Effects of independent outside directors on firm value from information transaction costs perspective

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ABSTRACT

It is not optimal for firms with high information asymmetry to invite monitoring from independent directors because it is costly for the firms to transfer firm-specific information to outsiders. On the basis of this idea, we develop and test the hypothesis that firms with high information asymmetry have less positive impact of board independence on firm value. Using a comprehensive sample of 3,836 firms from 1999 to 2006 in Korea, where a regulation requiring outside directors was instituted after the Asian financial crisis, we find that the effects of independent outside directors on firm value are more strongly positive when the information asymmetry is low. For the analysis, we choose various information asymmetry variables including measures derived from two econometric models that are widely used in the market microstructure literature: the Huang and Stoll model (1997; HS) and the Hasbrouck (1991), Foster and Viswanathan (1993) model (HFV). Also, the impact of independent outside directors is more evident when firms face volatile situations such as higher growth opportunities, risks, R&D expenses, low credit rating, or under financial distress. Taken together, the information asymmetry can be a significant factor in determining the valuation impacts of independent outside directors.

Keywords: Information Asymmetry, Outside Directors, Korea, Market microstructure, Firm value, Board independence

I. Introduction

Board directors in a modern corporation are responsible for monitoring management (Berle and Means (1933), Jensen and Meckling (1976)). This is particularly true for outside directors who are independent in contrast to inside managing directors. Since inside directors may not feel compelled to contradict the CEO, outside directors are in a better position to monitor managerial activities. As such, board independence is expected to be associated with enhanced corporate performance and valuation. Such expectations, however, have not been demonstrated empirically. Studies of U.S. firms show no relation between the proportion of outside directors and firm performance (see a survey by Hermalin and Weisbach (2003)). International evidence on this relation is also inconclusive. (e.g., Denis and McConnell (2003)). Choi, Park, and Yoo (2007) show the significant valuation effect of independent directors on firm value in Korea.

Independence may also be associated with indifference (Monks and Minow (1995)). Independent outside directors may lack not only the operational expertise of insiders, but also an understanding of basic corporate strategies (e.g., Klein (1998)). Existing evidence regarding the insignificance of board independence may reflect this reality: during stable periods, the management oversight benefits of outside directors are offset by the operational expertise of inside directors with ambiguous net results on firm performance (Fama and Jensen (1985)).

In this paper, we suggest that inconsistent relationship between board independence and firm value occurs because of information asymmetry. Maug (1997) develop a theory that it is not optimal for firms with high information asymmetry to invite monitoring from independent directors because it is costly for the firms to transfer firm-specific information to outsiders. Therefore, we should consider risk of information asymmetry if we analyze the effects of board independence on firm value.

This paper provides evidence in support of the positive impact of board independence for Korea in the aftermath of the Asian financial crisis, which is consistent with Choi et al (2007)'s study. However, we take a step forward from Choi et al (2007) in the regards that we examine if the valuation effects differ by information asymmetry risks of firms. On the other hand, Linck, Netter, and Yang (2008) find that board independence is affected by the costs and benefits of the board's monitoring and advising roles. They argue that board independence increases when information asymmetry costs are low. Our work adds valuation effect of board independence on Linck et al (2008)'s study using more refined independence variable and information asymmetry measures.

We have hand-collected information on outside directors in all the listed firms in Korea between 1999 and 2006. Our data include outside directors' personal background such as school, former post, and age. We divide outside directors with available data into two groups; independent outside directors who appear to have no current or past business or personal ties with the firm and gray outside directors who have current or past business or personal ties with the firm. Choi et al (2007) proxy gray outside directors as the one whose professions are lawyer, accountants, consultants, or bank executives. However, we proxy gray outside directors as the one who graduated from same high school, same college in the same university, or same former post as CEO or controlling shareholder especially for chaebol group. Additionally, we include the one who has worked at the same company or same affiliates in the gray outside directors.

For the analysis, we choose measures derived from two econometric models that are widely used in the market microstructure literature: the Huang and Stoll model (1997; HS) and the Hasbrouck (1991), Foster and Viswanathan (1993) model (HFV). Conceptually, these measures share the sprit of the Glosten and Milgrom model (1985), in which information asymmetry induces bid-ask spread.

Our basic empirical result is that board independence, measured by the proportion of independent outside directors from the business or personal ties, has significant and positive effects on firm value when firm's information asymmetry is low whereas gray outside directors has no valuation effect.

2. Background, motivation, and development of hypotheses

2. 1. Related literature

Given the separation of ownership and management for a modern corporation, the board of directors has been created as an internal governance mechanism to represent and protect shareholders from managers who may pursue their own personal interests or otherwise may not act in the best interests of shareholders. To do this, the presence of independent outsiders is crucial because only then can the board truly monitor and, if necessary, discipline the management. The general expectation, therefore, is that firm performance increases with the independence of the board.

Existing empirical studies of U.S. firms show inconclusive results. Rosenstein and Wyatt (1990) show that the appointment of outside directors is positively related to stock price reactions. However, other studies such as Hermalin and Weisbach (1991), Mehran (1995),

Yermack (1996), Klein (1998), and Dalton, Daily, Ellstrand, and Johson (1998) find no association between the presence of outside directors and firm performance. Agrawal and Knoeber (1996) even report that firm performance is negatively related to the percentage of outsiders on the board, with the implication that boards are not optimally constructed to maximize firm value.

Despite the inconclusive empirical results in the U.S. and elsewhere, the idea of a monitoring board was vigorously imported and implemented by Korean authorities as a part of the reform measures in the aftermath of the Asian financial crisis. Weak corporate governance wa viewed as one of the factors that had contributed to the Asian financial crisis in 1997 according to the IMF. Since 1998, the government, in principle, has adopted the American-style monitoring board structure and proceeded with a series of regulatory changes. The Securities Listing Regulations in February 1998 required all firms listed on the KSE (effective April 1, 1999) to have at least 25% of the board composed of outside directors. The government's objective was to induce firms to improve transparency and the oversight role of the board by installing independent outside directors.

Hypothesis 1. Firm performance increases with board independence.

Courts have been reluctant to mandate board structure because doing so is difficult (Karmel, 1984). Fisch (1997) interprets this legal flexibility as evidence that it is efficient to allow firms to tailor board structure to the functions that are most important. Despite the absence of legal mandates, however, firms have long been encouraged to increase the independence of their boards. For example, Harold Williams, the SEC Chairman from 1977 to 1981, placed significant pressure on NYSE firms to have a majority of outside directors on their boards.

Scholars have suggested alternative explanations for the determinants of board structure. One possibility is that board structure develops as an efficient response to the firm's contracting environment. Alternatively, board structure does not matter or is the result of, rather than a solution to, agency problems.

2.2. Costs of monitoring and advising

Outside directors face information acquisition and processing costs in transforming their general expertise to the specific firm for which they serve as a director. Further, while adding directors adds incremental information, it also increases the costs related to free-rider problems and coordination costs as well as direct costs such as compensation. As Maug

(1997) shows, it is not optimal for firms with high information asymmetry to invite monitoring from independent directors because it is costly for the firms to transfer firm-specific information to outsiders. Adams and Ferreira (2007) and Raheja (2005) model board structure and generally suggest that the number of outsiders decreases in the cost of monitoring.

The preceding discussion suggests that the effect o f board independence on firm value decrease with the cost of monitoring and advising. Jensen (1993) argue that it is more costly for large boards to monitor growth firms. The same argument could be made for the cost of advising by outsiders. Additionally, Fama and Jensen (1983) note that firms with high stock return volatility are more likely to have specific information unknown to outsiders. Thus, to proxy for monitoring and advising costs, we use the ~~~~~~~~. Following Fama and Jensen (1983), we use ~~~ to proxy for information asymmetry. Since we expect the cost of monitoring and advising to increase in these characteristics, we expect them to be negatively related to the effect of board independence on firm value.

3. Sample selection and data

We start with all firms in the database between 1999 and 2006. From this population, we select all firms with information available on board size and composition. We then match this sample to the FnDataguide and restrict the sample to Korean firms (excluding financial and utility companies) with annual financial data and monthly stock returns for the fiscal year immediately preceding the proxy statement dates. Table 1 reports the time series of the sample. The sample includes ~ firm-years from 1999 through 2006.

Table 2 reports descriptive statistics for all sample firms on key firm, board, and ~ variables. The mean value of tatal book assets ~~~.

Fig. 1 shows the time trends of board independence from 1999 to 2006. It shows a downward trend in the percentage of insiders on the board.

4. Valuation effect of board independence and information asymmetry

4.1. Research design

Hermalin and Weisbach (1998) suggest that board structure is relatively persistent, raising

concerns about the independence of the year-to-year firm-level observations in our dataset. In addition, board size, independence, and leadership are likely to be endogenously determined. Our research design uses several approaches to address these concerns. First, to reduce endogeneity problems, we include both industry and year fixed effects in our models, examine the robustness of our results after including lagged values of our dependent variables, and estimate our models in a simultaneous equations framework. Our OLS specification, while based on existing theory, implicitly assumes strict exogeneity. This assumption states that the errors are strictly independent of all past and future values of the independent variables (see Engle, Hendry, and Richard, 1983). While it might be reasonable to assume that errors and independent variables are independent within the same period, the same might not be true for all past and future values. For example, past board structure can affect current performance. Thus, we also estimate our models with a dynamic panel data estimation procedure that only assumes weak exogeneity (see Engle, Hendry, and Richard, 1983). Weak exogeneity allows the explanatory variables to be affected by past and current innovations in board structure; in other words, they are only assumed to be independent of all future innovations in board structure. This does not mean that the firm or market does not adjust for the firm's expected board structure. It simply means that it does not adjust for unexpected innovations to board structure. Lastly, while some of our variables are subject to outlier concerns, we believe that our large sample mitigates these problems. However, for robustness, we replicate our results via an iteratively re-weighted least squares procedure, the results of which do not alter our conclusions.

4.2. Valuation effect of board independence

This section reports the results from tests of our hypotheses on the determinants of ~. Our specifications are as follows.

$$\begin{aligned}\text{Tobin's Q} = {} & \alpha + \beta_1(\text{Board independence}) + \beta_2(\text{Board size}) + \beta_3(\text{Board's average age}) \\ & + \beta_4(\text{Largest ownership}) + \beta_5(\text{Board Composition}) + \\ & \beta_6(\text{CAPEX/Assets}) + \beta_7(\text{Leverage}) + \beta_8(\text{firm size}) + \\ & \beta_9(\text{Operating profitability}) + \beta_{10}(\text{Distress dummy}) + \\ & \beta_{11}(\text{Chaebol dummy}) + \beta_{12}(\text{Market risk}) + \beta_{13}(\text{Industry dummy}) \\ & + \beta_{14}(\text{year dummy}) \qquad (1)\end{aligned}$$

Where

Table 4 reports the results from estimation Eqs. (1). Our regressions only include

observations from . Thus, lagged values refer to the value from one year earlier. In the regression, ~~~ are all positive and significant. This is consistent with our hypotheses, which predict that board independence increase in firm advising benefits. The negative coefficient on the ~ suggests that the impact of . Our hypotheses also predict that board independence increases in the availability of private benefits. Consistent with this~~
We proxy for monitoring and advising costs using the ~~~~, and predict that firm value decrease in these attributes. ~~ are both negatively and significantly related to board ~. Overall, the results provide some, albeit not uniform, support for the hypothesis that board size and independence decrease in monitoring and advising costs.
Performance is negatively related to board independence.
Overall, our models explain from ~% of the variation in firm value. This implies that models based on the tradeoffs between monitoring and advising costs and benefits explain a significant proportion of the variation in board structure.

Table 4 presents the basic empirical results. It shows evidence in support of Hypothesis 1 that board independence (measured by the ratio of outside directors) affects firm performance (measured by Tobin's q) positively. The positive effect is particularly significant when outside directors are independent. With gray directors, the effects are insignificant. This positive impact of independent directors in Korea contrasts with existing work for U.S. firms indicating that board independence has no relation with firm performance (e.g., Hermalin and Weisbach (2003)). The difference, however, may be related to different degrees of board independence in the two countries. In the U.S., super-independent monitoring boards are the norm. If the boards are optimally determined, the replacement of an inside director by an independent outsider may not enhance, or may even reduce, firm performance (Hermalin and Weisbach (1991)).

4.3. Robustness checks
In this section, we perform a series of additional tests to deal with several econometric concerns.

5. Conclusion

This paper examines the development and determinants of ~ using a sample of almost ~ firms from 1999 to 2006. The sample includes firms of all sizes, ages, and industries, which

allows us to generalize our results more than is possible in papers with more restrictive sample selection criteria.

Consistent with anecdotal evidence, we find that corporate boards become more independent in the 2000s, although these trends do not apply equally to all firms. Firms with high information asymmetry show a more dramatic increase in the effect of board independence, while firms with low information asymmetry see a more . Further, there is evidence that

Our empirical results are generally consistent with the hypothesis that firms choose board structures based on the costs and benefits of monitoring and advising. Broadly speaking, monitoring guards against harmful behavior, and advising provides input on strategy. Firms with high growth opportunities, high R&D expenditures, and high stock return volatility are associated with less independent boards, while large firms tend to have more independent boards.

We structure our empirical analysis to test existing theoretical work. For tractability, the models only illustrate what happens under a certain set of circumstances, which can be problematic when many attributes are determined simultaneously. For example, internal governance internal governance mechanisms such as board structure are endogenously determined within the broader system of corporate governance. Thus, empirical tests based on existing theories are imperfect. We handle this problem in several ways, including simultaneous equations estimations, fixed-effects models, and other procedures that deal with endogeneity issues. Taken as a whole, our results are generally consistent with efficiency explanations of the ~.

Overall, our results show strong relations between board independence and firm value, suggesting that any regulatory framework that imposes uniform requirements on board structure could be ill-conceived. Further, the strong associations between board independence and firm value suggest that policy makers and researchers pay special attention to the effect of mandated reforms on small firms.

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Table I

Descriptive statistics for sample firms

This table presents descriptive statistics for sample firms over 1999-2006. The sample is drawn from FnDataguide. Data related to board of director characteristics are taken from Korea Listed Companies Association and KISLINE. Tobin's Q is the ratio of the sum of the market value of common equity, the book value of preferred equity, and the book value of long-term debt to the book value of assets. Board composition is the fraction of directors who are outsiders. Board composition is the fraction of directors who are outsiders. Director age is as of the end of year and the natural logarithm of the age. Largest ownership is the percentage shareholding of the largest shareholder. CAPEX/Assets is the ratio of capital expenditures to total assets. Leverage is the ratio of total debt to total assets. Firm size is the natural logarithm of (total assets/1,000,000). Operating profitability is the ratio of earnings before interest and taxes (EBIT) to beginning total assets. Distressed is a dummy that takes 1 when a firm experienced ordinary income losses in recent 3 years, or an equity loss in the year. Chaebol dummy is a dummy variable to indicate whether a firm belongs to one of the 50 largest chaebols. The Korea Fair Trade Commission updates the list of the 50 largest chaebols annually. Market risk (beta) is the estimate from market model in which the firm's monthly returns over the last year are regressed on the KOSPI monthly returns. Return Volatility is measured as the annualized standard deviation of daily returns during the year. 3yr Sales growth(%) is the growth rate of sales in the recent 3 years.

Variable	First quartile	Mean	Median	Third quartile	Standard deviation	Sample size
Tobin's Q	0.321	0.601	0.469	0.702	0.515	3,836
Outside Directors	0.020	0.241	0.222	0.300	0.152	3,836
Independent Outside Directors	0.000	0.180	0.200	0.250	0.152	3,836
Gray Outside Directors	0.000	0.026	0.000	0.000	0.063	3,836
GH	0.001	0.016	0.005	0.018	0.343	2,637
HFV	0.001	0.025	0.005	0.018	0.229	2,637
Board size	1.609	1.826	1.946	2.197	0.710	3,836
Director age	3.954	3.999	4.007	4.057	0.088	3,836
Largest ownership	0.202	0.335	0.316	0.453	0.175	3,836
CAPEX/Assets	0.006	0.044	0.025	0.062	0.312	3,836
Leverage	0.351	0.515	0.494	0.641	0.257	3,836
Firm size	4.479	5.522	5.282	6.330	1.483	3,836
Operating profitability	0.006	0.022	0.032	0.067	0.142	3,836
Distressed dummy	0.000	0.381	0.000	1.000	0.486	3,836
Chaebol dummy	0.000	0.188	0.000	0.000	0.391	3,836
Market risk(beta)	0.476	0.728	0.723	0.974	0.370	3,836
Volatility	0.377	0.561	0.498	0.692	0.259	3,836
Analyst report	0.000	2.877	0.000	2.000	5.620	3,836
Credit rating dummy	0.000	0.247	0.000	0.000	0.431	3,836
Firm Year	3.096	3.333	3.404	3.666	0.569	3,836
Institution ownership	0.082	0.258	0.199	0.383	0.215	2,860
Governance	4.575	4.704	4.691	4.804	0.209	2,152

Table II

Correlation analysis among the variables

This table presents the Spearman correlations among the main variables of acquiring firms. These variables include CAR, GH, HFV, 3yr Sales Growth Rate, Tobin Q, Size, NI/Sales, FCF, and 2yr adjusted ROS. We construct the cumulative abnormal returns (CARs) around the event date by summing the estimated daily abnormal returns from 5 days before the merger announcement to 5 days after the announcement, that is,

See Table 3 for exact definitions of the other variables. The sample consists of 428 firm-years between 1994 and 2005. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Indep Outside Directors	Gray Outside Directors	GH	HFV	Firm size	Institution ownership	Analyst report	Credit rating dummy	Firm year
Tobin's Q	0.097***	-0.056***	0.012	0.023	-0.054***	0.014	0.156***	-0.071***	-0.178***
Indep Outside Directors		-0.129***	-0.016	-0.012	0.217***	0.020	0.251***	0.087***	-0.049***
Gray Outside Directors			-0.020	-0.021	0.054***	0.022	0.006	0.040**	0.050***
GH				0.885***	0.002	-0.009	-0.001	0.021	0.007
HFV					0.005	-0.005	-0.008	0.012	0.017
Firm size						0.246***	0.658***	0.456***	0.130***
Institution ownership							0.197***	0.126***	-0.008
Analyst report								0.287***	-0.036***
Credit rating dummy									0.098***

Figure I

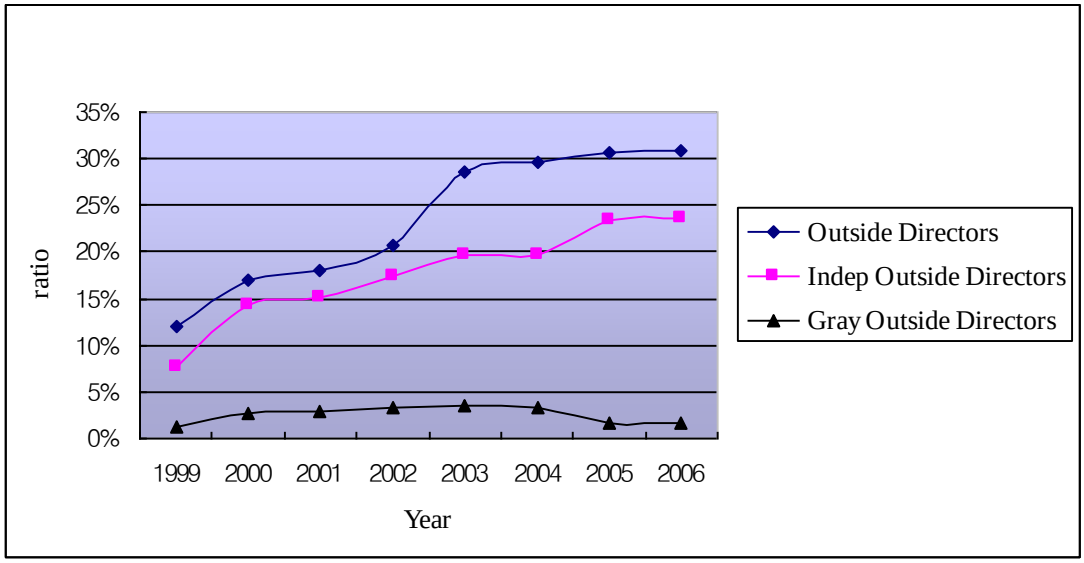
35%
30%
25%
20%
15%
10%
5%
0%
ratio
1999
2000
2001
2002
2003
2004
2005
2006
Year
Outside Directors
Indep Outside Directors
Gray Outside Directors

Table II

Information asymmetry variables, Split Sample

This table reports subsample averages for information asymmetry variables and firm's financial constraints variables. The sample comprises 2,663 nonfinancial firms (2,334 firms for institution ownership data) listed on the KSE between 1999 and 2004. Small GH (HFV) group is the one whose information asymmetry variable is smaller than the median of the sample firms and Large GH (HFV) group is the one whose information asymmetry variable is larger than the median of the sample firms. See Table 3 for exact definitions of the variables. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A : GH variable			
	Small GH group (A)	Large GH group (B)	Difference (t-stat.) (A-B)
Firm size	5.705 (0.033)	5.187 (0.026)	12.430***
Institution ownership	0.293 (0.006)	0.254 (0.006)	4.492***
Analyst report	3.532 (0.125)	2.229 (0.107)	7.923***
Credit rating dummy	0.323 (0.467)	0.264 (0.441)	4.424***
Firm year	3.362 (0.548)	3.334 (0.536)	0.674
Panel B : HFV variable			
	Small HFV group (A)	Large HFV group (B)	Difference (t-stat.) (A-B)
Firm size	5.707 (0.033)	5.184 (0.026)	12.591***
Institution ownership	0.295 (0.006)	0.254 (0.006)	4.764***
Analyst report	3.551 (0.125)	2.224 (0.107)	8.097***
Credit rating dummy	0.321 (0.467)	0.266 (0.442)	4.167***
Years listed on KSE	3.359 (0.556)	3.329 (0.562)	0.764

Table III

Effects of Outside Directors on Firm Value

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics between 1999 and 2006. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Regression (1) shows the results of basic regression and Regression (2) shows fixed effect regression of firm performance and manager ability. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)
Outside directors	**0.245*****	**0.400*****	**0.092***	**0.141*****
	(0.060)	**(0.108)**	**(0.056)**	**(0.052)**
Board size	-0.009	0.028	-0.001	-0.009
	(0.022)	(0.022)	(0.024)	(0.022)
Director age	-1.194***	-1.151***	-0.781***	-1.200***
	(0.092)	(0.094)	(0.130)	(0.092)
Largest ownership	-0.001	0.009	0.019	-0.005
	(0.044)	(0.045)	(0.058)	(0.044)
CAPEX/Assets	0.001	0.024	-0.003	0.001
	(0.023)	(0.025)	(0.021)	(0.023)
Leverage	-0.069	-0.090**	0.078*	-0.063*
	(0.036)	(0.038)	(0.046)	(0.036)
Firm size	0.028***	0.024***	0.019	0.032***
	(0.008)	(0.009)	(0.016)	(0.008)
Operating profitability	0.053	-0.008	0.158***	0.051
	(0.057)	(0.060)	(0.055)	(0.058)
Chaebol dummy	0.042*	0.039	0.102	0.042*
	(0.022)	(0.023)	(0.065)	(0.022)
Market risk(beta)	0.040*	0.066***	-0.017	0.040**
	(0.022)	(0.024)	(0.022)	(0.023)
Industry dummy	Yes	Yes		Yes
Year dummy	Yes	Yes	Yes	
Industry Fixed Effects			Yes	
Year Fixed Effects				Yes
Number of firms	3,836	3,293	3,836	3,836
Adj. R^2	0.239	0.249	0.578	0.244

Table VI

Information Asymmetry and Outside Directors

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics between 1999 and 2006. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Regression (1) shows the results of basic regression and Regression (2) shows fixed effect regression of firm performance and manager ability. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)
Outside directors	**0.284*** **	**0.286*** **
	(0.056)	**(0.055)**
Board size	-0.014	-0.014
	(0.020)	(0.020)
Director age	-0.897***	-0.895***
	(0.093)	(0.092)
Largest ownership	-0.024	-0.019
	(0.043)	(0.043)
CAPEX/Assets	0.009	0.008
	(0.023)	(0.023)
Leverage	-0.126***	-0.130***
	(0.040)	(0.039)
Firm size	0.029***	0.030***
	(0.007)	(0.007)
Operating profitability	0.300***	0.300***
	(0.067)	(0.065)
Chaebol dummy	0.001	-0.002
	(0.021)	(0.021)
Market risk(beta)	0.054**	0.054**
	(0.023)	(0.023)
GH	0.142***	
	(0.052)	
HFV		0.162***
		(0.055)
Outside director * GH	**-0.367**	
	(0.223)	
Outside director * HFV		**-0.444***
		(0.234)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Number of firms	2,637	2,637
Adj. R^2	0.238	0.236

Table III

Independence and gray Directors on Firm Value

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics between 1999 and 2006. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Regression (1) shows the results of basic regression and Regression (2) shows fixed effect regression of firm performance and manager ability. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)
Independent Outside directors	**0.164*** **	**-0.596*** **	**-1.467*** **
	(0.054)	**(0.183)**	**(0.264)**
Gray Outside directors	**-0.032**		
	(0.121)		
Board size	-0.009	0.004	-0.106***
	(0.022)	(0.022)	(0.026)
Director age	-1.191***	-1.206***	-1.212***
	(0.092)	(0.092)	(0.092)
Largest ownership	-0.004	0.004	0.007
	(0.044)	(0.044)	(0.044)
CAPEX/Assets	-0.001	0.001	0.003
	(0.023)	(0.023)	(0.023)
Leverage	-0.064	-0.073**	-0.074**
	(0.036)	(0.036)	(0.035)
Firm size	0.032***	0.004	0.027***
	(0.008)	(0.010)	(0.008)
Operating profitability	0.050	0.040	0.036
	(0.058)	(0.057)	(0.057)
Chaebol dummy	0.043*	0.045**	0.043*
	(0.022)	(0.022)	(0.022)
Market risk(beta)	0.041*	0.042*	0.046**
	(0.023)	(0.023)	(0.023)
Indep Outside director * Firm size		0.119***	
		(0.027)	
Indep Outside director * Board size			0.808***
			(0.128)
Industry dummy	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
Number of firms	3,836	3,836	3,836
Adj. R^2	0.238	0.242	0.246

Table VI

Information Asymmetry and Independent Outside Directors

This table presents linear ordinary least-squares regressions analysis of firm performance on manager ability and other firm characteristics between 1999 and 2006. The dependent variable is Tobin's Q, which is the market value to book value. Manager ability is the proportion of directors who graduated from the 5th percentile universities. Regression (1) shows the results of basic regression and Regression (2) shows fixed effect regression of firm performance and manager ability. Industry dummies are employed to control for industry compensation practices, and year dummies are employed to account for economy-wide shocks. Standard errors are shown in parentheses under parameter estimates. Levels of significance are indicated by ***, **, and * for 1%, 5%, and 10%, respectively.

Variable	(1)	(2)	(3)	(4)
Independent Outside directors	**0.223*** **	**0.223*** **	**0.233*** **	**0.236*** **
	(0.052)	**(0.052)**	**(0.053)**	**(0.052)**
Board size	-0.015	-0.015	-0.015	-0.015
	(0.020)	(0.020)	(0.020)	(0.020)
Director age	-0.890***	-0.887***	-0.892***	-0.889***
	(0.093)	(0.092)	(0.093)	(0.092)
Largest ownership	-0.026	-0.021	-0.024	-0.019
	(0.043)	(0.043)	(0.043)	(0.043)
CAPEX/Assets	0.009	0.008	0.009	0.008
	(0.023)	(0.023)	(0.023)	(0.023)
Leverage	-0.118***	-0.122***	-0.120***	-0.124***
	(0.040)	(0.039)	(0.040)	(0.039)
Firm size	0.032***	0.033***	0.032***	0.033***
	(0.007)	(0.007)	(0.007)	(0.007)
Operating profitability	0.304***	0.304***	0.302***	0.302***
	(0.067)	(0.066)	(0.067)	(0.066)
Chaebol dummy	0.003	0.001	0.002	0.001
	(0.022)	(0.021)	(0.022)	(0.021)
Market risk(beta)	0.058**	0.058**	0.058**	0.058**
	(0.023)	(0.023)	(0.023)	(0.023)
GH	0.074**		0.151***	
	(0.032)		(0.051)	
HFV		0.073**		0.179***
		(0.032)		(0.055)
Indep Outside director * GH			**-0.556** **	
			(0.286)	
Indep Outside director * HFV				**-0.688*** **
				(0.288)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Number of firms	2,637	2,637	2,637	2,637
Adj. R^2	0.236	0.236	0.236	0.235

Table VII

Robustness: Information Asymmetry and Independent Outside Directors

Variable	(1)	(2)	(3)	(4)	(5)
Independent Outside directors	**-0.596*** (0.183)**	**-0.303 (0.217)**	**0.002 (0.064)**	**0.058 (0.089)**	**-2.595** (1.266)**
Board size	0.004 (0.022)	0.007 (0.022)	-0.002 (0.021)	-0.006 (0.022)	0.085** (0.033)
Director age	-1.206*** (0.092)	-1.121*** (0.093)	-1.038*** (0.091)	-0.946*** (0.101)	-1.248*** (0.122)
Largest ownership	0.004 (0.044)	-0.015 (0.044)	0.043 (0.043)	-0.092* (0.049)	0.071 (0.059)
CAPEX/Assets	0.001 (0.023)	-0.016 (0.023)	0.002 (0.022)	0.004 (0.033)	-0.018 (0.026)
Leverage	-0.073** (0.036)	-0.060* (0.035)	-0.038 (0.035)	0.042 (0.036)	-0.408*** (0.058)
Firm size	0.004 (0.010)	0.033*** (0.008)	-0.038*** (0.009)	0.009 (0.008)	0.031*** (0.012)
Operating profitability	0.040 (0.057)	0.030 (0.057)	0.039 (0.056)	0.098* (0.059)	-0.423*** (0.085)
Chaebol dummy	0.045** (0.022)	0.033 (0.022)	0.007 (0.022)	0.018 (0.024)	0.081*** (0.030)
Market risk(beta)	0.042** (0.023)	0.033 (0.023)	0.024 (0.023)	0.018 (0.024)	0.116*** (0.033)
Firm year		-0.099*** (0.019)			
Analyst report			0.025*** (0.003)		
Institution ownership				0.164*** (0.057)	
Governance					0.073 (0.090)
Indep Outside director * Firm size	**0.119*** (0.027)**				
Indep Outside director * Firm year		**0.138** (0.062)**			
Indep Outside director * Analyst report			**0.011** (0.006)**		
Indep Outside director * Institution ownership				**0.375* (0.231)**	
Indep Outside director * Governance					**0.569** (0.262)**
Industry dummy	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes
Number of firms	3,836	3,836	3,836	2,860	2,152
Adj. R^2	0.242	0.244	0.275	0.274	0.291

Table VIII

Volatility, Growth opportunities, and Independent Outside Directors

Variable	(1)	(2)	(3)	(4)	(5)
Independent Outside directors	**0.395*** (0.116)**	**0.234*** (0.066)**	**0.040 (0.070)**	**0.242*** (0.056)**	**0.258*** (0.075)**
Board size	0.014 (0.021)	-0.009 (0.022)	-0.001 (0.022)	-0.007 (0.022)	-0.044* (0.026)
Director age	-0.974*** (0.092)	-1.202*** (0.093)	-1.188*** (0.092)	-1.153*** (0.093)	-1.259*** (0.123)
Largest ownership	0.034 (0.043)	-0.001 (0.044)	-0.011 (0.044)	-0.019 (0.044)	-0.062 (0.056)
CAPEX/Assets	0.015 (0.022)	-0.001 (0.023)	0.003 (0.023)	0.025 (0.027)	0.096* (0.049)
Leverage	-0.190*** (0.036)	-0.059 (0.038)	-0.058 (0.036)	-0.066* (0.036)	-0.200*** (0.047)
Firm size	0.046*** (0.007)	0.031*** (0.008)	0.040*** (0.008)	0.030*** (0.008)	0.031*** (0.010)
Operating profitability	0.045 (0.057)	0.032 (0.057)	0.032 (0.057)	0.037 (0.058)	0.264*** (0.077)
Chaebol dummy	0.031 (0.022)	0.041* (0.022)	0.054** (0.022)	0.046** (0.023)	0.052* (0.027)
Market risk(beta)		0.043* (0.023)	0.050** (0.023)	0.022 (0.023)	-0.002 (0.030)
Volatility	0.544*** (0.049)				
Distress		0.017 (0.026)			
Credit rating dummy			-0.129*** (0.026)		
3yr Sales growth rate				0.003*** (0.001)	
R&D expenditures					6.582*** (0.845)
Indep Outside director * Volatility	**-0.449*** (0.183)**				
Indep Outside director * Distress		**-0.179* (0.101)**			
Indep Outside director * Credit rating dummy			**0.249*** (0.089)**		
Indep Outside director * 3yr Sales growth rate				**-0.009*** (0.002)**	
Indep Outside director * R&D expenditures					**-5.241* (3.069)**
Industry dummy	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes
Number of firms	3,836	3,836	3,836	3,836	2,662
Adj. R^2	0.270	0.238	0.243	0.250	