show that, in all the models, the coefficients for family CEOs are significant, and that the sizes of the coefficients remain almost the same as the corresponding previous coefficients presented in Table 3. For example, in model (3) in Table 7, which includes the high ownership links dummy, the estimated coefficient for family CEOs is 0.7556; the corresponding coefficient in the previous model that excludes this dummy (model (10) in Table 3) is 0.7455. This indicates that the added dummy variable for high ownership links does not explain the impact of family CEOs on total compensation. Note that the estimated coefficients for the dummy for high ownership links on total compensation and salary are positive and significant at the 1% level, as reported in models (3) and (5). This indicates that regardless of whether he or she is a family member or not, managers in chaebol firms are compensated for their contribution to the operations of internal capital markets; however, this

role does not explain why family CEOs in chaebol firms receive excessive total CEO compensation through increased salaries.

[Insert Table 7 here]

3.4.2. Family shareholding

Another counterargument to the *entrenchment effects* theory is that family CEO compensation in chaebol firms is not strongly linked to performance (as shown in Table 6) because of these CEOs' large shareholdings. If family CEOs have large shareholdings, this means that their personal earnings are already aligned with their managerial performance through the mechanism of capital gains. This can justifiably reduce the incentives of family CEOs to receive performance-contingent payments. To examine this argument, we estimate the main regression models in Table 3, using the sample of chaebol firms with family CEOs, with the addition of a variable for family CEO ownership. If the counterargument is true, the estimated coefficient for CEO ownership is expected to be significantly negative on bonus levels, as family CEOs with high ownership levels would have lower levels of performance-related compensation. The results are reported in models (1)–(3) in Table 8. Contrary to the argument, we find that the estimated coefficients of CEO ownership on any compensation measures are not statistically significant. This indicates that shareholdings are not the reason that family CEOs receive less performance-contingent total compensation.

3.4.3. Talents of family CEOs

The final counterargument for the excessive compensation of family CEOs is that they have superior talents and are better able to manage the firms than are professional CEOs. If family CEOs have outstanding managerial competence as founders, or as successors of the founders

(see Adams et al., 2009), the seemingly excessive compensation structure of the family CEOs may be one of means of compensating them for their larger contribution to firm performance. Thus, we examine whether family CEOs have better industry-adjusted firm performance than professional CEOs in chaebol firms. The regression model used to examine this argument is as shown in Equation (4):

$$Industry\text{-}adjusted\ \ Firm\ \ Performance_{it} = \beta_1 Family\ \ CEO_i + \boldsymbol{\gamma X_{it}} + Industry\ \ Dummies + Year\ \ Dummies + \epsilon_{it}. \quad (4)$$

We measure firm performance using the industry-adjusted ROA, industry-adjusted annual stock returns, and industry-adjusted sales growth. Following the literature, the control variables for firm performance are the natural logarithm of sales, market to book ratio, CEO tenure, and the lagged value of the equity ratio (Joh, 2003; Kim, 2005). The results are reported in models (4)–(6) in Table 8. Contrary to the argument of greater talent, we find that family CEOs show significantly lower or insignificantly different industry-adjusted firm performance compared with professional CEOs. In model (4), the estimated coefficient on industry-adjusted ROA indicates that chaebol firms with family CEOs have 1.34% lower industry-adjusted ROAs than do firms with professional CEOs. In models (5) and (6), we do not find a significant difference between family CEOs and professional CEOs for industry-adjusted stock returns and sales growth.

In addition, we test whether the lower industry-adjusted firm performances of family CEOs are the result of family CEOs working in firms that are central to internal capital markets. The performance of such firms may be affected downward if they provide internal capital flows to the group firms. To address this issue, we add the previously developed dummy variables into

the regression models to capture the influence of managing internal capital markets on firm performance. As indicated by models (7)–(9), we do not find significant changes in the coefficients for the family CEO variable as a result. Moreover, the centrality dummy variables do not have significant impacts on industry-adjusted firm performance measures. In sum, we cannot find evidence that family CEOs in chaebol firms possess superior management talents.

[Insert Table 8 here]

4. Conclusion

This paper investigates the CEO compensation structure of family business groups by using a sample of such firms from Korea, whereas the previous papers have focused on family firms in North America or Europe. We find that family CEOs in business groups receive excessive total compensation compared with CEOs in non-chaebol firms and professional CEOs in chaebol firms. The excessive compensation is driven by fixed salary payments, rather than by performance-contingent payments. Our propensity score matching and DiD analyses robustly support these results. We find that CEO compensation is significantly less contingent on performance in the case of family CEOs in chaebol firms than is the case for other CEOs. Further, we test alternative hypotheses that might explain our main findings. We find that operation of internal capital markets, CEO talents, and CEO stock ownership do not explain the excessive compensation of family CEOs in chaebol firms. Overall, our empirical results suggest the existence of *entrenchment effects* among family CEOs in family business groups, that is, that the controlling families in Korean business groups engage in rent extraction through executive compensation.

This paper contributes to the executive compensation literature on business groups and family CEOs. The compensation structure of business groups has not been extensively investigated in the literature, even though business groups are globally prevalent and play a core role in economic development in many countries. In the literature on family CEOs' compensation structures, previous studies find that family CEOs receive lower compensation packages in continental Europe and the US than do professional CEOs, which is explained by *alignment effects*. However, our evidence of family business groups with Korean sample supports the argument for *entrenchment effects*. The difference between Korean and other firms in the US and Europe may be the result of the high expropriation incentives of the business groups, as well as the weak corporate governance system in Korea. To our knowledge, this paper is the first in the literature to show evidence that executive compensation is used as a tool for expropriation in business groups.

Table 1. CEO data-available observations

This table reports how many of Korean firms that listed in the Korea Composite Stock Price Index market of the Korea Exchange have CEO compensation data. The observation years are from 2013 to 2016. We categorize our sample into chaebol and non-chaebol firms based on the classification of the Korea Fair Trade Commission (KFTC). In addition, as the KFTC discloses information on whether a director in a chaebol firm is a family member or not, we divide our chaebol firms into family CEO firms and professional CEO firms.

	Total	**2013**	**2014**	**2015**	**2016**
Total firms	2,438	593	609	618	618
- CEO data-available	906	220	223	228	235
Chaebol firms	644	160	158	164	162
- CEO data-available	420	106	106	103	105
(family CEOs)	231	49	63	59	60
(professional CEOs)	189	57	43	44	45
Non-chaebol firms	1,794	433	451	454	456
- CEO data-available	486	114	117	125	130

Table 2. Descriptive statistics of variables and univariate tests

This table presents the means and medians of the variables employed in our empirical analyses. The summary statistics are reported based on the following three groups; non-chaebol group, chaebols' family CEO group, and chaebols' professional CEO group. In the last two columns, we report the univariate test statistics between non-chaebol and chaebol groups, and between family CEO and professional CEO groups in chaebol firms. Each descriptive value is trimmed at its 1st and 99th percentiles by year to screen outliers. T-statistics are from two-group mean-comparison tests. Z-statistics are based on Wilcoxon rank-sum tests. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable Name	Mean [Median]			T-statistic [Z-statistic]	
	Non-Chaebol	Chaebol		Chaebol vs Non-Chaebol	Family vs Professional in Chaebol
		Family CEO	Professional CEO		
Total compensation (million KRW)	916 [750]	2,113 [1,581]	1,055 [897]	7.84*** [7.72***]	8.13*** [8.28***]
Salary (million KRW)	692 [600]	1,558 [1,232]	696 [661]	7.11*** [6.99***]	10.52*** [10.03***]
Bonus (million KRW)	224 [112]	555 [162]	358 [224]	5.15*** [4.40***]	2.41** [0.80]
ROA	0.0392 [0.0419]	0.0178 [0.0234]	0.0278 [0.0262]	-3.55*** [-5.16***]	-1.69* [-1.07]
Industry-adjusted ROA	0.0116 [0.0146]	-0.0048 [0.0007]	0.0075 [0.0000]	-1.63 [-3.66***]	-2.21** [-1.53]
Annual stock return	14.5360 [8.3900]	-0.0366 [-5.4000]	1.4654 [-3.2800]	-5.02*** [-5.10***]	-0.40 [-0.32]
Industry-adjusted annual stock return	9.6115 [1.025]	-1.4313 [-6.555]	-0.7783 [-3.515]	-4.01*** [-3.48***]	-0.19 [-0.25]
Industry-adjusted sales growth	2.7684 [0.8900]	-0.1791 [0.8025]	2.2888 [0.0000]	1.21 [1.26]	1.37 [1.56]
Net income (million KRW)	35,197 [15,354]	243,053 [59,106]	507,622 [52,619]	4.29*** [7.44***]	-1.46 [-1.14]
Sales (million KRW)	620,075 [340,260]	6,161,112 [3,329,598]	8,289,894 [2,606,443]	8.27*** [19.44***]	-1.21 [1.30]
Market to Book	1.5073 [1.0597]	1.2256 [0.9628]	1.2493 [1.0421]	-3.16*** [-1.27]	-0.24 [-2.10**]
CEO tenure	12.1195 [14]	12.5342 [14]	7.5528 [6]	-6.09*** [-6.19***]	9.18*** [8.41***]
R&D intensity	0.0125 [0.0005]	0.0079 [0.0018]	0.0142 [0.0013]	-0.52 [2.10]	-2.66*** [0.11]
Beta	0.8055 [0.7580]	1.0656 [1.0273]	0.9009 [0.9004]	3.69*** [4.11***]	2.75*** [2.44**]
Stock Volatility	0.0245 [0.0244]	0.0211 [0.0206]	0.0212 [0.0205]	-5.46*** [-5.55***]	-0.17 [-0.29]
Equity Ratio$_{(t-1)}$	0.6093 [0.6045]	0.4962 [0.4637]	0.5289 [0.5166]	-7.13*** [-6.81***]	-1.69* [-1.70*]

Table 3. Chaebol, family CEO, and compensation

This table presents the estimates from OLS regressions of CEO compensation on chaebol indicator or family CEO indicator with controls. Market to Book is the ratio of the market value of shareholders' equity plus the book value of liability to the book value of total assets. CEO Tenure is the length of years that a CEO has been in a firm as a CEO. R&D intensity is the ratio of R&D expenditure to sales. Beta is a measure for systematic risk derived from the capital asset pricing model (CAPM) estimation. Stock Volatility is the annualized value of the standard deviation of the market model regression of weekly stock prices. Before regression estimation, each variable is trimmed at its 1st and 99th percentiles by year to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Pooled			Non-chaebol & chaebol firms with professional CEOs			Non-chaebol & chaebol firms with family CEOs			Chaebol firms		
	ln(total compensation)	ln(salary)	ln(bonus)	ln(total compensation)	ln(salary)	ln(bonus)	ln(total compensation)	ln(salary)	ln(bonus)	ln(total compensation)	ln(salary)	ln(bonus)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Chaebol	0.0568	0.0318	0.8122	-0.2665***	-0.3007***	0.6742	0.3654***	0.3722***	-0.5693			
	(0.77)	(0.42)	(1.29)	(-3.27)	(-3.52)	(0.95)	(3.84)	(3.80)	(-0.70)			
Family CEO										0.7455***	0.8139***	-0.9125
										(11.37)	(13.61)	(-1.36)
ln(sales)	0.2104***	0.1874***	0.1690	0.2051***	0.1690***	0.4641**	0.2196***	0.2012***	0.3124*	0.2237***	0.2077***	-0.0524
	(9.35)	(8.02)	(0.88)	(8.72)	(6.88)	(2.26)	(7.62)	(6.79)	(1.26)	(8.29)	(8.42)	(-0.19)
Market to Book	0.0583**	0.0459	0.4552*	0.0539*	0.0455	0.2773	0.0362	0.0141	0.4261	0.0268	-0.0005	0.5755
	(2.12)	(1.61)	(1.91)	(1.88)	(1.52)	(1.09)	(1.23)	(0.47)	(1.64)	(0.78)	(-0.02)	(1.61)
CEO Tenure	0.0267***	0.0295***	0.0035	0.0040	0.0041	0.0120	0.0188***	0.0203***	0.0072	0.0249***	0.0184***	0.1538**
	(5.71)	(6.07)	(0.09)	(0.82)	(0.81)	(0.28)	(3.37)	(3.54)	(0.15)	(4.11)	(3.33)	(2.45)
R&D intensity	3.0462***	1.8633*	16.6778*	3.6209***	2.4361**	18.6536**	2.2826*	1.6036	12.9442	4.1537***	1.8511	4.4318
	(3.07)	(1.81)	(1.96)	(3.77)	(2.42)	(2.22)	(1.84)	(1.25)	(1.20)	(2.65)	(1.28)	(0.27)
Beta	-0.0464	-0.0011	-0.5055	-0.0666	-0.0149	-0.4470	-0.0653	-0.0301	-0.2028	0.0391	0.0917*	-1.309**
	(-0.99)	(-0.02)	(-1.26)	(-1.38)	(-0.30)	(-1.07)	(-1.20)	(-0.54)	(-0.44)	(0.74)	(1.90)	(-2.39)
Stock Volatility	-3.6262	-3.8278	19.8884	-1.3473	-1.4883	15.9693	-3.6227	-3.3399	-4.7985	-15.8995***	-9.2976*	-40.4056
	(-0.99)	(-1.01)	(0.64)	(-0.39)	(-0.42)	(0.53)	(-0.98)	(-0.89)	(-0.15)	(-2.64)	(-1.69)	(-0.64)
Group dummies	.	.	.	.	.	.	.	.	.	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.2585	0.2092	0.0638	0.1788	0.1080	0.0402	0.3239	0.2954	0.0515	0.6945	0.7491	0.5040
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000
N	670	673	679	544	546	549	496	499	502	320	321	325

Table 4. Chaebol, family CEO and compensation (propensity score matching)

This table presents the differences in levels of total compensation, salary and bonus between treatment groups and control groups by employing propensity score matching procedures. The reported means, differences, and t-statistics are based on average treatment effects on treatments. The propensity score is estimated within an industry-year category for chaebol and non-chaebol matching and within an industry-group-year category for family CEO and professional CEO matching. The propensity score estimation includes available firm-level and CEO-level factors such as ln(sales), market to book, stock volatility, beta, R&D intensity, and CEO tenure. For the balancing property of the propensity score matching, we have added an interaction between ln(sales) and CEO tenure on measuring propensity scores. In our setting, the differences of propensity scores between matched peers do not exceed 0.1% in absolute value. Before matching and estimation, each variable is trimmed at its 1st and 99th percentiles by year to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Chaebol vs non-chaebols. The propensity score is estimated within an industry-year category.

	No. of observations	Mean	Difference	t-statistics of diff.
ln(total compensation) (chaebol CEOs)	48	13.7063	0.1438	0.90
ln(total compensation) (non-chaebol CEOs)		13.5625		
ln(salary) (chaebol CEOs)	49	13.4073	0.1639	1.05
ln(salary) (non-chaebol CEOs)		13.2433		
ln(bonus) (chaebol CEOs)	46	9.5556	-1.1167	-1.05
ln(bonus) (non-chaebol CEOs)		10.6723		

Panel B: Chaebols with professional CEOs vs non-chaebols. The propensity score is estimated within an industry-year category.

	No. of observations	Mean	Difference	t-statistics of diff.
ln(total compensation) (chaebol professional CEOs)	37	13.5132	-0.1061	-0.65
ln(total compensation) (non-chaebol CEOs)		13.6193		
ln(salary) (chaebol professional CEOs)	36	13.0792	-0.2419	-1.52
ln(salary) (non-chaebol CEOs)		13.3212		
ln(bonus) (chaebol professional CEOs)	38	10.7978	.6537	0.56
ln(bonus) (non-chaebol CEOs)		10.1440		

Panel C: Chaebols with family CEOs vs non-chaebols. The propensity score is estimated within an industry-year category.

	No. of observations	Mean	Difference	t-statistics of diff.
ln(total compensation) (chaebol family CEOs)	19	14.0086	0.5452**	2.05
ln(total compensation) (non-chaebol CEOs)		13.4634		
ln(salary) (chaebol family CEOs)	20	13.7702	0.5241**	2.09
ln(salary) (non-chaebol CEOs)		13.2461		
ln(bonus) (chaebol family CEOs)	20	7.5738	-2.1463	-1.14
ln(bonus) (non-chaebol CEOs)		9.7201		

Panel D: Family CEOs vs professional CEOs in chaebols. The propensity score is estimated within an industry-group-year category.

	No. of observations	Mean	Difference	t-statistics of diff.
ln(total compensation) (family CEOs)	41	14.3015	0.6027***	4.97
ln(total compensation) (professional CEOs)		13.6988		
ln(salary) (family CEOs)	42	14.0447	0.6722***	5.54
ln(salary) (professional CEOs)		13.3725		
ln(bonus) (family CEOs)	43	7.9562	-1.1528	-0.86
ln(bonus) (professional CEOs)		9.1090		

Table 5. Family CEO and compensation (difference-in-differences)

This table reports the estimates from the regressions to analyze the impact of a turnover from a family CEO to a professional CEO, and vice versa, on changes of total compensation, salary, and bonus, by using the difference-in-differences approach. In models (1)–(3), we compare compensation differences in the events of CEO turnovers from a family to a professional, with differences in the cases of CEO turnovers from one family member to another family member. In models (4)–(6), we compare compensation differences before and after CEO turnovers from a professional to a family member, with differences in the cases of the firms having the same professional CEO in previous and current years. Before estimation, each variable is trimmed at its 1st and 99th percentiles by year to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	△ln(total compensation)	△ln(salary)	△ln(bonus)	△ln(total compensation)	△ln(salary)	△ln(bonus)
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for a turnover from a professional CEO to a family CEO	1.1266***	0.8651**	1.4309			
	(3.25)	(2.70)	(0.37)			
Dummy for a turnover from a family CEO to a professional CEO				-0.7651***	-0.7741***	1.2643
				(-3.96)	(-4.89)	(0.48)
△ln(sales)	1.1962*	1.4228**	3.7318	1.0155***	0.6598**	4.9678
	(2.01)	(2.59)	(0.57)	(2.71)	(2.15)	(0.97)
△Market to Book	0.0802	0.3050	-0.0976	-0.0205	-0.0429	0.1267
	(0.20)	(0.81)	(-0.02)	(-0.36)	(-0.92)	(0.16)
△R&D intensity	18.5742	-8.7469	-60.3715	3.5584	-11.2377	241.3372
	(0.77)	(-0.39)	(-0.23)	(0.33)	(-1.26)	(1.62)
△Beta	0.0348	0.3128*	-0.6712	-0.0927	-0.0602	-0.8633
	(0.18)	(1.79)	(-0.31)	(-1.32)	(-1.05)	(-0.90)
△Stock Volatility	-21.8605	-38.9330**	-50.2524	1.0482	5.1560	-138.6815
	(-1.36)	(-2.61)	(-0.27)	(0.11)	(0.67)	(-1.08)
Intercept	-0.1850*	-0.0709	-0.6719	0.0733	0.0913**	-0.0468
	(-1.91)	(-0.79)	(-0.62)	(1.62)	(2.46)	(-0.08)
Adjusted R^2	0.2946	0.4046	-0.3037	0.1829	0.2413	0.0060
Prob > F	0.0564	0.0172	0.9873	0.0006	0.0000	0.3639
N	24	24	23	92	92	92

Table 6. Chaebol, family CEO, and performance-contingent pay

This table presents the estimates from panel regressions with firm- and year-fixed effects to analyze the relationships between total CEO compensation and four firm performance measures, ROA, ln(sales), ln(net income) and annual stock returns. R&D intensity is the ratio of R&D expenditure to sales. Beta is a measure for systematic risk derived from the capital asset pricing model (CAPM) estimation. Stock Volatility is the annualized value of the standard deviation of the market model regression of weekly stock prices. Before regression estimation, each variable is trimmed at its 1st and 99th percentiles to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	ln(total compensation)											
	Non-chaebol				Chaebol with professional CEO				Chaebol with family CEO			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ROA	-0.2935				2.0924**				1.1020			
	(-0.38)				(2.41)				(1.56)			
ln(sales)		0.9686***				0.4715**				0.5049**		
		(6.81)				(2.40)				(2.61)		
ln(net income)			0.0621				0.0494				0.0322	
			(1.54)				(1.16)				(0.53)	
Annual stock return				-0.0005				0.0001				-0.0002
				(-0.83)				(0.19)				(-0.27)
R&D intensity	-4.1719	1.1090	-6.5548	-3.8353	-1.1693	-2.0573	-1.6542	-1.7896	2.3968	4.7650	1.6795	0.5605
	(-0.92)	(0.28)	(-1.56)	(-0.91)	(-0.39)	(-0.69)	(-0.30)	(-0.58)	(0.26)	(0.54)	(0.17)	(0.06)
Beta	-0.0628	-0.0481	-0.0409	-0.0137	0.0397	0.0417	0.0375	.0205	-0.0205	-0.0152	-0.0349	-0.0206
	(-1.29)	(-1.09)	(-0.84)	(-0.28)	(0.68)	(0.71)	(0.65)	(0.33)	(-0.34)	(-0.26)	(-0.45)	(-0.31)
Stock Volatility	7.5813	7.1602	8.8319*	3.8266	-3.0065	-1.6857	-3.5622	-4.3632	-6.6826	-10.0800	-3.0820	-6.8147
	(1.57)	(1.62)	(1.67)	(0.72)	(-0.45)	(-0.25)	(-0.52)	(-0.62)	(-0.80)	(-1.23)	(-0.28)	(-0.68)
Year fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overall R^2	0.0165	0.0798	0.0002	0.0089	0.0750	0.2802	0.1677	0.0252	0.0669	0.2211	0.0711	0.0196
Prob > F	0.5918	0.0000	0.1786	0.8680	0.0961	0.0983	0.1252	0.5943	0.2783	0.0740	0.4634	0.5072
N	352	358	313	353	185	185	158	184	138	138	103	136

Table 7. Family CEO and compensation – robustness test 1

In this table, models (1) and (2) test whether family CEOs are in central firms for internal capital markets, while the centrality is measured by the number of ownership links to other group firms and by the relative size within a business group. Models (3)–(8) examine whether these measures of managing internal capital markets explain the association between a family CEO and compensation levels. To this end, we have added the centrality measures to the base regression models (10)-(12) in Table 3. Before estimation, each variable is trimmed at its 1st and 99th percentiles by year to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Logit regression		OLS regression					
	High link dummy	Large size dummy	ln(total compensation)	ln(total compensation)	ln(salary)	ln(salary)	ln(bonus)	ln(bonus)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family CEO	0.3838*	0.8826***	0.7556***	0.7445***	0.8288***	0.8112***	-0.9632	-0.9223
	(1.70)	(3.83)	(11.45)	(11.24)	(14.02)	(13.44)	(-1.43)	(-1.38)
High link dummy			0.1291**		0.1750***		0.0371	
			(2.41)		(3.64)		(0.07)	
Large size dummy				-0.0965		-0.0315		-0.9688
				(-1.33)		(-0.48)		(-1.30)
ln(sales)			0.1976***	0.2400***	0.1817***	0.2097***	-0.0718	0.2188
			(7.37)	(7.06)	(7.54)	(6.76)	(-0.26)	(0.63)
Market to Book			0.0162	0.0267	-0.0065	0.0110	0.4800	0.4525
			(0.49)	(0.81)	(-0.22)	(0.36)	(1.39)	(1.33)
CEO Tenure			0.0191***	0.0234***	0.0110**	0.0157***	0.1438	0.1568**
			(3.16)	(3.88)	(2.03)	(2.85)	(2.29)	(2.54)
R&D intensity			3.0554**	3.0116*	0.9022	0.9971	2.6955	1.3222
			(2.01)	(1.96)	(0.65)	(0.71)	(0.17)	(0.08)
Beta			0.0249	0.0300	0.0879*	0.0903*	-1.3458	-1.3012**
			(0.49)	(0.58)	(1.91)	(1.91)	(-2.55)	(-2.47)
Stock Volatility			-20.0673***	-21.2175***	-14.4754***	-14.9637***	-41.5335	-52.4998
			(-4.07)	(-4.22)	(-3.27)	(-3.26)	(-0.81)	(-1.02)
Group dummies			Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies			Yes	Yes	Yes	Yes	Yes	Yes
Year dummies			Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.3298**	0.0577						
	(2.35)	(0.42)						
Pseudo R^2 / Adjusted R^2	0.0062	0.0320	0.6881	0.6835	0.7511	0.7391	0.5019	0.5049
Prob > chi^2 / Prob > F	0.0867	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	354	354	328	328	329	329	333	333

Table 8. Family CEO and compensation – robustness test 2

In this table, models (1)–(3) employ the sample of the chaebol firms with family CEOs and test whether the higher portion of salaries in compensation mix of family CEOs than the portion of professional CEOs is due to stock ownership by family CEOs. In models (4)-(9), we test whether the excessive compensation of family CEOs is due to talents of family CEOs by investigating industry-adjusted firm performance. Before estimation, each variable is trimmed by year at its 1st and 99th percentiles to screen outliers. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Testing for CEO ownership			Testing for CEO talents					
	ln(total compensation)	ln(salary)	ln(bonus)	Industry-adjusted ROA	Industry-adjusted annual stock return	Industry-adjusted sales growth	Industry-adjusted ROA	Industry-adjusted annual stock return	Industry-adjusted sales growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CEO ownership	0.9619	0.5883	5.4016						
	(1.16)	(0.80)	(0.60)						
Family CEO				-0.0134**	0.5457	-0.5487	-0.0142**	-1.1204	-0.4406
				(-2.14)	(0.13)	(-0.37)	(-2.26)	(-0.27)	(-0.30)
ln(sales)	0.2921***	0.3098***	-0.7314	0.0091***	-1.1666	0.3361	0.0087***	-1.8520	0.5365
	(6.28)	(7.47)	(-1.44)	(3.99)	(-0.77)	(0.63)	(3.54)	(-1.12)	(0.93)
Market to Book	0.0165	-0.0464	1.2321**	0.0083***	5.2416**	2.7610***	0.0089***	6.4196***	2.6069***
	(0.34)	(-1.08)	(2.31)	(2.61)	(2.47)	(3.72)	(2.76)	(2.97)	(3.44)
CEO Tenure	0.0584***	0.0635***	0.0713	0.0009	0.1162	0.0294	0.0009*	0.2035	0.0431
	(5.08)	(6.26)	(0.57)	(1.60)	(0.30)	(0.22)	(1.68)	(0.53)	(0.31)
R&D intensity	-2.6997	-3.7458	-42.8240						
	(-0.59)	(-0.91)	(-0.84)						
Beta	0.0201	0.0202	-0.6219						
	(0.19)	(0.21)	(-0.53)						
Stock Volatility	-12.2370	-11.4993	49.5004						
	(-1.50)	(-1.58)	(0.55)						
Equity ratio$_{t-1}$				0.1031***	12.2272	7.2526*	0.1023***	-2.6337	8.1412**
				(6.43)	(1.20)	(1.96)	(6.35)	(-0.24)	(2.17)
High link dummy							-0.0067	-7.3808	0.1143
							(-1.14)	(-1.89)	(0.08)
Large asset dummy							0.0052	7.1985	-1.4737
							(0.79)	(1.64)	(-0.95)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.4399	0.5031	0.2036	0.1943	0.0137	0.0473	0.1932	0.0187	0.0458
Prob > F	0.0000	0.0000	0.0000	0.0000	0.2107	0.0137	0.0000	0.1618	0.0196
N	135	136	138	330	330	328	330	330	328

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