The Ceiling on the Total Amount of Share Holdings of Other Domestic Companies and Corporate Investment in Korea's *Chaebol*

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Abstract

Using pooled OLS and panel estimations with cross-company panel data for sixty Chaebol-affiliated companies in 2004 and for seventy eight Chaebol- affiliated companies in 2005, the regression results are consistent with the hypothesis that, with other things given, the ceiling on the total amount of share holdings of other domestic companies by Chaebol does not affect corporate investment in Korea. The regression results reveal that the ceiling on the total amount of share holdings of other domestic companies promotes fair competition which in turn enhances the economic democritization and thereby balanced growth. In order to monitor the opaque governance structure of Caebol, therefore, the democratic citizenship education should be strengthened.

Keywords: corporate investment, democratic citizenship education, the amount of share holdings of other companies by *Chaebol*, the amount of share held by *Chaebol*'s other companies

Introduction

The issue of the ceiling on the total amount of share holdings of other domestic companies by *Chaebol* has continuously triggered a lot of controversies in the past 20 years. Out of them, concerns on its impact on corporate investment were also raised. The ceiling on the total amount of share holdings in other domestic companies by *Chaebol* means that companies under *Chaebols* with more than 6 trillion won of total assets of affiliates shall not hold shares of other domestic companies surpassing 25% of their own net assets in the year 2005.

According to the result of a couple of previous studies, such ceiling has neutral effect on corporate investment. Therefore, we attempt to examine the relationship between each of the amount of share holdings of other domestic companies by *Chaebol* and the amount of shares held by *Chaebol*'s other companies, and corporate investment using more recent in-depth data on sixty and seventy eight affiliated companies in *Chaebols* provided by the Korea Fair Trade Commission (KFTC). In addition, since the data and information is subject to be thoroughly scrutinized by KFTC, this data source can be regarded as highly reliable. These *Chaebols* are controlled by the ceiling on the total amount of share holdings of other domestic companies by *Chaebol*.

A *Chaebol* can be defined as a business group consisting of large firms that are mainly owned and fully managed by family members or relatives in many diversified business areas (Solomon et al., 2002). The *Chaebol* is characterized by two features: a business group that is owned and governed by the dominant shareholder and his family, and a multi-diversified business group with coverage extending from manufacturing to services, from small retailers to multinational corporations.We divide between models for use with the company-level cross-sectional data and those models applicable to the panel data across the years 2004 and 2005.

The fraction of other companies'share holdings is an acquisition of existing shares and, thus, is not related to new investment. The amount of share holdings of other companies is an instrument that *Chaebol* with small fraction of shares maintains the ownership, which is possible to control.

Model

In order to test for the null that the ceiling on the total amount of share holdings of other domestic companies by *Chaebol* does not affect corporate investment, the following function can be formulated:

$$(I/K)_i = f((SH/K)_i, (X/K)_i) \qquad\qquad (1)$$

where I and K denote the amount of corporate investment and the amount of capital, respectively. SH stands for the amount of share holdings of other companies by *Chaebol* (SHING) or the amount of share held by *Chaebol*'s other companies (SHED). Vector X includes the control variables: the amount of net assets (NA), the amount of sales revenue (S), the amount of liability (D), and the amount of cash flow (CF). The estimated Pearson correlation co-efficient between K and each of the other variables is very high(see e.g., <Appendix Table 1>). Therefore, to avoid the possible multicollinearity, all of the variables are divided by K. Hence, SHING/K indicates the amount of share holdings of other companies by *Chaebol* divided by the amount of capital.

On the other hand, Kapopoulos and Lazaretou (2007) use Tobin's Q as a measure of firm performance and approximate it taking the ratio of the firm's market value plus the book value of total assets, noting that performance measure of Tobin's Q may be distorted because its denominator does not take into account the value of intangible assets. On the basis of this, Tobin's Q is not included in the regression. Such treatment also reflects the Henwood's evidence (1997) that the Tobin's Q fails to accurately predict investment.

Data

Details of the data sources as well as means and standard deviations (SDs) of the variables are given in Table 1. The order of the data is from the data package of the "2004-2005 Amount of Share Holdings by Affiliated Companies in *Chaebol*" provided by the KFTC. *Chaebol*'s 194 affiliated companies are subject to the ceiling on the total amount of share holdings by *Chaebol*'s other affiliated companies as of 2005.

Table 1: Definition and Source of Variables[1]

Variable	Definition of Variables (Source)	Mean (SD)	Min (Max)	$\chi^2(87)$ test
I/K	The corporate investment-to-capital ratio (Korea Financial Supervisory Service)	-37.843 (56.250)	-245.409 (131.722)	Accept H_0
SHING/K	The shareholding of other companies by *Chaebol* divided by the amount of capital (Korea Fair Trade Commission)	26.107 (24.818)	0.028 (117.748)	Accept H_0
SHED/K	The shareholded from other companies by *Chaebol* divided by the amount of capital (Korea Fair Trade Commission)	30.302 (81.719)	0.000 (735.889)	Accept H_0
NA/K	The net asset-to-capital ratio (Korea Fair Trade Commission)	71.889 (31.053)	0.000 (163.280)	Accept H_0
S/K	The sales revenue-to-capital ratio (Korea Financial Supervisory Service)	287.529 (254.611)	33.613 (1481.489)	Accept H_0
D/K	The liability-to-capital ratio (Korea Financial Supervisory Service)	204.017 (137.593)	12.463 (780.400)	Accept H_0
CF/K	The cash flow-to-capital ratio (Korea Financial Supervisory Service)	19.692 (24.496)	-117.350 (106.043)	Accept H_0

Notes:1) The number of observations is 88 affiliated companies. χ^2 test is goodness of fit test. The number of degrees of freedom in parentheses. The alternatives are: H_0: The data follow a specified distribution, H_1=The data do not follow the specified distribution. By "Accept H_0" we strictly mean "cannot reject H_0". The arisk controlled at 0.05 on a two-tailed test.

Estimation Results

Using the least squares method, the outliers can produce a misinterpretation on the estimated regression equation (Gerdtham and Jonsson, 1991). Outlying observations contribute a great amount of information on the coefficient estimates. Residual analysis from the case wise diagnostics detects outliers well and is a useful diagnostic tool. Therefore, we estimate the regression equation using data-excluding outliers.We restrict the estimations to a linear multiplicative functional form because this form has empirically been shown to be the most adequate in detecting outliers in the regression (e. g., MacKinnon and White, 1985).

Three basic different panel data estimators are considered: pooled Ordinary Least Squares (OLS); fixed effects (FE), estimated by OLS; and the first differenced estimator (FD) by OLS. Model selection is based on the adjusted R^2(see, e.g., Gupta, Mello, & Sharan, 2001). In Table 2 under the columns 'Pooled OLS', 'FE', and 'FD', the estimated values of adjusted R^2 in the FE and FD estimations are greater than that in the pooled OLS estimation. The FE estimation is analyzed over the FD estimation because the standard errors of the estimates (SEE) in the former are smaller than those in the latter. The use of SEE is also based on the overall model performance.

From the reported regressions in Table 2, the RESET test rejects the null hypothesis of functional form misspecification in the FE regressions for I/K. The estimated values of R^2 and F also suggest that correct specifications are implied in the FE regressions. Heteroskedasticity cannot be detected in the FE estimation.
The FE estimation suggests that after controlling for differences in the net asset-to- capital ratio (NA/K), the sales revenue-to-capital ratio (S/K), the liability-to-capital ratio (D/K), and the cash flow-to-capital ratio (CF/K), the estimated coefficient of each of the amount of share holdings of other companies by *Chaebol*-to-capital ratio (SHING/K) and the amount of share held by *Chaebol*'s other companies-to-capital ratio (SHED/K) is not significant to the corporate investment-to-capital ratio (I/K).

This result is consistent with the usual finding of previous studies that the ceiling on the total amount of share holdings of other domestic companies by *Chaebol* does not affect corporate investment in Korea. This neutrality effect of each of SHING/K and SHED/K on the corporate investment-to-capital ratio reveals that the fraction of other companies' shares owned by *Chaebol* is not related to new investments because *Chaebol* acquires the existing shares. The amount of share holdings of other companies is an instrument that *Chaebol* with small fraction of shares maintains the ownership which is possible to control.

In Table 2 under the column "FE," the empirical results indicate that differences in the sales revenue-to-capital ratio are causal to differentials in the corporate investment- to-capital ratio. This implies that the corporate investment-to-capital ratio appears to be higher the higher the sales revenue-to-capital ratio is.
On the other hand, the estimated coefficient of each of the net asset-to-capital ratio, the liability-to-capital ratio, and the cash flow-to-capital ratio is not statistically significant.

Conclusions

Using pooled OLS and panel estimations with cross-company panel data for sixty affiliated companies in 2004 and for seventy eight affiliated companies in 2005, the regression results are consistent with the hypothesis that the ceiling on the total amount of share holdings of other domestic companies by *Chaebol* does not affect corporate investment in Korea. The regression results reveal that the ceiling on the total amount of share holdings of other domestic companies promotes fair competition which in turn enhances the economic democritization and thereby balanced growth. In order to monitor the opaque governance structure of *Caebol*, therefore, the democratic citizenship education should be strengthened (see, e.g., Nelson, 1997).

In the estimations, the net asset-to-capital, the sales revenue-to-capital, the liability- to-capital, and the cash flow-to-capital ratios are controlled for. For example, the corporate investment-to-capital ratio appears to be higher, the higher the sales revenue- to-capital ratio is.

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Table 2: The effect of each of SHING/K and SHED/K on I/K[1]

	Dependent Variable: IK									
Explanatory Variables	OLS 2004[2]		OLS 2005[3]		Pooled OLS[4]		FE[5]		FD[6]	
SHING/K	0.023 (0.286)	—	-0.101 (0.163)	—	0.021 (0.215)	—	0.228 (0.172)	—	-0.529 (0.215)**	—
SHED/K	—	-0.005 (0.003)	—	-0.144 (0.105)	—	0.110 (0.122)	—	0.0001 (0.001)	—	-0.024 (0.352)
NA/K	0.538 (0.241)**	0.233 (0.303)	-0.150 (0.139)	-0.262 (0.139)*	0.521 (0.179)***	0.636 (0.215)***	0.206 (0.242)	0.115 (0.236)	0.207 (0.164)	0.443 (0.146)***
S/K	0.029 (0.020)	0.023 (0.020)	0.044 (0.018)**	0.049 (0.018)***	0.096 (0.029)***	0.089 (0.029)***	0.114 (0.054)*	0.083 (0,050)*	-0.065 (0.031)**	-0.015 (0.025)
D/K	-0.097 (0.062)	-0.048 (0.067)	-0.154 (0.025)***	-0.150 (0.025)***	-0.179 (0.056)***	-0.194 (0.057)***	-0.053 (0.080)	0.007 (0.067)	0.093 (0.078)	0.073 (0.085)
CF/K	0.925 (0.300)***	0.726 (0.318)**	0.795 (0.160)***	0.682 (0.180)***	0.590 (0.226)***	0.813 (0.331)**	0.086 (0.493)	-0.044 (0.492)	0.025 (0.167)	0.151 (0.174)
Constant	-0.763 (0.224)***	-0.471 (0.284)*	-14.981 (11.299)	-5.773 (12.798)	-75.944 (19.988)***	-86.388 (23.078)***	-0.394 (0.307)	-0.223 (0.284)	-23.770 (31.828)	-59.030 (31.617)*
R^2	0.325	0.355	0.617	0.626	0.335	0.341	0.407	0.385	0.947	0.939
Adjusted R^2	0.262	0.282	0.589	0.598	0.286	0.293	0.334	0.310	0.940	0.931
D.W.	1.572	1.618	1.764	1.721	1.177	1.197	1.686	1.668	1.770	1.661
F	5.197***	5.943***	21.630***	22.405***	6.798***	6.997***	5.594***	5.119***	136.207***	116.902***
SEE	0.510	0.503	35.534	35.147	47.542	47.310	0.695	0.707	185.755	199.638
RESET2: t-value	1.650	0.187	1.037	1.062	3.566***	3.156***	0.615	0.766	1.702*	1.437
RESET3: t-value	—	—	—	—	2.547**	1.280	—	—	1.210	0.988
Hetero: $\chi^2(5)$	13.260	16.140	9.344	12.775	12.760	11.088	8.344	4.200	2.288	1.848

Notes:1) Values in parentheses are the estimated absolute standard errors of the regression coefficients. ***, **, and * denote significance at the 1%, 5% and 10% levels on a two-tailed test, respectively. In the FE regression, the observed D.W. (Durbin-Watson) statisticlies between d_U and the value of 4-d_U, implying that correct specifications are implied. Ramsey's RESET t test in absolute term. Hetero stands for heteroskedasticity. The 90% critical value for $\chi^2(5)$ with the number of degrees of freedom in parenthesis is 9.240. For the test procedure see Breusch and Pagan (1979).

2) No outlying affiliated company. The number of observations is 60.

3) In the results the outlying affiliated companies with the maximum and minimum residuals from casewise diagnostics (8th, 65th, 71st, 73rd and 84th companies) are excluded in the estimation. The number of observations is 73.

4) It contains the year dummy. No outlying affiliated company. The number of observations is 88.

5) The fixed effect estimation. It contains the year dummy. No outlying affiliated company. The number of observations is 56.

6) The first differenced estimator. No outlying affiliated company. The number of observations is 44.

Appendix

Appendix Table 1: The Estimated Pearson Correlation Coefficients[1]

	I	K	NA	S	D	CF
I	-	-0.831 (0.000)	-0.706 (0.000)	-0.727 (0.000)	-0.719 (0.000)	-0.769 (0.000)
K	-0.831 (0.000)	-	0.920 (0.000)	0.877 (0.000)	0.864 (0.000)	0.928 (0.000)
NA	-0.706 (0.000)	0.920 (0.000)	-	0.946 (0.000)	0.938 (0.000)	0.857 (0.000)
S	-0.727 (0.000)	0.877 (0.000)	0.946 (0.000)	-	0.926 (0.000)	0.780 (0.000)
D	-0.719 (0.000)	0.864 (0.000)	0.938 (0.000)	0.926 (0.000)	-	0.865 (0.000)
CF	-0.769 (0.000)	0.928 (0.000)	0.857 (0.000)	0.780 (0.000)	0.865 (0.000)	-

Notes: 1). The number of observations (n) is 130. Values in parentheses are the estimated absolute p- values. Correlation is significant at the 0.01 level on a two-tailed test.