

Internal Fund Allocation and Ownership Structure
: Evidence from Korean business groups

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2003. 11.

Preliminary Draft

Abstract

We examine whether the dispersed asset-weighted ownership structure of a controlling shareholder across member firms within a group (chaebol) have significant explanatory power on the adjusted investment ratio (our measure of the transfer) in the period of 1998 to 2002. As an indirect transfer measure, we use the adjusted investment ratio of Rajan, Servaes, and Zingales (2000). The asset-weighted largest shareholder ownership and inside ownership are our measure of cash flow ownership holdings of controlling shareholders. The results suggest that the ownership structure distorts the allocation of internal funds within chaebols in the direction of making the controlling shareholders more powerful and profitable.

I. Introduction

Recently, funds allocation in internal capital market has been frequently examined in theoretical and empirical researches in terms of explaining diversification discount.

Lamont (1997) and Shin and Stulz (1998) show the existence of internal capital markets in business groups and find evidence of inefficient capital allocation in business groups. Shin and Park (1999) show that internal capital market also exists in Korean business conglomerates, “Chaebol” even though, unlike U.S., each member firm in chaebol group exists as an independent economic entity. They document that the internal capital market works inefficiently.

As a source of the inefficient behavior of internal capital market, Rajan, Servaes and Zingales (2000) suggest that internal power struggles distort the allocation of resources when diversity in resources and opportunities among segments are high. Scharfstein and Stein (2000) also argue that divisional rent seeking behavior by segment managers cause inefficient fund allocation in diversified firms. They called the fact that weaker divisions get subsidized by stronger ones “socialism”.

In contrast to these views in internal resource allocation, Stein (1997) argues that it would be positive role of internal capital market that winner-picking behavior can contribute to value creation in diversified firms.

Most recently, Billet and Mauer (2003) divide the internal capital market into efficient (or inefficient) subsidy and transfer. And then, they link the components to the excessive value of diversified firms to explain the diversification discount.

This Study suggests that the allocation behavior in internal capital market could be affected by the ownership structure in the business group. Owners of business groups are often

criticized for expropriating minority shareholders by transferring resources from the firms where they have low cash flow rights to those where they have high cash flow rights, this phenomenon is called as “Tunneling” (Johnson, La Porta, Lopez-de-Silanes, and Shleifer (2000))

Bertrand, Mehta and Mullainathan (2002) show that a significant amount of tunneling via non-operating components of profit occurs in Indian business groups. They support it by showing the propagation of earning shocks across firms within a group.

Chang and Shin (2003) examine tunneling evidence in Korean Chaebols using combined financial statement data from 1999 to 2000. However, they show that their empirical findings are not consistent with the tunneling hypothesis when they use operating cash flows as a tunneling device. However, Bae, Kang and Kim (2002) find the evidence of tunneling that controlling shareholders benefit from the acquisitions which increase the value of other group firms in Chaebol.

According to the tunneling hypothesis, we argue that the internal resources in business groups could be transferred from firms where controlling shareholders have low cash flow rights to those where they have high cash flow rights. Therefore, funds allocation within firms where controlling shareholders have high cash flow rights is more efficient to make all investment opportunities they have be fully satisfied without regarding their own status of available resources and external financing constraints. Controlling shareholders have incentives to make more efficient investments for firms with high cash flow rights than firms with low cash flow rights.

As a transfer measure of capital across firms in business groups, we follow Rajan, Servaes and Zingales (2000). They suggest the measure which is the transfer in a particular year in a firm to segments that belong to the particular group.

To measure absolute value of cash flow rights that the controlling shareholders have in each affiliated firm, we use normalized asset-weighted ownership measures. We multiplied each of two ownership variables, largest shareholder ownership and inside ownership, by total assets and divided it by sum of asset-weighted ownership of all affiliates in the same group. The largest shareholder's ownership consists of the ownership of the largest shareholder and the holding of its specially related parties (its family members). The inside ownership is the ownership held by all the related parties including other affiliates in the same group in addition to the holdings of the largest shareholder. It is an approximate variable for the cash flow rights of controlling shareholders because the largest shareholders also benefit from the profits of other affiliated firms which have some ownership in the affiliated firm.

Since most of other affiliates in a chaebol group are actually controlled by the largest shareholder in the same group, the inside ownership variable could be considered as an appropriate measure for the control rights of a chaebol firm.

Lemmon and Lins (2003) shows that having a significant degree of control over the firm's assets is a necessary condition for expropriation of minority shareholders. Thus, it is likely that the tunneling behavior would occur more often within the firms where controlling shareholders have relatively high controlling powers. We expect that tunneling evidence that make the investment better in firms where the controlling shareholders have high cash flow rights would be more prevalent for affiliated firms where controlling shareholders have large controlling powers i.e. the firms with high inside ownership holdings. We examine it with two subsamples divided into firms with above-median inside ownership and firms with below-median inside ownership.

Johnson, Boone, Breach and Freidman (2000) show that Korea has relatively low level of legal protection for minority shareholders, and these countries with poor corporate governance

system were more affected by the Asian crisis because expropriation by managers are more prevalent in such countries. Consistently, Kim and Lee (2003) and Baek, Kang, and Park (2002) also report that corporate governance and proxy variables for agency problems explain the decline in firm value during the crisis in Korea. Thus, we expect that the tunneling evidence would be more prevalent during the crisis. This is tested using 1998 sample separately.

II. Data and Variables

1. Sample firms

Our initial sample consists of all the 2,900 firms that are listed in the Korea Stock Exchange (KSE) between 1998 and 2001. From these, we exclude financial firms, the firms without financial statement data in the Korea Listed Companies Association (KLCA)'s database. This resulted in 1,933 firms. These firms are then classified as chaebol or non-chaebol for each year according to the information announced by the Korea Fair Trade Commission (KFTC). In April of each year, KFTC ranks Korean chaebols according to the total asset size and announces the largest 30 chaebol groups.¹

Then for the chaebol firms, we exclude the firms without ownership data and those with less than three member firms. We believe that the chaebol firms with less than three affiliated member firms are not useful in examining the characteristics of internal capital markets in the chaebols. This resulted in the final sample of 1,784 firms (1,514 non-chaebol and 270 chaebol

¹ After 2001, KFTC changed the criterion for the chaebol groups. It classifies all conglomerates as chaebol group whose total assets are over 2 trillion Korean won. Therefore in 2002, 43 largest (not 30) conglomerates were announced as the largest chaebol groups.

firms). The 270 chaebol firms belong to 59 different chaebol group-years.

The ownership data are obtained from the KFTC. In 2002, KFTC announced the new ownership data on chaebol firms available from 1998. Unlike the existing data, these data contain information on the ownership holdings of a chaebol firm by other affiliated member firms in the same chaebol group. These data enable us to calculate the total inside ownership held by all the related parties including other affiliates in the same group in addition to the holdings of the largest shareholder.² Since most of other affiliates in a chaebol group are actually controlled by the largest shareholder in the same group, the inside ownership variable would be an appropriate measure for the control rights of a chaebol firm. We also use the largest shareholder's ownership as a separate ownership variable which consists of the ownership of the largest shareholder and the holding of its specially related parties (its family members).

For the test, we use two different sets of financial statements, individual, and consolidated financial statements in the test. Consolidated financial statements are required for the parent companies that have majority owned affiliated firms. In the U.S., the consolidated financial statements appropriately show financial status of an economic entity that is controlled by the same company. However, unlike the U.S., the Korean ownership structure is characterized as a pyramidal and cross ownership structure in which a control of a firm is possible with much less than the majority holdings (Schleifer and Vishny (1997)).

We expect that the consolidated financial statements might better reflect the economic reality of the chaebol group as a whole and are more useful in monitoring illegal practices among chaebol member firms such as cross-subsidizations, unfair internal transactions and

² As Chang and Shin (2003) point out, it is impossible to calculate exact inside ownership holdings with ownership data reported on the individual financial statement because the owner-classification required to report in the individual financial statement is not appropriate to discriminate exact level of ownership rights of affiliated firms.

lavish debt guarantees than individual financial statements since it contains non-listed companies' financial information as well as the listed parent company's

2. Variables

Since we do not have direct data on transferred funds from/to affiliated firms in Chaebol, as a transfer measure of internal resources among member firms, we used Rajan, Servaes and Zingales (2000)'s industry and firm adjusted investment ratio which is proxy for the transfers that the segment makes or receives. We approximate the investment an affiliated firm would have made on its own by the investment ratio of non-chaebol firms in the same industry (which is the weighted average of the ratio of capital expenditures to beginning of period assets). We classify industry according to 2-digit industrial classification code of Korea National Statistical Office.

In addition to the non-chaebol and industry adjustment, we add group level adjustment. It is possible that diversified firms like chaebol have more funds overall, perhaps because their cost of capital is low. To correct for this, we follow the way of Rajan, Servaes and Zingales; we further subtract the non-chaebol and industry adjusted investment ratio averaged across the affiliates in the group from the affiliated firm's non-chaebol and industry adjusted investment ratio. It is the proxy for the transfers the firm makes (if it is negative) or subsidy (if positive).

It is computed as

$$\frac{I_i}{BA_i} - \frac{I_i^{Nonch}}{BA_i^{Nonch}} - \sum_{i=1}^n w_i \left(\frac{I_i}{BA_i} - \frac{I_i^{Nonch}}{BA_i^{Nonch}} \right)$$

Where I_i refers to capital expenditure of firm i in a chaebol and BA_i is book value of assets of firm i . $Nonch$ refers to non-chaebol firms and w_i is firm i 's share of total sum of group assets in a chaebol.

Measuring absolute value of cash flow holding the controlling shareholders have, considering relative level of absolute ownership value in a business group, we use median-adjusted asset-weighted ownership variables which is normalized by total sum of asset-weighted ownership value the controlling shareholder have in the business group. We call this *asset-weighted Lar (Inside)* and it is calculated as

$$\frac{Lar_i(Inside_i) \times Assets_i}{\sum_{i=1}^n Lar_i(Inside_i) \times Assets_i} - Median(Average)_n \left(\frac{Lar_i \times Assets_i}{\sum_{i=1}^n Lar_i(Inside_i) \times Assets_i} \right)$$

where $Lar_i(Inside_i)$ refers to the largest shareholder (inside) ownership of firm i in beginning of the year t and $med(average)_n(.)$ means median (average) value of normalized assets-weighted ownership among n member firms in a chaebol.

As an investment opportunity measure, we used market-to-book ratio. Market value is defined as the sum of the market value of common stock and the book value of debt and preferred stock. The book value of assets comes from firms' balance sheets. Likewise, to consider relative superiority of investment opportunity in a chaebol, we adjusted asset-weighted average of affiliates' market-to-book ratio as the group's investment opportunity measure from each affiliated firm's market-to-book ratio.

Table I reports the summary statistics of the variables. In panel A, mean total assets of chaebol firms are about 5 times larger than that of non-chaebol firms. Mean total debt of chaebol firms are about 6 times larger than that of non-chaebol firms. The 4th column shows that these differences are statistically strongly significant when tested Wilcoxon rank-sum z-statistics.

The lower market-to-book ratio of chaebol firms compared to non-chaebol firms is consistent with Shin and Park (1999). However, it is not statistically significant. Different

from the findings of Shin and Park, chaebol firms do not show systematic heavier investment than non-chaebol firms do during our sample period.

In Panel B, we report descriptive statistics of group adjusted values of the variables. Mean of simple largest ownership of chaebol firms is 9.31 percent and average of the inside ownership is 36.2 percent. Mean and median value of transfer is 3.57 and -0.34 percent, respectively, suggesting that the distribution is skewed. Mean values of asset-weighted largest and inside ownership are 12.92 and 4.90 percent respectively, with high standard deviations. It means that asset values of the ownership of the controlling shareholders are widely dispersed across the member firms in the group.

III. Empirical Results

We test the statistical significance of ownership variables in explaining transfer across member firms using regression analyses. Our specification includes firm fixed effects, calendar-year dummies, and the firm size measured by log of assets or sale of each firm³. The inclusion of a separate dummy variable for each firm allows us to control for unobserved heterogeneity over time in our panel data. Thus, our findings are not affected by cross-sectional differences in organizational structure or individual firm reporting.

Table II consists of two panels in which we separately report the result related with the largest ownership (Panel A) and the inside ownership (Panel B), respectively. The model (1)

³ Another size measure we used is group median (or average) adjusted normalized assets. It is the firm's assets normalized by total sum of assets of all firms in the business group subtracting median (or average) value of normalized assets among the firms in the group. However, the results are not qualitatively different.

of each panel report the result based on full sample. The estimated coefficient of asset-weighted Lar (or Inside) is negative. If the controlling shareholder forces the resources to move into the firms where they have high cash flow ownership, the coefficient should be positive. This suggests that funds are not simply move toward the firms with high asset-weighted Lar (or Inside) holdings.

However, the significant positive coefficient of an interaction variable between asset-weighted Lar (or Inside) and the variable, $M/B - \bar{M/B}$, indicates that the resources move toward the direction in which it make the firms with high asset-weighted cash flow ownership make better decision in group-wise capital budgeting.

The firms with relative greater potential in investment opportunities and profitability within the group should receive more capital if internal capital market of the group is efficient. The result suggests that firms with high investment opportunities invest more than the firms with low investment opportunities within firms where controlling shareholders have relatively high asset-weighted ownership. This suggests that internal capital allocation is efficient. The controlling shareholder benefits most by making internal capital allocation across the firms with relatively high asset-weighted cash flow ownership more efficient using funds from other affiliates where they have relatively small ownership holdings. This reflects the tunneling evidence in internal capital market of chaebol firms.

In model (2) and (3) of each panel, we report the regression results for the subsamples based on our measure of overall level of simple control rights held by the controlling shareholders. To test whether the tunneling evidences would be more frequent among high insider ownership firms with above median value of inside ownership each year, first, we test the regression with separate subsamples of above/below median inside holdings and then, in model (4) and (5), examine statistical differences by adding interaction term between high inside holding dummy

and ownership variables in the whole sample. We expect the firms with the above-median control rights are more exposed to the expropriation of minority shareholders.

The results are in line with our expectations. It shows that the effect of tunneling is more significant in the subsample of firms where controlling shareholder hold more control powers. In model (4) of each panel, we test it again for more formal statistical support for our hypothesis by including an indicator variable, *High Inside (HI) Dummy*, which is 1 for firms with above-median inside rights, otherwise 0 and an interaction term between the control right indicator variable (HI dummy) and asset-weighted largest (or inside) ownership. In model (5) of each panel, we include an interaction term between HI dummy and an interaction term of $M/B - \bar{M}/\bar{B}$ and asset-weighted largest (or inside) ownership variable.

The results are consistent with our hypothesis. In model (5), the coefficient estimate of the interaction term is significantly positive indicating that the firms with ownership structure in which controlling shareholders have above-median control rights show more problematic capital allocation behavior in internal capital markets. The gap of the efficiency of internal capital market between the firms with high largest (or inside) ownership and the firms with low largest (or inside) ownership is bigger within firms where controlling shareholders have above-median control powers. However, we couldn't find any evidence from coefficient estimates of an interaction term in model (4) that internal funds simply move toward the firms with high asset-weighted largest (or inside) ownership even in the firms where controlling shareholders have relatively high control powers.

Table III shows the results of the regression analyses using consolidated financial statements. In models (1), (2) and (3) of panel A with asset-weighted largest ownership variable, the interaction term between $M/B - \bar{M}/\bar{B}$ and asset-weighted largest ownership shows

positive coefficient estimates even though we find that the significance is not enough for results with inside ownership variables in panel B.

Different from table II, the degree of controlling power measured by inside ownership held by controlling shareholders does not provide any difference for the explanatory power of interaction variables except for an interaction term between asset-weighted largest ownership and high inside dummy which is slightly negatively significant.

Contrary to our expectation that it better reflects the tunneling behavior across member firms in chaebol since it encompasses almost all non-listed affiliated firm's financial information within a group. It does not show any significant relationship between ownership variables and transfer measures. It might suggest that each subordinate company included in the consolidated financial statement of the parent company should be considered as an independent entity since the controlling shareholders hold their ownership privately even though we could not find out existing state of it with our ownership and financial dataset.⁴

As previously noted, Johnson, Boone, Breach, and Friedman (2000) argue that managers are more likely to expropriate minority shareholders during a crisis when the expected return on investment falls. They show that countries with weak corporate governance have experienced a larger fall in asset prices during the crisis. Following their arguments, we test the tunneling behavior on corporate capital budgeting during the crisis separately.

Table IV reports the results based on the subsample of 1998.⁵ When analyzing with asset-

⁴ Since all subordinate companies of a parent company are non-public ones and they don't have market valuations, they are not applicable to our way of analyses which need separate ownership information and market-to-book ratio as a proxy for investment opportunity.

⁵ Mitton (2002), Kim and Lee (2003) set the crisis period as June (May) 1997 to August 1998 when using stock price performance. Kim and Lee used change in ROA from end of 1997 to end of 1998 as operating

weighted inside ownership, we find evidence consistent with our hypothesis. Different from previous results of Table II, in models (1), (2), and (3) of panel B, the coefficient estimate on asset-weighted largest ownership variable is positive and significant, suggesting that controlling shareholder would like to transfer funds to the firm where their asset-weighted inside holdings are relatively high compared to the other member firms in the group regardless of the firm's investment opportunity.

In model (4) of each panel, we statistically analyze the difference of coefficient between 1998 and the other years by including 1998 indicator variable in our regression. The coefficient estimate on the interaction term between 1998 indicator variable and asset-weighted Lar (or Inside) is significantly positive. It satisfies our expectation that the tunneling behavior in internal capital market seems to be severe especially during the crisis.

Rajan, Servaes, and Zingales (2000) suggests that divisions within a firm have widely diverse asset-weighted investment opportunities, managers of divisions with good investment opportunities have an incentive to choose low-return defensive investments, not the most profitable investment. They show their measure of diversity in investment opportunity explains transfer across divisions in each group differently, depending on their level of asset-weighted investment opportunity.

To control for the effect of diversity on transfer, we divide our sample into two groups depending on whether the firm's asset-weighted investment opportunity is above or below the group average. Then, we include a measure of diversity in our regression equation which is the standard deviation of a group's asset-weighted market-to-book ratio divided by the equally

performance measure. We also test with only 1998 subsample because of availability of ownership data and yearly financial statement information.

weighted market-to-book ratio. However, the coefficient estimate on the measure of diversity is not statistically significant and there is not any evidence that our previous result counts on the diversity of a group's investment opportunity.

Additionally, instead of asset-weighted ownership variables, we test above specifications again with equity-weighted ownership variables. If asset-weighted ownership variable measures even controlling benefits from a firm, equity-weighted ownership variables are proxies for only pecuniary benefit from a firm. However, the results seem not to depend on it. Thus, we do not report the results.

IV. Conclusion

Previous studies have documented that internal capital market exists in diversified business group. In addition, studies examine whether internal capital market is efficient or not. This study reports that tunneling behavior explains inefficiencies of internal investment behavior from evidence of Korean business group "Chaebol".

Using the indirect transfer measure of recent Rajan, Servaes, and Zingales (2000), we find that funds allocation within the firms where controlling shareholders have high ownership are more efficient compared to funds allocation within the firms where controlling shareholders have low ownership holdings. The adjusted investment ratio (our transfer measure) is better aligned with the relative investment opportunities in the firms with relatively high controlling shareholder ownership.

The likelihood that the tunneling would occur is higher for firms where controlling shareholders have relatively high controlling power. The tendency of making funds allocation

within the firms where controlling shareholders have relative high ownership holdings more efficiently seems to much more obvious in the firms with above-median inside ownership which is our measure of full controlling power of controlling shareholder,.

In addition, consistent with the expectation that the tunneling evidence would be more severe during the Asian Crisis, funds tend to move to the firms with high ownership of controlling shareholders, not depending on relative investment opportunities of the firms within a group.

Consequently, we find that the dispersed asset-weighted ownership structure of a controlling shareholder across member firms within a group have significant explanatory power on the adjusted investment ratio or the transfer. It suggests that the ownership structure distorts the allocation of internal funds within chaebols in the direction of making the controlling shareholders more powerful and profitable.

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Table I. Descriptive statistics

The table reports mean and descriptive statistics of financial and ownership information for our sample firms. In Panel A, we compare basic financial information for chaebol firms with that of non-chaebol firms. Leverage represents debt ratio calculated as total debt divided by total assets. M/B represents the Market to Book ratio. Market value is defined as sum of market value of common stock and book value of debt and preferred stock. Book value of assets comes from firm's balance sheet. Capital expenditure shows investment ratio normalized by total assets of a firm. Difference represents the z-statistics from the Wilcoxon rank-sum test for the test of the differences of each variable's distributions for chaebol and non-chaebol firms. In Panel B, Largest ownership consists of the ownership of the largest shareholders and the holdings of its special parties (i.e. family members). Inside ownership includes other affiliates in the same group in addition to the holdings of the largest shareholder. M/B refers to asset-weighted average of affiliates' market-to-book ratio within a group. Transfer is defined as non-chaebol-, industry-adjusted investment less the asset-weighted average of non-chaebol, industry-adjusted investment across all the firms in a group. Asset-weighted Lar(Inside) is group median adjusted asset-weighted ownership which is normalized by total sum of asset-weighted ownership the controlling shareholders have within a chaebol group.

Panel A:					
		Non-Chaebol	Chaebol	All	Difference
Number of Observations		1514	270	1784	
Assets (billions of 2000 won)	Mean	500	2725	837	-19.99
Debt (billions of 2000 won)	Mean	292	1844	527	-19.45
Leverage	Mean	0.56	0.66	0.58	-8.74
M/B	Mean	0.88	0.85	0.88	-0.49
Capital Expenditure	Mean	0.08	0.07	0.07	-1.03

Panel B:						
	Mean	Std. Dev.	30 percentile	Median	70 percentile	
Largest ownership (%)	9.31	11.57	1.03	3.76	12.55	
Inside ownership (%)	36.20	17.66	24.60	35.32	47.44	
Transfer (%)	3.57	0.13	-4.63	-0.34	3.57	
M/B – M/B	-0.007	0.28	-0.065	-0.003	0.029	
Asset-weighted Lar (%)	12.92	29.29	-1.55	0	12.45	
Asset-weighted Inside (%)	4.90	21.06	-4.11	0	6.04	

Table II. Regression results with asset-weighted ownership variables

The table represents regression results with our asset-weighted ownership variables. Dependent variable is our measure of transfer which is defined as non-chaebol, industry-adjusted investment less the asset-weighted average of non-chaebol, industry-adjusted investment across all the firms in a group. Size is Log of assets. M/B represents the Market to Book ratio. Market value is defined as sum of market value of common stock and book value of debt and preferred stock. Book value of assets comes from firm's balance sheet. M/B refers to asset-weighted average of affiliates' market-to-book ratio within a group. Asset-weighted Lar (Inside) is group median-adjusted asset-weighted ownership which is normalized by total sum of asset-weighted ownership the controlling shareholders have within a chaebol group. High Inside (HI) Dummy is an indicator variable which have 1 if inside ownership is above-median, otherwise 0. All regressions contain firm-fixed effects and calendar year dummies. Heteroskedasticity robust t-statistics are reported in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level.

	Panel A:					Panel B:				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Full	High Inside	Low Inside	Full	Full	Full	High Inside	Low Inside	Full	Full
Size	-0.097*	-0.037	-0.200**	-0.102*	-0.102*	-0.122**	-0.059	-0.240***	-0.133**	-0.126**
	(-1.65)	(-0.39)	(-2.20)	(-1.70)	(-1.72)	(-2.20)	(-0.67)	(-2.74)	(-2.33)	(-2.14)
M/B – M/B	0.009	0.017	0.022	0.016	0.019	0.024	0.065	0.035	0.029	0.043
	(0.18)	(0.09)	(0.52)	(0.30)	(0.42)	(0.42)	(0.28)	(0.77)	(0.50)	(0.82)
Asset-weighted Lar	-0.211**	-0.304*	-0.085	-0.182**	-0.211**					
	(-2.43)	(-1.72)	(-1.20)	(-2.22)	(-2.33)					
Asset-weighted Inside						-0.136	-0.320	0.047	0.005	-0.101
						(-0.95)	(-0.87)	(0.33)	(0.03)	(-0.71)
(M/B–M/B) * Asset-weighted Lar	0.357**	2.066**	0.328**	0.384**	0.298*					
	(1.99)	(2.34)	(2.02)	(2.05)	(1.65)					
(M/B–M/B) * Asset-weighted Inside						0.507**	2.843*	0.471**	0.530**	0.469*
						(2.11)	(1.72)	(2.11)	(2.19)	(1.85)
Asset-weighted Lar * HI Dummy				-0.069						
				(-1.18)						
Asset-weighted Inside * HI Dummy									-0.149	
									(-1.37)	
((M/B–M/B) * Asset-weighted Lar) * HI Dummy					1.691**					
					(2.05)					
((M/B–M/B) * Asset-weighted Inside) * HI Dummy										2.295**
										(2.01)
High Inside(HI) Dummy				-0.024	-0.030				-0.019	-0.024
				(-0.93)	(-1.24)				(-0.72)	(-0.92)
Year Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
# of Observations	270	136	134	270	270	270	136	134	270	270
F	5.23	1.81	3.14	4.16	3.67	5.23	1.37	2.71	4.20	3.39
Adj_R2	0.33	0.32	0.30	0.33	0.36	0.32	0.30	0.29	0.32	0.35

Table III. Regression results based on consolidated financial statement.

The table represents regression results with our asset-weighted ownership variables. Dependent variable is our measure of transfer which is defined as non-chaebol, industry-adjusted investment less the asset-weighted average of non-chaebol, industry-adjusted investment across all the firms in a group. Size is Log assets. M/B represents the Market to Book ratio. Market value is defined as sum of market value of common stock and book value of debt and preferred stock. Book value of assets comes from firm's balance sheet. $\bar{M/B}$ refers to asset-weighted average of affiliates' market-to-book ratio within a group. Asset-weighted Lar (Inside) is group median-adjusted asset-weighted ownership which is normalized by total sum of asset-weighted ownership the controlling shareholders have within a chaebol group. High Inside (HI) Dummy is an indicator variable which have 1 if inside ownership is above-median, otherwise 0. All regressions contain firm-fixed effects and calendar year dummies. Heteroskedasticity robust t-statistics are reported in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level.

	Panel A:			Panel B:		
	(1) Full	(2) Full	(3) Full	(1) Full	(2) Full	(3) Full
Size	-0.131** (-2.28)	-0.135** (-2.39)	-0.137** (-2.39)	-0.131** (-2.31)	-0.142** (-2.39)	-0.138** (-2.39)
$\bar{M/B} - M/B$	0.085 (1.61)	0.098* (1.85)	0.099* (1.89)	0.069 (1.25)	0.079 (1.42)	0.077 (1.37)
Asset-weighted Lar	-0.185 (-1.40)	-0.116 (-0.94)	-0.187 (-1.40)			
Asset-weighted Inside				-0.386** (-2.34)	-0.290 (-1.58)	-0.340** (-1.99)
$(\bar{M/B} - M/B) * \text{Asset-weighted Lar}$	0.350* (1.70)	0.402* (1.93)	0.383* (1.88)			
$(\bar{M/B} - M/B) * \text{Asset-weighted Inside}$				0.303 (1.25)	0.349 (1.41)	0.350 (1.41)
Asset-weighted Lar * HI Dummy		-0.167* (-1.89)				
Asset-weighted Inside * HI Dummy					-0.08 (-0.67)	
$((\bar{M/B} - M/B) * \text{Asset-weighted Lar}) * \text{HI Dummy}$			0.290 (0.43)			
$((\bar{M/B} - M/B) * \text{Asset-weighted Inside}) * \text{HI Dummy}$						-0.250 (-0.31)
High Inside(HI) Dummy		-0.037 (-1.16)	-0.053* (-1.65)		-0.032 (-0.95)	-0.035 (-1.07)
Year Dummy	Included	Included	Included	Included	Included	Included
# of Observations	270	270	270	270	270	270
F	2.68	2.44	2.34	2.73	2.23	2.35
Adj_R2	0.52	0.53	0.52	0.53	0.52	0.52

Table IV. Regression results with 1998 data for Asian Crisis

The table represents regression results with our asset-weighted ownership variables. Dependent variable is our measure of transfer which is defined as non-chaebol, industry-adjusted investment less the asset-weighted average of non-chaebol, industry-adjusted investment across all the firms in a group. Size is Log of assets. $\bar{M/B}$ represents the Market to Book ratio. Market value is defined as sum of market value of common stock and book value of debt and preferred stock. Book value of assets comes from firm's balance sheet. $\bar{M/B}$ refers to asset-weighted average of affiliates' market-to-book ratio within a group. Asset-weighted Lar (Inside) is group median-adjusted asset-weighted ownership which is normalized by total sum of asset-weighted ownership the controlling shareholders have within a chaebol group. High Inside (HI) Dummy is an indicator variable which have 1 if inside ownership is above-median, otherwise 0. Regressions based on 1998 year subsample contain industry dummies. Regressions based on full sample contain firm-fixed effects and calendar year dummies. Heteroskedasticity robust t-statistics are reported in parentheses. ***, **, and * indicates significance at the 1%, 5%, and 10% level.

	Panel A:				Panel B:			
	(1) 1998	(2) 1998	(3) 1998	(4) Full	(1) 1998	(2) 1998	(3) 1998	(4) Full
Size	0.015 (1.25)	0.020 (1.52)	0.021 (1.52)	-0.089 (-1.54)	-0.010 (-0.55)	-0.007 (-0.37)	-0.006 (-0.31)	-0.111 ** (-2.02)
$\bar{M/B} - \bar{M/B}$	-0.137 (-1.21)	-0.183 (-1.45)	-0.186 (-1.59)	0.023 (0.45)	-0.031 (-0.23)	-0.040 (-0.27)	-0.006 (-0.04)	0.038 (0.69)
Asset-weighted Lar	-0.004 (-0.08)	0.002 (0.03)	-0.017 (-0.29)	-0.206 (-2.38) **				
Asset-weighted Inside					0.189 ** (2.00)	0.205 ** (2.11)	0.178 * (1.77)	-0.170 (-1.25)
$\bar{M/B} - \bar{M/B}$ * Asset-weighted Lar	0.220 (0.32)	-0.157 (-0.21)	-0.970 (-0.68)	0.408 ** (2.28)				
$\bar{M/B} - \bar{M/B}$ * Asset-weighted Inside					1.684 (1.54)	1.572 (1.23)	0.551 (0.38)	0.566 (2.42)
Asset-weighted Lar * HI Dummy		-0.038 (-0.43)						
Asset-weighted Inside * HI Dummy						-0.051 (-0.53)		
$\bar{M/B} - \bar{M/B}$ * Asset-weighted Lar * HI Dummy			1.121 (0.72)					
$\bar{M/B} - \bar{M/B}$ * Asset-weighted Inside * HI Dummy							1.731 (1.12)	
Asset-weighted Lar * 1998 Year Dummy				0.151 ** (2.21)				
Asset-weighted Inside * 1998 Year Dummy								0.165 ** (2.30)
High Inside(HI) Dummy		0.032 (1.10)	0.032 (1.11)			0.006 (0.20)	0.004 (0.14)	
Year Dummy				Included				Included
Industry Dummy	Included	Included	Included		Included	Included	Included	
# of Observations	64	64	64	270	64	64	64	270

F	2.41	2.10	2.23	5.12	3.95	4.09	3.29	5.20
Adj_R2	0.26	0.27	0.28	0.34	0.33	0.33	0.34	0.33
