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performance

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ABSTRACT

We propose a new determinant of firm value within a business group: controlling shareholders' value (CSV), the value of controlling shareholders' stake in an affiliate divided by their stake in all affiliates. We posit that controlling shareholders focus attention on the high-CSV affiliates. Using data on Korean family-controlled business groups, we find that CSV has greater explanatory power for firm performance than traditional cash flow rights (CFR). We also find that, among affiliates with non-family CEOs, higher CSV is associated with higher Tobin's Q and lower EBITDA, indicating that controlling shareholders and non-family CEO have successfully addressed their principal-agent problem.

Keywords: Controlling shareholders' value (CSV); Business group; Cash flow rights (CFR); Ownership structure; Chaebol; Limited attention

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1. Introduction

We propose a new determinant of earnings and firm value among the affiliate firms of a business group: *Controlling Shareholders' Value (CSV)*, or the value of the controlling shareholders' shareholding in each affiliate divided by the combined value of the controlling shareholders' shareholdings in all of the affiliates in the group. This contrasts with the commonly used notion of *Cash Flow Rights (CFR)*, the percentage of the shares of a given affiliate owned by the controlling shareholders. We argue that both CSV and CFR must be taken into account to develop a full picture of the short-term performance and long-term firm value of the affiliates within a business group.

Suppose a controlling shareholder has two affiliates A and B, whose equity values are \$1 billion and \$10 billion, respectively. Suppose she owns 50% of A and 30% of B, so her CFRs are $CFR_A = 50\%$ and $CFR_B = 30\%$. Her CSV in A is $CSV_A = \$500 \text{ million} / \$3.5 \text{ billion} = 14.3\%$, while her CSV in B is $CSV_B = \$3 \text{ billion} / \$3.5 \text{ billion} = 85.7\%$.

Recent theoretical literature considers the effects of limited attention span (see DellaVigna, 2009). The controlling family of a large, heterogeneous business group cannot devote full attention to every affiliated firm; thus, attention becomes a scarce resource. Assuming that a given amount of attention increases the long-run value of each affiliate by the same percentage, the optimal strategy would be to pay the most

attention to those affiliates in which the controlling family's CSV is highest.¹ The controlling shareholder would rather pay close attention to B instead of A, since a 1% increase in the value of B increases her long-run portfolio value by \$30 million, while a 1% increase in the value of A increases her long-run portfolio value by \$5 million.

Most of the literature on large Korean business groups has focused on how CFR affects the Type II agency problem between controlling and outside shareholders, and has documented the existence of tunneling and propping in cash-flow expenditures among affiliates.² In this paper, we focus more on how CSV affects the Type I agency problem between controlling shareholders and the CEO. To the best of our knowledge, this is the first paper to examine CSV in affiliates, and whether CSV affects the long-run value or short-term performance of those affiliates.

¹ When we calculate controlling shareholders' holdings in an affiliate, we include both direct and indirect investments by other affiliates.

² Related studies define tunneling as the transfer of wealth from an affiliate with a small CFR to another with a large CFR. Propping is defined as the transfer of wealth from an affiliate with a large CFR to another (often facing some financial distress) with a small CFR (Johnson et al., 2000; Friedman et al., 2003). Many studies have provided supporting evidence of tunneling in various international contexts. Johnson, La Porta, Lopez-de-Silanes, and Shleifer (2000), Faccio, Lang, and Young (2001), and Claessens, Djankov, Fan, and Lang (2002) provide it in the context of Asia. For example, Bae, Kang, and Kim (2002) and Baek, Kang, and Lee (2006) present evidence of tunneling in Korea, and Bertrand, Mehta, and Mullainathan (2002), Cheung, Rau, and Stouraitis (2006), and Bertrand, Johnson, Samphantharak, and Schoar (2008), in India, Hong Kong, and Thailand, respectively. Johnson et al. (2000) and Faccio et al. (2001) provide evidence of tunneling in Europe, and Attig (2007), in Canada. Friedman, Johnson, and Mitton (2003) and Riyanto and Toolsema (2008) present evidence for propping. Bae, Cheon, and Kang (2008) present that earnings surprise of an affiliate of a Korean Chaebol has a positive effect on the market value of its other affiliates; such transfer of wealth, if it happens, is propping. Dow and McGuire (2009) claim that affiliates of Japanese keiretsu choose tunneling in good times but choose propping in downturns. Gopalan, Nanda, and Seru (2007) show that propping occurs in Indian business groups via lending and borrowing among affiliates.

The most pressing concerns facing shareholders and CEOs are optimizing short-term performance (proxied by EBITDA) and long-run firm value (proxied by Tobin's Q). Narayanan (1985) suggests that American managers tend to make decisions that yield short-term gains at the expense of the long-term interests of the shareholders. Bolton and Samama (2013) argue that excessive focus on short-term performance has had adverse economic consequences: "Financial policy makers, regulators, academics, and other market observers have long expressed concern that, particularly in capital market-driven economies like the U.S. and U.K., excessive focus on quarterly earnings and short-term stock price has led to corporate underinvestment—and, as a result of such underinvestment, disappointing growth in GDP and jobs."³ Kay (2012) reaches similar conclusions about the UK economy.

When a business group is controlled by a single family, the family expects to maintain control over the long run and hence should focus its attention on maximizing the long-run value of the business group; moreover, it should be willing to tolerate weaker short-term group performance when doing so will enhance long run value. This focus on the long run may partly explain the success of Korean family-owned business groups, and their contribution to the growth of the Korean economy.

³ They argue that long-term shareholders create a positive externality, and that compensation (in the form of additional dividends or warrants) should be provided to incentivize long-term shareholding.

However, it is not enough that the controlling shareholders *desire* a focus on long run value. They must induce the CEOs of the affiliated firms to *act* in a way that maximizes long run value. When the firm CEO is a family member, the CEO's interests are aligned with the family's interests.⁴ By contrast, non-family CEOs may view their jobs and shareholdings as transient, and thus focus more on short-term performance, resulting in a Type I agency problem.

The controlling shareholders can ameliorate the Type I agency problem with a non-family CEO by paying close attention, to ensure that the CEO focuses on long-run value, even at the expense of short-term performance. Since attention is a scarce resource, the controlling shareholders should apply more attention to the affiliates with higher CSV. This attention is not intended to enhance the *skills* of the CEO; after all, the outside CEO was presumably chosen because he or she was a more skillful manager than the available family members. Rather, the attention is intended to ensure that the CEO uses his or her high skill to enhance long run value, rather than short-term performance.

When a firm CEO is a member of the controlling family, the Type I agency problem is eliminated.⁵ The family CEO is presumably at least as skilled as other available family members. Thus, attention is unlikely to improve decision-making. For this reason, we

⁴ With a family CEO, there is a Type II agency problem but no Type I agency problem.

⁵ However, the agency problem between the CEO and outside shareholders increases when the CEO is a member of the controlling family. See Section 2 for a discussion of agency problems in the context of Korean chaebols.

might expect to see attention on the part of the controlling shareholders play a smaller role in affiliates with a family CEO. How the CSV effect plays out in the two groups, family versus non-family CEO, is an empirical question. For this reason, our analysis treats the two groups separately.

This leads us to the main contribution of this paper, hypothesizing the CSV effect: among business group affiliates, those with the largest CSV exhibit higher Tobin's Q and lower EBITDA.

In this paper, we study the Korean business groups known as chaebols. Chaebols are large conglomerates with exceptionally broad scope controlled by members of a single family. Despite their very broad scope, discussed further in Section 2, Korean chaebols have been enormously successful.^{6 7} They have played, and continue to play, the major role in the rapid economic development of Korea. This makes chaebols a fertile subject for the study of the governance of a large and very complex business. What determines how well a vast family-controlled conglomerate and its individual affiliates perform? What determines the trade-off between long-term value and short-

⁶ The contribution of chaebols to the Korean economy is overwhelming and continues to grow. The top five chaebols accounted for 49.1% and 60.7% of Korea's GDP in 2001 and 2011, respectively. In 2011, the top five were Samsung, Hyundai Motor, SK, LG, and Lotte; note that the first, second and fourth of these have become well-known brands internationally.

⁷ In 2011, Samsung Group controlled 81 affiliates in 27 different industries. Similarly, Hyundai Motor Group and SK Group controlled 56 affiliates in 26 industries, and 94 affiliates in 34 industries, respectively.

run performance? How well do chaebols handle the various principal-agent problems? How, and how well, do they allocate attention? How do family-managed affiliates compare with those managed by non-family CEOs? How effectively do affiliates use R&D and capital expenditures? We seek to give a value-neutral analysis of the effects of family control.

Capital expenditures and Research and Development (R&D) are two key decision variables affecting EBITDA and Tobin's Q. Both are intended to increase future cash flow and future share price; the controlling shareholders would prefer to allocate funds between them based on their relative contributions to long-run firm value. However, capital expenditures and R&D have quite different effects on current EBITDA and Tobin's Q. Current capital expenditure has no effect on current EBITDA, while R&D reduces current EBITDA.⁸ A non-family CEO may be tempted to substitute capital expenditure for R&D, or simply reduce R&D, to improve current EBITDA.

We use ten years of data (2001-2011), consisting of 426 group-year and 11,420 firm-year observations to compute CFR and CSV. Since Tobin's Q is central to our analysis and can only be computed for listed firms, we regressed Tobin's Q and EBITDA on the subsample of 2,059 listed firm-year observations and performed robustness checks.

Our major empirical results can be summarized as follows.

⁸ R&D is expensed under standard accounting practices in Korea, as well as most developed countries.

First, we find evidence of the CSV effect. CSV has greater explanatory power for Tobin's Q than CFR. The CSV effect is strong and robust to varying specifications among firms with non-family CEOs, but weak and specification-dependent among firms with family CEOs. Specifically, within the affiliates with non-family CEOs, CSV has a positive effect on Tobin's Q and a *negative* effect on EBITDA; neither effect is significant in our main econometric specification with family CEOs. This indicates that the principal-agent problem between controlling shareholders and non-family CEOs has been handled well for firms with high CSV, in the sense that the CEOs have maximized long-run value, as desired by the controlling shareholders, even at the expense of short-term performance; it supports the hypothesis that controlling shareholders are paying more attention to firms with high CSV.⁹ Moreover, following Kay (201) and Bolton and Samama (2013), it suggests that attention by controlling shareholders, focused primarily on high-CSV affiliates, provides benefits for the overall economy. It also suggests that the choice of a non-family CEO reflects ex-ante attention, while careful monitoring of the

⁹ This suggests two possibilities. The first possibility is that controlling shareholders provide greater attention to firms with high CSV, but that additional attention is ineffective unless it causes the shareholder to hire a non-family CEO. Under this possibility, a non-family CEO is hired, and she identifies a promising project, perhaps an investment of capital or a large R&D effort. The second possibility is that controlling shareholders provide greater attention to firms with high CSV, but they possess additional information about the firm's prospects and choose to hire non-family CEOs for those firms with the best prospects; in other words, they identify an attractive investment or R&D project and choose a non-family CEO to manage it. Our analysis does not permit us to distinguish between the two possibilities; however, this does not affect our finding that Tobin's Q is positively related to CSV, and EBITDA is negatively related to CSV for firms with non-family CEOs.

CEO by the controlling family (DeAngelo and DeAngelo, 1985) reflects ex-post attention. Second, we find that Tobin's Q is positively related to both R&D and capital expenditure among firms with family CEOs as well as non-family CEOs. EBITDA is negatively related to R&D and positively related to capital expenditure among firms with non-family CEOs; with family CEOs, only the capital expenditure effect is significant.

The rest of the paper is organized as follows. Section 2 reviews Korean business groups (chaebols) and the agency problems within chaebols. Section 3 develops our hypotheses. Section 4 presents our measurement of CFR and CSV, and describes the sample data. Section 5 reports the empirical results, while Section 6 concludes.

2. Agency problems within Korean family-controlled business groups (Chaebols)

2.1. Chaebols

Large, family-controlled conglomerates in Korea are known as chaebols. While the previous literature on chaebols has focused on tunneling and propping, our interests in this paper are focused on other questions.

Chaebols typically have very broad scope, with the affiliates of a single business group active in a wide variety of unrelated industries. This breadth of scope

differentiates chaebols from large corporate groups in most of the developed world.

A controlling family faces different incentives from individual shareholders. Diversifying their holdings as minority shareholders of many companies would eliminate the benefits of family control. In order to diversify and increase the size of the whole enterprise, the controlling family must obtain outside capital in the form of equity and debt to increase market share in the existing industries and to expand into new industries. The chaebol structure permits the controlling family to retain control over the enterprise, even as the need for outside capital requires the family to reduce its CFR to minority status. However, it leaves the question of how the controlling family can effectively manage the broad scope of the enterprise.

2.2. *Agency problems*

Controlling shareholders view the connection between long-run firm value and short-term performance from a different perspective than outside shareholders and managers. The controlling shareholders in a business group are likely to take a long-run view, spanning multiple generations in the case of a family-controlled group; they should focus on long-run firm value (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Faccio and Lang, 2002). By contrast, outside shareholders and managers are likely to focus on short-term performance, which may generate dividends and drive the stock

price in the short term. Following conventional practice in corporate finance, we use Tobin's Q as a proxy for long-run firm value and EBITDA as a proxy for short-term performance. Because Tobin's Q is central to our analysis, we limit attention to listed affiliates of the chaebols.

The existing studies on the incentives of controlling shareholders focus on the agency problem between controlling shareholders and outside shareholders arising from the variability of CFRs across affiliated firms. The variation in CFR creates a potential incentive to transfer earnings among affiliated firms. These transferred earnings would be reflected in short-term performance, as measured by EBITDA.¹⁰

When a firm is managed by the controlling shareholder, the principal-agent problem between the controlling shareholder and the manager is not a concern, but the agency problem between inside and outside shareholders becomes more serious (Jensen and Meckling, 1976; Shleifer and Vishny, 1997; Villalonga and Amit, 2006). However, when a firm is managed by an outside CEO, the agency problem between inside and outside shareholders is diminished; the CEO of a single affiliate has no incentive to transfer profits to another affiliate and lacks the unilateral ability to transfer profits from another

¹⁰ Tunneling alone cannot explain the sustained existence of business groups, whereas propping can be used as a means for tunneling in the future (Friedman et al., 2003; Riyanto and Toolsema, 2008). Therefore, both tunneling and propping have been seen as both short-run and long-run strategies to serve the interests of controlling shareholders at the expense of outside investors. For evidence on the entrenchment effect of a controlling shareholder family, see Fama and Jensen (1983) and Morck, Shleifer, and Vishny (1988).

affiliate.

The compensation of individual executives in Korea was not disclosed prior to the end of 2013. Using data on the aggregate compensation of all directors, Kato, Kim, and Lee (2007) found that compensation of non-chaebol directors is significantly related to stock performance, but find no such effect among chaebols. If compensation of chaebol directors is based primarily on the achievement of cash-flow targets, the CEO's incentives are primarily to improve short-term performance at the expense of long-run firm value. In particular, the CEO would have little incentive to embark on aggressive R&D, whose cost reduces EBITDA, even if it were in the interests of the controlling shareholders to do so. This creates something of a puzzle, as the rapid expansion of the Korean economy over the last two decades has been fueled to a substantial extent by aggressive R&D in electronics, automobiles, and other industries. While R&D reduces EBITDA, capital expenditure has no direct effect on EBITDA.

The decision to hire a non-family CEO reflects a decision by the controlling shareholder to accept the cost associated with the principal-agent problem. This could reflect the fact that family members lack the expertise or time to give the firm the attention it deserves, and hence have no choice but to accept the cost. However, it could also reflect the possibility that the controlling shareholders are able, through careful monitoring or performance incentives, to motivate the CEO to maximize long-run firm

value.

The separation of family CEOs from non-family CEOs creates a potential for selection bias. A similar issue arises in Adams et al. (2009), which looks at subsamples of founder and non-founder CEOs. In that paper, as in ours, the turnover from one type of CEO to the other is quite slow, so that if there is a selection bias, it was based in most cases on considerations that applied many years in the past. This should minimize the effect of selection bias on current performance.

Hence, as an empirical strategy, we examine the relationship between CFR and CSV, on the one hand, and Tobin's Q and EBITDA on the other hand, separately in the two groups: firms with family CEOs and firms with non-family CEOs.

3. Hypothesis development

Burkart, Panunzi, and Shleifer (2003) argue that the welfare of controlling shareholders who are family members is composed of the value of their total stockholdings plus the private benefits of control.¹¹ As noted above, when attention is

¹¹ They also argue that private benefits of control can be grouped into non-pecuniary benefits such as amenities and reputation and pecuniary ones such as tunneling. Previous literature on these pecuniary benefits has focused on the wedge between inside ownership and CFR, which determines the potential of controlling shareholders to benefit from tunneling and propping. In our data sample, there is a strong negative correlation between CFR and the wedge, giving rise to multicollinearity problems. Since in any case, our main interest is CSV, we do not use the wedge as an independent variable.

a scarce resource, controlling shareholders' attention should be focused on the firms with highest CSV. Based on this rationale, we examine the effect of CSV and CFR on the determination of long-run firm value, proxied by Tobin's Q, and short-term performance, proxied by EBIDTA. CSV has not been studied in the previous literature. CSV is calculated using all affiliates, whether or not they are listed. However, our hypotheses are tested only on listed affiliates, since we can only measure Tobin's Q for listed firms.

We expect that controlling shareholders will devote their attention to increasing the value of affiliates with large CSV, in order to increase their portfolio value. Thus, we expect that Tobin's Q will be positively related to CSV. One form of greater attention is ensuring a good solution of the principal-agent problem between shareholders and the CEO; this would involve, among other things, undertaking actions that increase Tobin's Q, even at the expense of lowering EBITDA.

Hypothesis 1-A. Firms with higher controlling shareholders' value (CSV) have higher Tobin's Q. [CSV effect]

Hypothesis 1-B. Firms with higher controlling shareholders' value (CSV) have lower EBITDA.

R&D and capital expenditure are two important channels for increasing long-run

firm value. Because R&D is treated as an expense, it reduces EBITDA. Current capital expenditure does not have a direct effect on EBITDA, while past capital expenditure increases current EBITDA.

Hypothesis 2-A. Firms with higher R&D have higher Tobin's Q and lower EBITDA.

Hypothesis 2-B. Firms with higher Capital Expenditure have higher Tobin's Q and higher EBITDA.

4. Description of sample and variables

4.1. Sample

Since 1993, the Fair Trade Commission (FTC) in Korea has designated business groups annually. The FTC collects and publishes data on the affiliate firms in each of the designated business groups, which we need to compute CFR and CSV; similar data on firms and groups outside the designated groups is not publicly available. From 1993 to 2001, the FTC designated the top 30 business groups each year based on aggregate assets. From 2002 to 2008, it designated all business groups with aggregate assets

exceeding KRW 2 trillion; starting in 2009, the criterion was changed to KRW 5 trillion.¹² From the list of business group affiliates designated by the FTC, we drop firms either owned by the government or without any controlling shareholder.¹³ Thus, our sample firms are the affiliates of designated Korean business groups in which a family is the controlling shareholder over the period of 2001 to 2011.

Table 1 presents the number of sample firms. First, we collect samples of 426 group-year observations which consist of 11,420 firm-year observations. From this initial sample, we calculate controlling shareholders' CFR and CSV.¹⁴ We use all 11,420 firm-year observations to compute CFR and CSV, and 2,059 firm-years for listed firm to use in our regressions of Tobin's Q and EBITDA. Financial firms and financially distressed firms¹⁵ are included. The results are robust to the exclusion of financial and financially distressed firms.

The numbers of both business groups and affiliates increased from 2001 to 2007,

¹² Every fiscal year end, the FTC investigates the ownership of all business group affiliates and financial statements and discloses the results the following April. Based on the announcement date of FTC, our sample period is April 2002 to April 2012.

¹³ When the business group is owned by the government or there is no controlling shareholder, the FTC defines the controlling shareholder as an affiliate that occupies the apex of the investment structure. In these cases, controlling firms' CFR and CSV cannot be calculated.

¹⁴ In an earlier version of this paper, where we used both listed and unlisted firms in the regression for EBITDA, we removed firms less than a year old as well as firms with assets less than KRW 7 billion, since unlisted firms with these characteristics do not have audited financial statements. Since our regressions now use just listed firms, and listed firms are required to have audited statements, we no longer screen out firms based on these two criteria.

¹⁵ By financially distressed firms, we mean firms with negative equity book value.

dropping in 2008 as a result of the change in FTC threshold, and increasing sharply afterward.

<Table 1>

4.2. *Controlling shareholders' cash flow rights and value*

For all affiliates, controlling shareholders' CFR and CSV are constructed using data from the Online Provision of Enterprises Information System (OPNI)¹⁶ of the FTC. OPNI, established in July 2007 in order to expand the market-based monitoring of business groups, categorizes shareholder types based on controlling shareholders, family members, nonprofit organizations, non-family executives, and affiliates. OPNI also provides the intra-group shareholding matrix among affiliates.

There are various ways to measure the CFRs of controlling shareholders. Following Kim (2000) and Kim, Lim, and Sung (2007), we include controlling shareholders' indirect ownership as well as their direct ownership. For an affiliate i , the direct ownership of the controlling shareholder (f_i) is sum of family ownership, where the family ownership includes the ownership of controlling shareholders and their family members, non-profit organizations, and non-family executives.¹⁷ Suppose that A is the intra-group

¹⁶ See its website: www.groupopni.ftc.go.kr.

¹⁷ Some may question the inclusion of non-family executives' ownership. However, the conflict of

shareholding matrix among affiliates. Then, the element a_{ij} will be the fraction of shares in affiliate i held directly by affiliate j ; $a_{ii} = 0$ for each i , $a_{ij} \geq 0$, and $\sum_{j=1}^n a_{ij} \leq 1$. Also, let \mathbf{F} be the column vector with i^{th} element f_i and let \mathbf{I}_n be the $n \times n$ identity matrix. Then, the controlling shareholders' cash flow rights (cfr_i) for firm i is the i^{th} element of column vector (\mathbf{CFR}). As explained in Kim (2000), we have $\mathbf{CFR} = (\mathbf{I}_n + \mathbf{A} + \mathbf{A}^2 + \dots)\mathbf{F}$, so we have

$$\mathbf{CFR} = (\mathbf{I}_n - \mathbf{A})^{-1}\mathbf{F} \quad (1)$$

Controlling shareholders' value in an affiliate i is defined as the product of the controlling shareholders' CFR in the affiliate and the capital stock of the affiliate: $(cfr_i)(E_i)$. We use capital stock (i.e. book value) (E_i) instead of market value because 82% of the firms in our sample are unlisted, so market value is not available for them. Our regressions are run over listed firms only, but CSV of the listed firms is calculated using the capital stock of all the firms, both listed and unlisted, in a business group.¹⁸ Finally, controlling shareholders' value (\mathbf{CSV}_i), which is our main variable, is calculated as controlling

interests between of the controlling shareholder and non-family executives are rare in Korea. Considering this reality of Korean business environment, we think that including non-family executives' ownership can better explain the Korean corporate finance.

¹⁸ Later, as a robustness check, we rerun the regressions using CSV Market, which is calculated using market capitalization rather than capital stock; see Table 6.

shareholders' investment in affiliate i divided by the sum of controlling shareholders' investment in all affiliates of the business group.

$$CSV_i = (cfr_i)(E_i) / \sum_{j=1}^n (cfr_j)(E_j) \quad (2)$$

4.3. *Other variables*

OPNI indicates whether the CEO of each affiliate is a member of the controlling family. We construct a dummy variable, *Family CEO dummy*, which is one if the CEO is a family member and zero otherwise. OPNI also provides industry code, foundation date, assets, sales, equity, and earnings. For data not available from OPNI, we use the data provided by Korean data providers KISLINE, a division of NICE Holdings Co., Ltd. and DataGuide, a division of FnGuide, Inc.

In our empirical analyses, we use *EBITDA* as a proxy for the short-term firm performance and *Tobin's Q* as a proxy for the long-term firm value. *EBITDA* is defined as operating cash flow from the statement of cash flow, divided by assets. *Tobin's Q* is defined as the market value of debt and equity, divided by the book value of debt and

equity.¹⁹ Market value is measured at calendar year-end.²⁰ Firm size (*Size*) is the natural logarithm of assets and leverage ratio (*Lev*) is defined as debt divided by assets. Firm age (*Age*) is calculated in years, with months represented by decimals. Liquidity (*Liquidity*) is defined as cash and cash equivalents divided by assets. Capital expenditure (*Capital Expenditure*) is defined as net cash expenditure for investment (in the statement of cash flow) divided by assets. The dummy variable for a financial firm (*Financial dummy*) is one if the firm is in the financial sector and zero otherwise. As variables for the characteristics of the business group, we use the numbers of affiliates (*No. of Affiliates*), number of affiliates in the financial sector (*No. of Financial*), and number of industries in which the affiliates are engaged (*No. of Industries*).²¹ In addition, the degree of diversification (*Diversification*) for each business group is measured by dividing the number of industries by the number of affiliates. Table 2 summarizes the definitions of all the variables we use.

<Table 2>

¹⁹ Technically, Tobin's Q should be the market value of assets (which equals the market value of debt plus equity) divided by the replacement cost of assets. Since replacement cost of assets is not readily ascertainable from accounting statements, it is common to use book value of assets, which equals the book value of debt plus equity.

²⁰ As a robustness check, we also use the average annual market value, but the results are qualitatively the same.

²¹ We compute the number of industries based on the two-digit of Korean Standard Industrial Classification (KSIC) code.

4.4. *Descriptive statistics*

Table 3 presents descriptive statistics of ownership structure and firm characteristics for the listed firms (2,059 firm-years) used in our regressions. 11,420 firm-year observations are used to compute CFR and CSV for the 2,059 listed firm-year observations.

It is important to distinguish between cash flow rights (CFR) and control rights. The average CFR of the controlling shareholders is 21.6%, composed of direct CFR of 12.2% and indirect CFR through affiliates of 9.4%. The controlling shareholders can influence or direct each affiliate's vote, not just the proportion of votes corresponding to CFR. Thus, while the indirect CFR through affiliates is 9.4%, the average control rights vested in the affiliates is 30.2%. The average control rights of the controlling shareholder consist of the direct CFR and the control rights vested in affiliates, or 51.8%. All of these descriptive statistics indicate that a pyramidal ownership structure prevails within these Korean business groups: the controlling shareholder exercise control over the whole business group, despite holding a minority stake of CFR.

Among all firm-years in our sample, the average CSV is 10.5%, the median is 4.9%, and the maximum CSV is 92.5%. We calculated the highest CSV affiliate, and the sum of the three greatest CSV affiliates within each business group, then averaged these numbers over business group; on average, the highest CSV is 36.1% and the sum of the

three highest CSVs is 65.4%. These results indicate that the bulk of the controlling shareholders' value is held in a small number of affiliate firms within the group.

This is illustrated in Fig. 1, which shows the distributions of controlling shareholders' cash flow rights (CFR) and value (CSV). Fig. 1-a shows that, while there are a significant number of affiliates with CFR of 100%, the bulk of the affiliates have low CFR; again, control is being exercised despite having small CFR. In Fig. 1-b, we see that 76% of the sample firm-years exhibit CSV below 5%.²² If attention is focused mostly on the high-CSV affiliates, as we have hypothesized, then the bulk of the affiliates will receive relatively little attention.

In the sample, limited to listed firms, 36.4% of the firms are managed by members of the controlling shareholders' family (*Family CEO dummy*). 8.7% are financial firms. The age of the sample firms (*Age*) is 33.2 years on average and the median is 33.0 years.

The mean value of Tobin's Q is 1.16, while the median value is 1.01, so almost half have Q less than 1. EBITDA is calculated from the statement of cash flow; there are 2,055 observations, with values ranging from -0.62 to 0.54.²³ Average liquidity measured by cash and cash equivalent relative to assets is 0.067, while mean capital expenditure is 0.058.²⁴ The number of affiliates (*No. of Affiliates*) ranges from 3 to 94 and the number of

²² For visibility, the maximum value of the y-axis is limited to 14%.

²³ Of the 2,056 observations in our data set, we deleted one clear outlier.

²⁴ Capital Expenditure is calculated from cash flow from investment in the statement of cash flow. A negative value means the firm sold a capital asset in that fiscal year.

industries (*No. of Industries*) ranges from 2 to 34, with a mean of 36.4. The degree of diversification of a business group (*Diversification*) ranges from 0.2 to 1, the latter indicating that each affiliate is in a different industry.

<Table 3>

<Fig. 1>

5. Empirical results: firm value and CSV, CFR, and family management

5.1. Results from multivariate analysis

This section analyzes the determinants of long-run firm value (Tobin's Q) and short-term performance (EBITDA) within the sample of *listed* firms. The main variables of interest are thus CSV, CFR, family CEOs (*Family CEO dummy*), R&D, and Capital Expenditure. The analysis is limited to publicly traded firms, since Tobin's Q is defined only for them.

As control variables, we include firm size, leverage, firm age, liquidity, financial firm (*Financial dummy*), number of affiliates, and the degree of diversification. Every model includes year, business group, and industry dummies.

As is customary in this literature (see Adams et al. (2009)²⁵ for a discussion of founder-CEOs in the US and Almeida et al. (2011) for a discussion of chaebols), we do not include firm-fixed effects. While firm-fixed effects would allow us to control for a large number of unobserved variables, there is little change in CFR or CSV or family CEO within a given firm from one year to the next.²⁶ Thus, using firm-fixed would effectively wash out the variation in our main variables of interest, CSV and family CEO, as well as in the main variable, CFR, in the existing literature on business groups. Since all firms within a single business group are effectively controlled by the controlling shareholder, the inclusion of business group dummies does allow us to control for many unobserved variables,²⁷ while retaining sufficient variation in CFR and CSV to us to measure their effects on Tobin's Q and EBITDA. We calculate *t*-values using the standard errors adjusted for heteroskedasticity and individual firm-level clustering.

Panel A of Table 4 presents the results from the multivariate analysis on Tobin's Q, while Panel B of Table 4 presents the results on EBITDA. Models (1)-(3) include all listed

²⁵ Adams et al. (2009) write at page 141, "We do not use firm fixed-effects in our specification because our main explanatory variable (founderCEO) varies little over time for a given firm."

²⁶ Previous year's data are available for 1,736 observations. Out of this sample, 3.3% of all firms change from non-family CEO to family CEO, while 2.2% change from family CEO to non-family CEO. The correlation between CSV and lagged CSV, as well as the correlation between CFR and lagged CFR, both exceeded 0.96.

²⁷ For our purposes, the relevant unobserved variables reflect the traits and characteristics of the controlling shareholders, such as managerial strategy and capability, monitoring style and capability, level of attention, and concerns about inheritance and managerial succession.

firms. Model (1) is a traditional analysis, including CFR but excluding CSV; Model (2) includes CSV but excludes CFR; and Model (3) includes both CFR and CSV. Models (4) and (5) separate Model (3) into two subsamples based on CEO characteristics: Model (4) uses a sample of all listed firms with family CEOs, while Model (5) considers those listed firms managed by independent CEOs. The coefficients and significance of the variables apart from Size are remarkably similar across Models (1)-(3), providing us assurance of the validity of the analysis combining CFR and EBITDA, in particular that there is not a significant multicollinearity problem in the analysis.

Note that the coefficient of Tobin's Q on CFR is insignificant in Models (1) and (3), while the coefficient of Tobin's Q on CSV is significant and positive in Models (2) and (3). Thus, CSV has more explanatory power for firm value than CFR, the traditional focus of this literature.

While the coefficients and significance of the variables are consistent across Models (1)-(3), there are striking differences between Model (4), the family CEO subsample, and Model (5), the non-family CEO subsample. CSV has a positive and statistically significant effect on Tobin's Q at the 1% level among all firms, and among firms with a non-family CEO; CSV has a statistically significant *negative* effect on EBITDA at the 5% level, but only among firms with a non-family CEO. These results strongly support Hypotheses 1-A and 1-B among firms with non-family CEOs: controlling shareholders

are able to induce non-family CEOs to maximize long-run firm value, even at the expense of short-run firm performance. The decision to hire a non-family CEO increases the potential severity of the Type I agency problem between controlling shareholders and the CEO. The controlling shareholders can potentially offset this through increased attention to, and monitoring of, the firm's performance. We have argued that this increased attention is likely to be directed at the affiliated firms with high CSV. However, we cannot directly measure attention, and it is possible that some other mechanism other than increased attention is at work. Whatever the mechanism, we find empirically that high CSV contributes to the effective solution of the agency problem between controlling shareholders and CEOs among firms with non-family CEOs.²⁸

CFR has a negative and significant (1%) effect on both Tobin's Q and EBITDA among family CEOs in Model (4); the effects are not significant among non-family CEOs.²⁹

R&D has a significantly positive effect on Tobin's Q in both Models (4) and (5); the effect on EBITDA is insignificant in Model (4) but negative and significant in Model (5). These results provide strong support for Hypothesis 2-A among firms with both non-family CEOs, but at best weak support among firms with family CEOs.

Capital Expenditure has a significantly positive effect on Tobin's Q and on EBITDA

²⁸ We also tested the interaction term between CSV and Family CEO dummy, (b)×(c), and found the effect on Tobin's Q is negative and significant at the 10% level.

²⁹ There is no direct evidence of tunneling or propping here, but the negative effect of CFR on EBITDA among family CEOs is consistent with propping.

in Models (1)-(5). This provides strong support for Hypothesis 2-B, both among firms with non-family and family CEOs.

Financial dummy has a significant negative effect on EBITDA for all five models; its effect on Tobin's Q is significant only for the subgroup of family CEOs (Model (4)), where it is negative and highly significant ($t=-7$).³⁰

Diversification has no significant effect on EBITDA, and a significantly positive effect on Tobin's Q only for the subgroup of family CEOs. Recall that diversification of the business group is of limited value to outside shareholders, who can diversify their shareholdings through mutual funds, but is of value to controlling shareholders. The result is consistent with the findings of Khanna and Palepu (2000), who suggest that diversification can increase firm value, but it is difficult to explain why diversification is profitable only for firms with family CEOs. One possible explanation is that controlling shareholders either better understand their business group as a whole or are better able to take advantage of synergies within the affiliates of their group, while independent CEOs focus solely on the value of the firm they manage; if that is the case, then outside shareholders receive benefits from the exploitation of synergies.

Lev has a statistically significant negative effect on EBITDA in all Models, and a significant positive effect on Tobin's Q for Models (1)-(3) and (5), but not for the family

³⁰ See Campello (2002) and Bae, Kang, and Lim (2002).

CEOs of Model (4). This indicates that debt financing is more likely to benefit firms managed by non-family CEOs. This result suggests either that the information asymmetry of family managed firms is higher or that the signaling effect of using debt can benefit only those firms managed by professionals (Myers, 1984; Ross, 1977).

Liquidity has a significant and positive effect on EBITDA in all Models, but the effect is weaker among family CEOs, while liquidity has a significant positive effect on Tobin's Q for family CEOs but not for non-family CEOs.

Age consistently has a significant negative effect on Tobin's Q, and no effect on EBITDA, regardless of CEO characteristics.

<Table 4>

5.2. *Robustness tests for the CSV effect*

Recall that we initially ran regressions in Model (1) (with CFR but not CSV), Model (2) (with CSV but not CFR) and Model (3) including both CFR and CSV. We found that CSV has more explanatory power for firm value (measured by Tobin's Q) than does CFR, and that the pattern of coefficients and *t*-statistics is similar in the three models, indicating that our results for CSV are not driven by multicollinearity with CFR.

We perform three additional robustness checks on the CSV effect. First, we use an IV approach to correct for the possible endogeneity problem in CSV. Second, because

CSV is defined through accounting variables rather than market value, it involves measurement error; we employ an alternative measure of CSV using market value, reducing measurement error at the cost of potentially worsening the endogeneity problem. Finally, we consider an alternative specification using an interaction term.

5.2.1. *Instrumental variable (IV) analysis*

CSV is endogenous; an increase in the market value of a firm increases Tobin's Q and also affects CSV, so an association between CSV and Tobin's Q might reflect past changes in market value rather than greater levels of attention by controlling shareholders. To address this concern, we use *Lagged Q* (Tobin's Q for the previous fiscal year) as an IV.³¹

To identify a second instrument, suppose that there were a single central holding company holding shares in all members of the group, with no other interlocking shareholdings. In that case, the holding company would attract a great deal of attention from the controlling shareholders. The holding company model is unusual among Korean business groups. However, *Equity Investments in Other Affiliates*, measured as a member firm's equity investments in other affiliates over the sum of all member firms' equity investments in other affiliates, is a measure of how much a given affiliate acts like

³¹ As noted above in Section IV.A.1, CSV, CFR and family versus non-family CEO status of a given firm change very slowly from year to year, so the use of firm fixed-effects would wash out most of the variation in our main variables of interest.

a central holding company, so we use it as a second instrument.

The endogeneity of CSV is less of a concern in our regressions for EBITDA. However, because high EBITDA can lead to a higher stock price, and thus higher Tobin's Q and CSV, we use *Lagged EBITDA* (EBITDA for the previous fiscal year) and Equity Investments in Other Affiliates as IVs.

Panels A and B of Table 5 present the IV analysis of the CSV effect using CSV. The results for CSV are essentially identical to those of Table 4, with no changes of sign or significance in the coefficients of Tobin's Q and EBITDA on CSV for the family and non-family CEO firms; the coefficient of EBITDA on CSV among all firms becomes significant. There are no changes of sign or significance in the coefficients on Capital Expenditure, and only one change in the coefficient on R&D (the positive coefficient of Tobin's Q on R&D among family CEOs loses significance). This confirms the evidence for Hypothesis 2-A among non-family CEOs, and further weakens the evidence among family CEOs. It confirms the evidence for Hypothesis 2-B among both family and non-family CEOs.

The main difference between Table 4 and V is in the coefficients on CFR; two of the six remain insignificant, three lose significance, and one (the coefficient of Tobin's Q on CFR among all firms) becomes significant and negative. The results of Table 5 provide further support to our finding that CSV has more explanatory power than CFR on Tobin's Q and EBITDA.

<Table 5>

5.2.2. *Measurement error*

CSV is calculated using equation (2), with capital stock rather than market capitalization, since most of the firms within the business groups are unlisted. We perform an alternative calculation, *CSV Market*, in the same way as CSV, except that we use market capitalization instead of capital stock. CSV and CSV Market provide different measures of controlling shareholders value for the listed firms, which are the firms used in our regressions. Each has advantages and disadvantages. Note that CSV Market more accurately measures the relative value of the listed affiliates (and hence the relevant attention paid to them), but effectively sets the value of the unlisted affiliates to zero; the latter effect distorts the measure of attention across group-years, since the fraction of group value vested in the listed affiliates varies across groups and years. More significantly, Tobin's Q is market value of assets divided by book value of assets. CSV weights the controlling shareholders' equity stake by book value, while CSV Market weights the controlling shareholders' equity stake by market value. This difference in measurement means that the relationship between CSV Market and Tobin's Q involves greater endogeneity than the relationship of CSV and Tobin's Q. Thus, we view CSV as the preferable measure of attention, and include results using CSV Market solely as a

robustness check.

Panels A and B of Table 6 report multivariate analyses using CSV Market instead of CSV. For the reasons described above, we believe that CSV Market poses greater endogeneity problems than CSV, and should be read with caution. On their face, the results using CSV Market appear to strengthen the case for Hypothesis 1-A, that firms with higher CSV have higher long-run value, as the coefficient of Tobin's Q on CSV Market becomes positive and significant among the family CEOs as well as among the non-family CEOs. The coefficient of EBITDA on CSV was negative and significant among non-family CEOs, but the coefficient of EBITDA on CSV Market is positive and insignificant, appearing to weaken the support for Hypothesis 1-B, and the assertion that the agency problem between controlling shareholders and non-family CEOs is well solved in firms with high CSV. The coefficients on R&D and Capital Expenditure show no changes of sign or significance; thus, the findings continue to support Hypothesis 2-A (but only among non-family CEOs) and Hypothesis 2-B among both family and non-family CEOs.

<Table 6>

5.2.3. *Alternative specification*

While the individual affiliate firms of a chaebol have relatively narrow scope, firm

size is itself an element of complexity. Consequently, it may require more attention to achieve a 1% improvement in a large affiliate firm than a 1% improvement in a small affiliate firm. This suggests we look at the interaction term $CFR \times Size$, to see whether its inclusion weakens the CSV effect. However, the correlation between CFR and $CFR \times Size$ is 0.987 in our sample,³² indicating that $CFR \times Size$ is effectively collinear with CFR . The correlation between CSV and $Size$ is 0.383, while the correlation between CSV and CFR is 0.202, indicating that CSV carries information and our specification is not subject to multicollinearity problems. In particular, it rules out the possibility that the CSV effect is simply an interaction between CFR and $Size$.

However, Table 4 does give us some information on the relationship between $Size$ and CSV . In each specification in which the coefficient of Tobin's Q on CSV is significant, the coefficient is positive, while the coefficient of Tobin's Q on $Size$ is negative. In the specification in which the coefficient of $EBITDA$ on CSV is significant (i.e. in the subgroup of family CEOs), the coefficient is negative, while the coefficient of $EBITDA$ on $Size$ is positive. This pattern, in which coefficients on $Size$ are of opposite sign to those on CSV whenever the coefficients on CSV are significant, suggests that increasing $Size$ may reduce the effectiveness of attention from controlling shareholders. If so, the effects of $Size$ and CSV on level of attention and its efficacy are separate effects, and not simply an

³² The correlation between $Size$ and $CFR \times Size$ is -0.041.

interaction between CFR and Size.

6. Concluding Remarks

Based on extensive data on Korean business groups, we tested several hypotheses based on the CSV effect, under which controlling shareholders are expected to increase the value of those affiliates in which they invested relatively larger amount of capital than other affiliates. We found the following results.

First, CSV has greater explanatory power for firm value than CFR. Previous studies, which have focused on CFR, have overlooked this CSV effect.

Second, an increase in CSV increased firm value (Tobin's Q), at least among firms with non-family CEOs. The CSV effect is robust among non-family CEOs to changes in the measurement of CSV, and to the use of IV analysis. The presence of the CSV effect among firms with family CEOs is at best weak and is dependent on the precise empirical specification.

Third, we found evidence that high CSV contributes to the effective solution of the Type I agency problem between controlling shareholders and CEOs among the firms with non-family CEOs, taking actions that increase long-run firm value even at the cost

of reduced short-run firm performance (EBITDA). This finding held when we used CSV, in both OLS and IV analyses, but disappeared when we used CSV Market.

This paper contributes to existing literature by highlighting the importance of the CSV effect in dynamics of business group. The results indicate a need for considering the CSV effect when examining the relationship between ownership structure and firm performance or value.

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Table 1

The sample: the number of business groups and their affiliated firms.

The sample firms consist of family-controlled firms that are affiliates of business groups designated by the Fair Trading Commission (FTC).

Year	No. of business group	Affiliated firms		
		Listed	Unlisted	Total
2001	31	137	503	640
2002	35	157	584	741
2003	36	166	615	781
2004	38	171	664	835
2005	41	187	788	975
2006	43	195	816	1,011
2007	55	231	1,206	1,437
2008	31	180	806	986
2009	35	193	892	1,085
2010	38	213	1,151	1,364
2011	43	229	1,336	1,565
Total	426	2,059	9,361	11,420

Table 2
Description of variables

Variable name	Definition
<i>Family Ownership</i>	Total ownership by the controlling shareholder and her family members, affiliated nonprofit organizations, and non-family executives
<i>Affiliates Ownership</i>	Ownership of affiliates
<i>Inside Ownership</i>	The sum of family ownership and affiliates ownership
<i>CFR</i>	Cash flow rights calculated from the equation (1)
<i>CSV</i>	Controlling shareholders' value calculated from the equation (2)
<i>CSV Market</i>	An alternative measure of CSV using market value
<i>Equity Investments in Other Affiliates</i>	A member firm's equity investments in other affiliates divided by the sum of all member firms' equity investments in other affiliates
<i>Family CEO dummy</i>	1 if either the controlling shareholder or her family member is CEO and 0 otherwise
<i>Tobin's Q</i>	(book value of debt + market value of equity)/book value of asset
<i>EBITDA</i>	Net cash flow from operation/assets
<i>Size</i>	$\ln(\text{assets})$
<i>Lev</i>	Debt/asset
<i>Age</i>	Number of years after foundation (Months are in decimal)
<i>Liquidity</i>	Cash and cash equivalent/assets
<i>Capital Expenditure</i>	Net cash outflow from investment/assets
<i>Financial dummy</i>	1 if the firm is in the financial sector and 0 otherwise
<i>Industry dummies</i>	1 if the firm belongs to a specific industry under 2-digit KSIC code and 0 otherwise
<i>Group dummies</i>	1 if when the firm belongs to a business group or 0 otherwise
<i>No. of Affiliates</i>	Number of affiliates
<i>No. of Industries</i>	Number of industries involved based on 2-digit KSIC code
<i>Diversification</i>	No. of Industries/No. of Affiliates

Table 3

Descriptive statistics: listed firms.

Family Ownership is the sum of direct ownership by the controlling shareholder and her family members, affiliated non-profit organization, and non-family executives. *Affiliates Ownership* is the sum of ownership of each affiliate. *Inside Ownership* is aggregate direct ownership by family members and affiliates. The variable *CFR* (cash flow rights) is the sum of controlling shareholder family's direct and indirect ownership calculated from equation (1). *CSV* is the controlling shareholders' stake obtained from equation (2). *CSV Market* is an alternative measure of *CSV*, using market value. *Equity Investments in Other Affiliates* are measured as a member firm's equity investments in other affiliates over the sum of all member firms' equity investments in other affiliates. *Family CEO dummy* is a dummy variable of 1 when either the controlling shareholder or her family is CEO and of 0 otherwise. *Tobin's Q* is defined as sum of debt and market value of equity over assets. *EBITDA* is defined as net cash flow from operation over asset. *Size* is $\ln(\text{assets})$ and *Lev* is defined as debt over assets. *Age* is firm year and months are in decimal. *Liquidity* is defined as cash and cash equivalent over assets and *Capital Expenditure* is defined as net cash outflow from investment over assets. *Financial dummy* is 1 if the firm is a financial firm and is 0 otherwise. *No. of Affiliates* is the number of affiliates in a business group. *No. of industries* is the number of industries that a business group engages and the industry classification is from 2-digit KSIC code.

Variable name	Mean	Median	Std. dev.	Min.	Max.	No. of obs.
<i>Family Ownership</i>	0.122	0.035	0.166	0.000	0.854	2059
<i>Affiliates Ownership</i>	0.302	0.304	0.210	0.000	1.000	2059
<i>Inside Ownership</i>	0.424	0.410	0.173	0.000	1.000	2059
<i>CFR</i>	0.216	0.163	0.173	0.000	0.987	2059
<i>CSV</i>	0.105	0.049	0.143	0.000	0.925	2059
<i>CSV Market</i>	0.203	0.066	0.275	0.000	1.000	2045
<i>Equity Investments in Other Affiliates</i>	0.159	0.037	0.242	0.000	1.000	2059
<i>Family CEO dummy</i>	0.364	0.000	0.481	0.000	1.000	2059
<i>Tobin's Q</i>	1.162	1.010	0.606	0.213	9.445	2045
<i>EBITDA</i>	0.060	0.056	0.093	-0.615	0.539	2055
<i>R&D</i>	0.006	0.000	0.018	0.000	0.242	2052
<i>Size</i>	13.823	13.881	1.612	9.322	18.802	2058
<i>Lev</i>	0.517	0.531	0.210	0.000	1.176	2058
<i>Age</i>	33.249	33.030	17.533	0.010	83.940	2059
<i>Liquidity</i>	0.067	0.040	0.088	0.000	0.999	2056
<i>Capital Expenditure</i>	0.058	0.046	0.125	-1.174	1.972	2056
<i>Financial dummy</i>	0.087	0.000	0.283	0.000	1.000	2059
<i>No. of Affiliates</i>	36.379	31.000	21.367	3.000	94.000	2059
<i>No. of Industries</i>	15.732	15.000	6.607	3.000	34.000	2059
<i>Diversification</i>	0.497	0.464	0.155	0.200	1.000	2059

Table 4

Results from multivariate analysis.

The dependent variable is Tobin's Q (in *Panel A*) or EBITDA (in *Panel B*). *CFR* is cash flow rights including both direct and indirect ownership in equation (1). *CSV* is the value of the controlling shareholders' shareholding in each affiliate, divided by the combined value of the controlling shareholders' shareholdings in all of the affiliates in the group and is calculated from equation (2). *Family CEO dummy* is 1 if the CEO is a member of the controlling family and is 0 otherwise. *R&D* is defined as R&D expense divided by sales. *Size* is $\ln(\text{assets})$ and *Lev* is defined as debt divided by assets. *Age* is firm year and months are in decimal. *Liquidity* is defined as cash and cash equivalent divided by assets and *Capital Expenditure* is defined as net cash outflow from investment divided by assets. *Financial dummy* is 1 if the firm is a financial firm and is 0 otherwise. *No. of Affiliates* is the number of affiliates in a business group. *Diversification* is the diversification ratio for each business group measured by dividing the number of industries by that of affiliates. Models (1), (2), and (3) employ all listed firms in the sample. Models (4) and (5) analyze the *Family CEO* sub-sample and *Non-family CEO* sub-sample, respectively. Every model controls for fixed-effects of years, business groups, and industries in 2-digit KSIC code. The numbers in the bracket are robust *t*-values where standard errors are adjusted for heteroskedasticity and firm clustering. ***, **, and * denote statistical significance at 1%, 5%, and 10% confidence level, respectively.

	Panel A: The effect of CSV, CFR, and family CEO on Tobin's Q					Panel B: The effect of CSV, CFR, and family CEO on EBITDA				
	All listed firms			Family CEO sub-sample	Non-family CEO sub-sample	All listed firms			Family CEO sub-sample	Non-family CEO sub-sample
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>CFR</i>	-0.211 [-0.99]		-0.287 [-1.37]	-0.903*** [-3.13]	-0.009 [-0.04]	-0.083*** [-3.64]		-0.082*** [-3.55]	-0.109*** [-2.64]	-0.034 [-1.08]
<i>CSV</i>		0.657*** [3.87]	0.696*** [4.14]	0.160 [1.19]	1.117*** [3.62]		-0.020 [-0.93]	-0.009 [-0.41]	0.030 [1.04]	-0.083** [-2.20]
<i>Family CEO dummy</i>	-0.003 [-0.07]	-0.014 [-0.30]	-0.003 [-0.06]			-0.008 [-1.35]	-0.011* [-1.83]	-0.008 [-1.35]		
<i>R&D</i>	3.744*** [3.90]	3.721*** [3.81]	3.707*** [3.80]	3.918** [2.14]	2.979*** [2.89]	-0.143 [-1.17]	-0.138 [-1.09]	-0.142 [-1.17]	-0.069 [-0.24]	-0.256** [-2.08]
<i>Capital Expenditure</i>	0.560*** [3.89]	0.597*** [4.17]	0.594*** [4.17]	0.528** [2.08]	0.409*** [2.69]	0.224*** [5.86]	0.225*** [5.80]	0.224*** [5.86]	0.227*** [3.38]	0.211*** [5.04]
<i>Size</i>	-0.013 [-0.68]	-0.048** [-1.99]	-0.049** [-2.00]	0.038 [1.36]	-0.083** [-2.28]	0.008*** [3.67]	0.009*** [3.27]	0.009*** [3.17]	0.008* [1.90]	0.009*** [2.72]
<i>Lev</i>	0.371*** [3.02]	0.386*** [3.17]	0.371*** [3.08]	0.062 [0.38]	0.354** [2.10]	-0.075*** [-3.94]	-0.071*** [-3.67]	-0.075*** [-3.94]	-0.092** [-2.54]	-0.084*** [-3.60]
<i>ln(Age)</i>	-0.076*** [-2.79]	-0.087*** [-3.13]	-0.085*** [-3.05]	-0.088*** [-3.67]	-0.084* [-1.77]	0.001 [0.30]	0.001 [0.21]	0.001 [0.34]	0.000 [0.01]	0.002 [0.32]

<i>Liquidity</i>	0.855*** [2.74]	0.854*** [2.71]	0.830*** [2.65]	1.434*** [3.41]	0.499 [1.31]	0.280*** [6.00]	0.287*** [6.07]	0.281*** [6.04]	0.233** [2.58]	0.308*** [5.82]
<i>Financial dummy</i>	-0.369 [-1.33]	-0.454 [-1.52]	-0.461 [-1.56]	-1.646*** [-7.03]	-0.381 [-1.49]	-0.162*** [-3.38]	-0.159*** [-3.45]	-0.161*** [-3.38]	-0.147** [-2.04]	-0.148** [-2.51]
<i>ln(No. of Affiliates)</i>	-0.049 [-0.71]	-0.011 [-0.16]	-0.006 [-0.09]	0.022 [0.20]	-0.020 [-0.20]	-0.024* [-1.91]	-0.026** [-2.02]	-0.024* [-1.94]	-0.010 [-0.53]	-0.026 [-1.28]
<i>Diversification</i>	0.250 [1.37]	0.215 [1.17]	0.245 [1.35]	0.690*** [2.77]	-0.119 [-0.46]	0.010 [0.28]	0.001 [0.03]	0.010 [0.28]	0.031 [0.57]	-0.014 [-0.28]
<i>Constant</i>	1.322*** [3.06]	1.593*** [3.40]	1.631*** [3.44]	2.196*** [3.50]	1.458** [2.03]	0.208*** [3.08]	0.193*** [2.85]	0.204*** [2.96]	0.154 [1.09]	0.171* [1.83]
<i>Year/Group/Industry dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>No. of Obs.</i>	2,040	2,040	2,040	744	1,296	2,040	2,040	2,040	744	1,296
<i>Adjusted R²</i>	0.390	0.399	0.401	0.598	0.406	0.316	0.308	0.315	0.331	0.329

Table 5

Robustness check: instrumental variables analysis.

The dependent variable is Tobin's Q (in Panel A) or EBITDA (in Panel B). *CFR* is cash flow rights measured by the sum of direct ownership and indirect ownership in equation (1). *CSV* is the controlling shareholder's investment in an affiliate relative to her total investment in the business group and is calculated from equation (2). *Family CEO dummy* is 1 if the CEO is either the controlling shareholder or her family and is 0 otherwise. *Size* is $\ln(\text{assets})$ and *Lev* is defined as debt over assets. *Age* is firm year and months are in decimal. *Liquidity* is defined as cash and cash equivalent over assets and *Capital Expenditure* is defined as net cash outflow from investment over assets. *Financial dummy* is 1 if the firm is a financial firm and is 0 otherwise. *No. of Affiliates* is the number of affiliates in a business group. *Diversification* is the diversification ratio for each business group measured by dividing the number of industries by that of affiliates. *Lagged Q (Lagged EBITDA)* denote Tobin's Q (EBITDA) for the previous fiscal year and *Equity Investments in Other Affiliates* are measured as a member firm's equity investments in other affiliates over the sum of all member firms' equity investments in other affiliates; these are instrumental variables in the analyses. Model (3) analyzes all listed firms, while Models (4) and (5) represent the family CEO and non-family CEO subsamples, in 2-SLS tests. Every model controls for fixed-effects of years, business groups, and industries in 2-digit KSIC code. The numbers in the parenthesis are robust *t*-values where standard errors are adjusted for heteroskedasticity and firm clustering. ***, **, and * denote statistical significance at 1%, 5%, and 10% confidence level, respectively.

	Panel A: Tobin's Q						Panel B: EBITDA					
	All listed firms		Family CEO		Non-family CEO		All listed firms		Family CEO		Non-family CEO	
	(3)	(4)	(5)	(3)	(4)	(5)	(3)	(4)	(5)	(3)	(4)	(5)
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
	CSV	Q	CSV	Q	CSV	Q	CSV	EBITDA	CSV	EBITDA	CSV	EBITDA
<i>CFR</i>	0.046 [1.05]	-0.640** [-2.07]	0.140 [1.50]	-1.921 [-0.91]	0.080* [1.92]	-0.430 [-1.27]	0.041 [0.94]	-0.042 [-1.60]	0.140 [1.49]	0.006 [0.03]	0.078* [1.86]	0.019 [0.60]
<i>CSV</i>		4.951*** [3.61]		8.355 [0.59]		4.972*** [2.95]		-0.189** [-2.00]		-0.765 [-0.55]		-0.215** [-2.25]
<i>Family CEO dummy</i>	-0.007 [-0.70]	-0.050 [-0.72]					-0.008 [-0.74]	-0.010* [-1.68]				
<i>R&D</i>	-0.140 [-0.93]	4.077*** [3.08]	-0.791 [-1.44]	11.100 [0.98]	-0.065 [-0.43]	2.984** [2.24]	-0.075 [0.51]	-0.195 [-1.57]	-0.767 [-1.38]	-1.098 [-0.93]	-0.049 [-0.33]	-0.285** [-2.00]
<i>Capital Expenditure</i>	-0.071*** [-2.89]	0.885*** [4.19]	-0.123** [-1.98]	1.587 [0.88]	-0.067*** [-4.04]	0.693*** [3.18]	-0.060** [-2.43]	0.240*** [4.94]	-0.125** [-2.05]	0.130 [0.61]	-0.055*** [-3.46]	0.223*** [4.57]
<i>Size</i>	0.034*** [6.75]	-0.251*** [-3.14]	0.072*** [5.14]	-0.564 [-0.52]	0.021*** [3.80]	-0.210** [-2.53]	0.034*** [6.74]	0.017*** [2.99]	0.071*** [5.18]	0.067 [0.63]	0.021*** [3.87]	0.016*** [2.97]
<i>Lev</i>	0.022 [0.77]	0.372** [2.04]	-0.056 [-0.76]	0.550 [0.50]	0.034 [1.41]	0.243 [1.05]	0.027 [0.92]	-0.068*** [-3.19]	-0.052 [-0.72]	-0.148 [-1.09]	0.031 [1.30]	-0.081*** [-3.28]
$\ln(\text{Age})$	0.012 [1.61]	-0.169*** [-2.81]	0.017 [1.26]	-0.240 [-0.82]	0.004 [0.66]	-0.167** [-2.37]	0.011 [1.44]	0.001 [0.18]	0.017 [1.26]	0.010 [0.36]	0.003 [0.43]	0.000 [0.04]
<i>Liquidity</i>	0.086 [1.34]	0.381 [0.78]	0.021 [0.11]	1.122 [0.78]	0.027 [0.54]	0.142 [0.28]	0.094 [1.48]	0.266*** [5.48]	0.018 [0.10]	0.276 [1.49]	0.035 [0.70]	0.266*** [4.94]

<i>Financial dummy</i>	0.151***	-0.853*	0.326***	-3.949	0.119**	-0.625	0.146***	-0.160**	0.326***	-0.061	0.113**	-0.150*
	[2.67]	[-1.78]	[3.47]	[-0.87]	[2.15]	[-1.63]	[2.65]	[-2.56]	[3.52]	[-0.14]	[2.03]	[-1.93]
<i>ln(No. of Affiliates)</i>	-0.042**	0.149	-0.059*	0.518	-0.029	-0.046	-0.044**	-0.048***	-0.058*	-0.062	-0.032	-0.049*
	[-2.10]	[1.03]	[-1.85]	[0.59]	[-1.22]	[-0.27]	[-2.19]	[-3.00]	[-1.81]	[-0.73]	[-1.33]	[-1.97]
<i>Diversification</i>	0.020	0.096	0.051	0.241	0.013	-0.261	0.023	0.005	0.053	0.097	0.007	-0.049
	[0.36]	[0.27]	[0.69]	[0.24]	[0.24]	[-0.59]	[0.41]	[0.12]	[0.73]	[0.81]	[0.14]	[-0.81]
<i>Lagged Q</i>	0.017***		0.004		0.009*							
	[3.01]		[0.33]		[1.70]							
<i>Lagged EBITDA</i>							-0.002		0.042		-0.054**	
							[-0.09]		[0.75]		[-2.55]	
<i>Equity investments in other affiliates</i>	0.168***		0.026		0.234***		0.171***		0.027		0.247***	
	[4.98]		[0.50]		[5.12]		[5.07]		[0.51]		[5.27]	
<i>Constant</i>			-									
	0.053	2.112***	0.740***	7.019	0.138	3.059***	0.079	-0.236***	-0.737***	-0.628	0.173	-0.125
	[0.43]	[2.73]	[-2.67]	[0.61]	[1.05]	[2.99]	[0.67]	[-3.25]	[-2.68]	[-0.54]	[1.34]	[-1.13]
<i>Year/Group/Industry dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>No. of Obs.</i>		1,672		626		1,046		1,672		626		1,046

Table 6

Robustness check: using CSV market instead of CSV.

The dependent variable is Tobin's Q (in *Panel A*) or EBITDA (in *Panel B*). *CFR* is cash flow rights including both direct and indirect ownership in equation (1). *CSV Market* is CSV measured by market capitalization times CFR for an affiliate over the sum of market capitalization times CFR of all affiliates. *Family CEO dummy* is 1 if the CEO is a member of the controlling family and is 0 otherwise. *R&D* is defined as R&D expense divided by sales. *Size* is $\ln(\text{assets})$ and *Lev* is defined as debt divided by assets. *Age* is firm year and months are in decimal. *Liquidity* is defined as cash and cash equivalent divided by assets and *Capital Expenditure* is defined as net cash outflow from investment divided by assets. *Financial dummy* is 1 if the firm is a financial firm and is 0 otherwise. *No. of Affiliates* is the number of affiliates in a business group. *Diversification* is the diversification ratio for each business group measured by dividing the number of industries by that of affiliates. Models (1)-(3) analyze all listed firms, while Models (4) and (5) represent the family CEO and non-family CEO subsamples, in 2-SLS tests. Every model controls for fixed-effects of years, business groups, and industries in 2-digit KSIC code. The numbers in the bracket are robust *t*-values where standard errors are adjusted for heteroskedasticity and firm clustering. ***, **, and * denote statistical significance at 1%, 5%, and 10% confidence level, respectively.

	Panel A: The effect of CSV, CFR, and family CEO on Tobin's Q					Panel B: The effect of CSV, CFR, and family CEO on EBITDA				
	All listed firms			Family CEO sub-sample	Non-family CEO sub-sample	All listed firms			Family CEO sub-sample	Non-family CEO sub-sample
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>CFR</i>	-0.211 [-0.99]		-0.569*** [-2.96]	-1.235*** [-4.83]	-0.338 [-1.59]	-0.083*** [-3.64]		-0.093*** [-3.76]	-0.125*** [-2.70]	-0.055 [-1.62]
<i>CSV market</i>		0.833*** [7.44]	0.918*** [8.50]	0.611*** [6.14]	1.257*** [6.10]		0.011 [0.84]	0.024* [1.82]	0.034 [1.46]	0.020 [1.11]
<i>Family CEO dummy</i>	-0.003 [-0.07]	-0.036 [-0.81]	-0.017 [-0.37]			-0.008 [-1.35]	-0.011* [-1.90]	-0.008 [-1.42]		
<i>R&D</i>	3.744*** [3.90]	3.363*** [3.50]	3.299*** [3.49]	3.566** [2.06]	2.754*** [2.69]	-0.143 [-1.17]	-0.144 [-1.13]	-0.154 [-1.29]	-0.105 [-0.37]	-0.270** [-2.14]
<i>Capital Expenditure</i>	0.560*** [3.89]	0.502*** [3.75]	0.485*** [3.70]	0.503** [2.17]	0.300** [2.19]	0.224*** [5.86]	0.225*** [5.79]	0.222*** [5.82]	0.223*** [3.33]	0.214*** [5.06]
<i>Size</i>	-0.013 [-0.68]	-0.123*** [-4.55]	-0.131*** [-4.83]	-0.073** [-2.48]	-0.170*** [-4.10]	0.008*** [3.67]	0.006** [2.20]	0.005* [1.68]	0.004 [0.60]	0.004 [1.07]
<i>Lev</i>	0.371*** [3.02]	0.476*** [4.08]	0.455*** [3.92]	0.144 [0.95]	0.472*** [3.07]	-0.075*** [-3.94]	-0.069*** [-3.56]	-0.073*** [-3.76]	-0.088** [-2.46]	-0.083*** [-3.42]
<i>ln(Age)</i>	-0.076*** [-2.79]	-0.092*** [-3.56]	-0.090*** [-3.44]	-0.094*** [-4.25]	-0.079* [-1.82]	0.001 [0.30]	0.000 [0.05]	0.000 [0.17]	0.000 [0.01]	0.001 [0.16]
<i>Liquidity</i>	0.855*** [2.74]	0.742** [2.38]	0.683** [2.22]	1.355*** [3.46]	0.420 [1.15]	0.280*** [6.00]	0.285*** [5.98]	0.276*** [5.92]	0.227** [2.49]	0.304*** [5.66]
<i>Financial dummy</i>	-0.369 [-1.33]	-0.392 [-1.38]	-0.398 [-1.44]	-1.571*** [-6.82]	-0.336 [-1.37]	-0.162*** [-3.38]	-0.162*** [-3.43]	-0.163*** [-3.33]	-0.137* [-1.92]	-0.158** [-2.57]

<i>ln(No. of Affiliates)</i>	-0.049 [-0.71]	-0.003 [-0.04]	0.008 [0.12]	0.070 [0.65]	-0.059 [-0.62]	-0.024* [-1.91]	-0.024* [-1.86]	-0.022* [-1.77]	-0.009 [-0.47]	-0.023 [-1.14]
<i>Diversification</i>	0.250 [1.37]	0.252 [1.40]	0.317* [1.81]	0.732*** [3.14]	-0.133 [-0.54]	0.010 [0.28]	0.001 [0.03]	0.012 [0.33]	0.035 [0.64]	-0.013 [-0.26]
Constant	1.322*** [3.06]	2.385*** [4.91]	2.407*** [4.35]	3.505*** [5.82]	2.908*** [3.71]	0.208*** [3.08]	0.215*** [3.17]	0.198*** [2.75]	0.078 [0.65]	0.231** [2.35]
<i>Year/Group/Industry dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	2,040	2,040	2,040	744	1,296	2,040	2,040	2,040	744	1,296
Adjusted R ²	0.390	0.440	0.449	0.632	0.460	0.316	0.308	0.317	0.334	0.326

Fig. 1-a. CFR of all firm-years

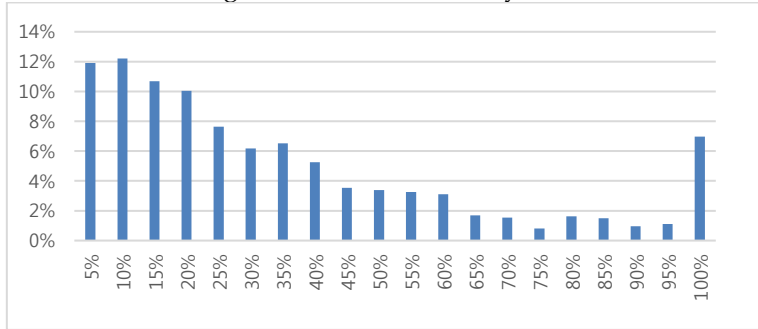


Fig. 1-b. CSV of all firm-years

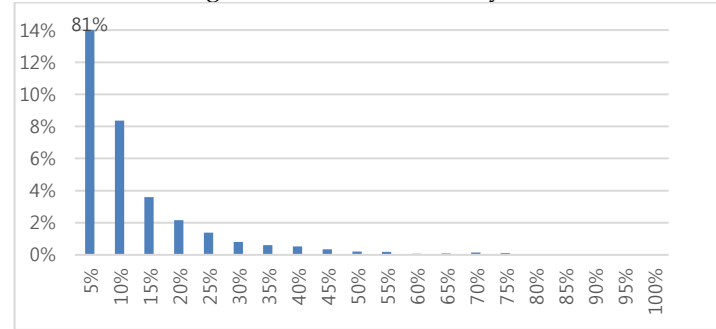


Fig. 1-c. CFR of listed firm-years

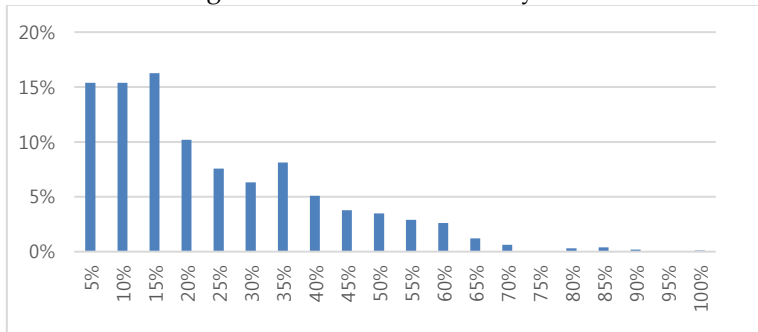


Fig. 1-d. CSV of listed firm-years

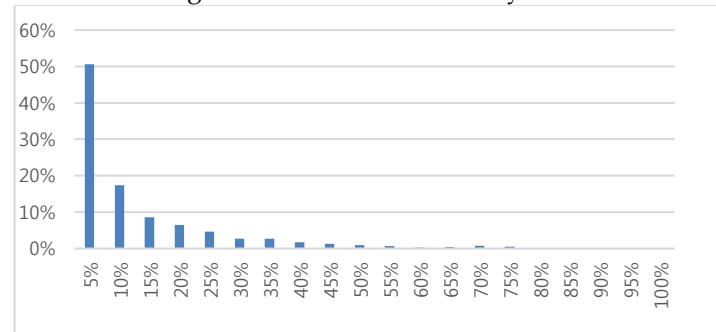


Fig. 1. Distribution of controlling shareholders' cash flow rights and value among affiliated firm. The X-axis represents controlling shareholders' cash flow rights (CFR) and value (CSV) with 5% interval. The Y-axis represents the proportion of sample relevant to a particular interval of the X-axis. Sample used here is based on firm-years observations. Fig. 1-a and Fig. 1-b use 11,420 observations of all firm-years and Fig. 1-c and Fig. 1-d use 2,059 observations of listed firm-years only.