The Effects of Academic Outside Directors on Firm Performance:
Evidence from Korean Chaebol Firms*

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We investigate the performance impact of academic outside directors in Korean Chaebol firms. Professors are traditionally considered popular candidates for outside directors in Korea. Indeed, academic directors take up 35% of the board members in the top 10 conglomerates of Korea. However, there are very few studies that investigate the role of academic outside directors regarding their monitoring and advisory role (White, Woidtke, Black, and Schweitzer, 2014; Francis, Hasan, and Wu, 2015). We categorize outside directors that are professors based on their academic backgrounds and observe whether academic directors have an incremental contribution to firm value. We also investigate whether academic directors effectively monitor senior management. Results indicate that academic directors are negatively associated with firm performance, and the existence of academic directors does not necessarily increase monitoring of the executives. We find that firms with academic directors are not related with higher CEO turnover-performance sensitivity or higher pay-for-performance. Instead, we find that firms with academic directors are more likely to manage earnings. Overall, our analysis indicates that academic outside directors do not contribute to the corporate governance of the boards of Korean Chaebol firms. Our paper contributes to the board independence and the board composition literature in Korea (Lee, Shim, and Choi, 2012; Shawn and Jung, 2015).

Key words: Academic Directors; Corporate Governance; Firm Performance; Korean Chaebol

Ⅰ. Introduction

Public sentiment has often questioned the independence and effectiveness of external directors in Korean Chaebol firms. As a gesture of change, Hyundai Motors acquiesced in April 2015 to the stockholders' request for

a 'Transparent Management Committee' explicitly representing shareholder rights on management issues such as M&A or major asset acquisitions. The Committee consisted of four external directors, with one director named specifically a 'director for protecting stockholder rights'. It is highly noteworthy that a professor was elected to this position.

Due to government regulations requiring at least 50 percent of the board be constituted of external directors, firms are mandated to fill the external director seats.[1] The chosen external directors may provide valuable indicators of management or major shareholder intentions. The decision to hire or not to hire certain types of board members may also lead to different consequences in terms of future firm performance. Prior literature has documented the benefits of other types of board members, such as accounting experts (Moon, Lee, and Ji, 2006; Lim, Cho, and Ko, 2014) and politically connected outside directors (Shin, Hyun, Oh, and Yang, 2017).

According to a 2012 news article by Joongang Daily, academic directors take up 35% of the board members in the top 10 conglomerates of Korea. Academic directors have traditionally been popular candidates for external directors as they symbolize both independence and expertise. However, researchers have not analyzed the exact role and contribution of academic directors, especially in Korean firms. This paper attempts to fill this void.

Prior research on academic external directors in US firms find mixed evidence (White et al., 2014; Francis et al., 2015). Francis et al.(2015) find that academic outside directors are associated with higher firm performance, such as more patents and citations, lower discretionary accruals, higher price informativeness, etc. White et al.(2014) find that firms appoint academic outside directors for their advisory and monitoring functions because firms value the business connections, reputation, and expertise of academic outside directors. However, academic directors may be less effective when firms are facing more risk or when social ties exist between the directors and executives.

We believe Korean Chaebols provide an ideal setting to test the effectiveness of academic directors on the board. Korean Chaebol firms are well known for their low quality of corporate governance (Baek, Kang, and Lee, 2006; Bertrand, Mehta, and Mullainathan, 2002; Cheung, Rau, and Stouraitis, 2006; Jian and Wong, 2010; Joh, 2003). Because of the Korean Chaebol firms' weak corporate governance, the marginal contribution of academic outside directors to the boards (i.e., whether they

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1) According to Commercial Act Article 542-8(1), listed firms that have an asset value of over 2 trillion Korean Won must appoint more than 3 outside directors, and the number of outside directors must be more than half of the number of the board of directors.

improve corporate governance) would be of more interest to researchers, practitioners and regulatory authorities. However, it is also possible that Chaebol firms are more inclined to appoint academic outside directors due to the seeming independence of academic directors. Therefore, it is an empirical question whether academic outside directors contribute to or aggravate the corporate governance of Korean Chaebols. This paper aims to understand the value contribution of academic directors and the characteristics of Chaebol firms that appoint academic directors. To the best of our knowledge, this paper is the first to analyze the impact of academic directors of Korean firms.

This paper tries to explain the underlying mechanism in which academic directors perform monitoring and advisory roles on the board. Our initial question is the characteristics of the firms that appoint academic external directors. Our fundamental question is the specific role and contribution of these academic directors. We find that there is a negative association between firm performance (Tobin's Q or ROA) and the number of academic directors on the board. We conjecture that these results are driven by the poor monitoring role of academic directors and confirm that the monitoring role of the board decreases as the number of academic directors increases.

Our study contributes to the board independence literature in Korea by analyzing

the role of academic directors. We verify that substantive independence based on expertise is more crucial than merely appearing independent on paper, as we show that academic directors play a weaker monitoring and advisory role despite their seeming independence. The negative impact of academic directors on firm performance partially confirms the concern that outside directors behave as rubber-stamps. Our study calls researchers' attention to the board structure of firms and extends the literature on the heterogeneity of outside directors (Fich, 2005). Our findings on the effectiveness of academic outside directors is also relevant in the Korean Chaebol setting because of the weak corporate governance of Korean Chaebols. The substantive importance of the academic directors is more contentious for Korean Chaebols. Black and Kim(2012) show that Chaebol reforms around 2000 led to greater firm value. However, our findings show that Chaebol firms strategically manage board structure to avoid strict rules in Korea and hurt firm value. The findings of our paper should be of interest to authorities when designing new regulations.

The remainder of the paper proceeds as follows. Section 2 reviews prior studies and provides the hypotheses. Section 3 describes the sample, variable definitions and descriptive statistics. Section 4 provides the research design and empirical results, and Section 5 summarizes the findings.

II. Literature Review and Hypothesis Development

2.1 Corporate Governance and the role of External Directors

The board performs two fundamental functions of monitoring and advising executives (Linck, Netter, and Yang, 2008; Adams and Ferreira, 2007; Armstrong, Guay, and Weber, 2010). To effectively provide both advisory and monitor functions, the board of directors must have both expertise and independence. (Armstrong et al., 2010). Outside directors are regarded as the epitome of expertise and independence. Outside directors make up over 60% of the board (Linck et al., 2008), and are customarily "experienced professionals, such as CEOs and executives of other firms, former politicians and regulators, university deans and presidents, and successful entrepreneurs" (Armstrong et al., 2010, p. 184). Outside directors have "incentives to develop reputations as experts in decision control" (Fama and Jensen, 1983, p. 315).

The benefits of independent external directors have been well documented in the literature. Weisbach(1988) finds a stronger association between past performance and the possibility of CEO resignation for boards dominated by external directors. Rosenstein and Wyatt(1990) find that the appointment of new outside directors is positively associated with excess return. Borokhovich, Parrino, and Trapani(1996) find that outside directors have a positive effect on firm value by observing outside CEO succession. In the case of Korean firms, firms with more external directors are less likely to conduct income increasing earnings management (Kim, 2006), more likely to disclose valuable information. (Lee et al., 2012), and display higher levels of accounting conservatism (Kim and Bae, 2007).

However, some research has questioned the contribution of external directors. Kim (2007) finds that the proportion of external directors is not associated with financial statement fraud. Lee, Kim, and Jung (2010) note that firms with a higher proportion of independent external directors have a higher probability of reporting asset misappropriation.

This mixed evidence has led researchers to observe the substantive social independence of directors, rather than the conventional façade of independence. Lee et al.(2010) mention that the substantial operation of the external directors is much more important than the formal design. Substantive independence, proxied by independence from social ties, is more critical for the external director to effectively monitor senior management (Hwang and Kim, 2009; Krishnan, Raman, Yang, and Yu, 2011; Shawn and Jung, 2015). Hwang and Kim (2009) find that boards that were

conventionally and socially independent granted lower compensation, showed stronger pay-for-performance sensitivity and higher turn-over-performance sensitivity than boards that were conventionally independent but had social ties with the executives. Krishnan et al. (2011) suggest a positive relationship between earnings management and seemingly independent directors that had social ties with the CEO or the CFO.[2] Shawn and Jung(2015) find that external directors without substantive in-dependence are associated with higher CEO overinvestment. The underlying assumption of research on external director social ties is that the independence of directors does not directly translate into an identical level of ef-fectiveness in monitoring and advising senior management. Therefore, it is critical to ana-lyze the substance of external directors, es-pecially for the external directors that are heralded as independent directors.

To observe the substantive independence of external directors in Korea, prior literature has analyzed various job categories of the di-rectors, such as accounting experts (Moon et al., 2006; Lim et al., 2014) and politically connected outside directors (Shin et al., 2017). In the case of accounting experts, Moon et al.(2006) document that Korean firms with more accounting experts as their external di-rectors show higher earnings quality and firm performance. Lim et al.(2014) define the level of accounting and financial expertise as the number of accountants, tax accountants, revenue officers, and business professors act-ing as external directors and find mixed re-sults on the effect of external director ex-pertise on firm value and business performance. The authors interpret this result as accounting experts bringing in more conservatism to the firm, and causing firms to show lower business performance. As for politically connected out-side directors, Shin et al.(2017) find that Korean Chaebols with more politically con-nected outside directors have higher operating performance and face lower levels of risk.

Among various job categories, academics have traditionally been popular candidates for external directors in Korean firms as they symbolize both independence and expertise. Academic directors take up 35% of the board members in the top 10 conglomerates of Korea, whereas academic directors only comprise 10% of the top 20 firms in the United States (Korea Joongang Daily, 2012).[3] In our sam-ple, more than 57% of firms have academics

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2) Because the Sarbanes-Oxley Act (SOX) emphasizes independence of external directors, executives bring in seemingly independent external directors with social ties. Nonetheless, managerial/board risk aversion increased in the post-SOX period, and thus mitigated the impact of social ties on earnings management after SOX.
3) In this paper's sample of Korean Chaebol firms, 57.6% of firms have an academic director on their board. This is substantially higher than in the S&P 1500 firms, where 39.7% of firms appoint academic directors (Francis et al. 2015).

on their boards. A recent paper based on US data shows that approximately 40% of S&P 1500 firms have at least one academic director on their board (Francis et al., 2015).

Academic directors are particularly important in Korean firms because of regulatory requirements for external directors. Commercial Law mandates that all listed Korean firms fill at least 25% of their board with external directors. For listed firms with total assets worth more than 2 trillion Korean Won, there are two requirements: 1) external directors must make up more than 50% of the board of directors, and 2) there must be more than 3 external directors. Firms must find eligible external directors to meet the regulatory requirements, and in the process, firms may bring in directors that are not the most qualified. In 2010, POSCO CEO Lee Ku-taek lamented that "the pool of external directors in Korea is very limited. [⋯] It is very difficult for a CEO to find an appropriate candidate" (Maeil Business Newspaper, 2010). This implies the possibility that some external directors may not be the best candidate, but only a viable candidate. Furthermore, Korean firms are much less reluctant than U.S. firms to appoint ex-CEOs of other firms as external directors. For example, only 28% of outside directors in Korean Chaebol firms are former executives from other companies (Maeil Business

Newspaper, 2010). Considering that academic directors are a popular choice when expanding the board (White et al., 2014),[4] the exact role and contribution of academic directors in Korean firms remain an empirical question. Therefore, understanding the effectiveness of academic outside directors is very important in corporate governance research in Korea.

2.2 Performance Impact of Academic Outside Directors in Korean Chaebols

Academics possess many qualities to be regarded as desirable outside directors. Academic directors have their own unique characteristics and can contribute to firms with their expertise, monitoring, reputation and social connections (White et al., 2014). As experts in their fields, academic directors can also boost the competitive advantage of firms by facilitating access to external knowledge spillovers (Audretsch and Lehmann, 2006). In Korea, a predominant portion of academic directors are business and industry specialists – 53% and 41%, respectively. This suggests that academic directors have the relevant expertise in advising senior management. Nonetheless, academic directors may not contribute to firm value. Francis et al.(2015) argues that academics are trained to be in-

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4) White et al.(2014) find that 65% of academic director appointments in US firms increase the board size.

tellectually rigorous; scholarly rigor differs from business acumen or entrepreneurism. Thus, academic directors may be limited in their ability to enhance firm performance.

Empirical evidence on the impact of academic directors is mixed. Based on a hand-collected sample of US firms from 1995 to 2007, White et al.(2014) find weak evidence on the benefits of academic directors. They analyze how the market values academic director appointments and find that on average, appointment of academic directors does not lead to any significant market reaction. They categorize academic directors into three groups- administrative, business, and specialized,[5] and each group is valued differently. Administrative academics are valued positively by the market only when the administrative director is affiliated with a business school and the director is an addition to the board. The market is indifferent to business academics but values specialized academics. The findings of White et al.(2014) only support weak evidence of the value contribution of academic directors.

On the other hand, using S&P 1500 firms from 1998 to 2011, Francis et al.(2015) find a significantly positive effect on Tobin's Q and Return on Assets for the existence and the relative size of academic directors on the board. Firms with academic directors have more patents and patent citations, lower discretionary accruals, more informative stock prices, and lower cash-based CEO compensation. It is interesting to note that in the case of Francis et al.(2015), the positive relationship between firm performance and academic directors are driven by academics not in administrative posts - unlike White et al.(2014). Overall, there is mixed evidence of the contribution of academic directors for US firms.

Because the number of outside directors are mandated by government regulations, the number of outside directors in Korean Chaebol firms tends to be sticky over multiple years. Hence, a newly appointed academic outside director would be a replacement of an existing outside director. If the removed outside director is an effective monitor and advisor, e.g., an accounting expert or a politically connected outside director that has been documented to improve earnings quality and lower firm risk (Moon et al., 2006; Lim et al., 2014; Shin et al., 2017), the incoming external director could be detrimental to firm value. Therefore, despite their independence and expertise, if the academic directors are replacing a more effective director, the ex-

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5) White et al.(2014) classify "academic directors into three groups according to differences in training and experience: Administrative—academics with administrative leadership positions, e.g., presidents, chancellors, and deans; Business — professors with general business expertise, e.g., professors in business schools; and Specialized—professors with specialized expertise, e.g., professors in medicine, science, and engineering." (p. 136)

istence of academic directors would show a negative relationship with firm performance.

The above discussion further implies that academic outside directors may not be unequivocally beneficial, or may not provide all Korean Chaebol firms with the same value. This prediction is also consistent with the literature on company boards from the resource dependence theory perspective (Pfeffer and Salancik, 1978; Lester, Hillman, Zardkoohi, and Cannella Jr, 2008). Lester et al.(2008) suggest that the resources academic directors bring to boards are strongly related to their human and social capital. Thus, the ambiguous role of academic directors in firm value creation leads us to the following null hypothesis.

Hypothesis 1: Firms with academic external directors are not associated with higher firm performance.

2.3 Monitoring Role of Academic Directors

Weisbach (1988, p. 431) notes that "boards of directors are widely believed to play an important role in corporate governance, particularly in monitoring top management. Directors are supposed to supervise the actions of management, provide advice, and veto poor decisions. The board is the shareholders' first line of defense against incompetent management; in extreme cases, it will replace an errant chief executive officer (CEO)." The monitoring role of the board requires active participation of the board in the firm's decision-making processes (Adams and Ferreira, 2007).

Academics could be effective monitors of senior management because academics are "trained to be independent and critical thinkers with their own opinions and judgements, [and] are less likely to be influenced by others" (Francis et al., 2015, p. 547). Francis et al.(2015) also suggest that academic directors are more effective monitors than non-academic external directors; academic directors are associated with better corporate governance. Academic directors are more inclined to attend board meetings and to participate in monitoring-related committees, such as corporate governance committees and audit committees, than non-academic directors. Academic directors are also associated with firms that give lower cash-based compensation, and firms with higher turnover-performance sensitivity. Firms with academic directors display higher financial reporting quality and are less likely to manage earnings with discretionary accruals.

However, anecdotal evidence in Korea suggests that the appointment of academic directors may not enhance the monitoring role of the board (Kim, 2010; Korea Joongang Daily, 2012). In addition, while professors have an independent source of income from universities, the average compensation for outside directorship is significantly large

enough to affect their behavior. According to our dataset, the average compensation for outside directors is 41 million KRW (see Table 1). Considering that the average salary of professors in Korea is 94 million KRW in 2015[6] (Korean ministry of education, 2015), the directorship position is financially valuable to academic directors. Hence, academic directors are less likely to confront insiders because they are financially tied to the company (Baysinger and Butler, 1985).

Therefore, the effectiveness of monitoring role of academic directors in Korea firms remains an empirical question. The monitoring capabilities of academic directors can be verified by the association between the academic directors and the turnover-performance sensitivity or pay-for-performance sensitivity of the CEO (Weisbach, 1988; Yermack, 1996; Fich and Shivdasani, 2006; Masulis, Wang, and Xie, 2012). If academic directors effectively monitor senior management, then CEOs would be more likely to be replaced and would receive lower compensation after poor performance. On the other hand, if academic directors fail to appropriately monitor executives, the presence of academic directors would be correlated with lower turnover-performance sensitivity and pay-for-performance sensitivity. Furthermore, effective boards can also monitor

earnings management of executives (Klein, 2002). If academic directors are effective monitors, we would observe lower discretionary accruals for firms with academic directors as the existence of academic directors could hinder executives from managing earnings.

Thus, our second hypothesis is stated as follows:

Hypothesis 2a: Academic Directors are not associated with higher CEO turnover-performance sensitivity.

Hypothesis 2b: Academic Directors are not associated with higher pay-for-performance sensitivity.

Hypothesis 2c: Academic Directors are not associated with higher earnings management.

III. Sample and Variables

3.1 Sample and Variable Definition

The Korean Fair Trade Commission (KFTC) discloses detailed information on the large business conglomerates (Chaebols) to enforce regulations such as equity investment ceilings, bans on cross-shareholdings, and restrictions on related-party transactions. We

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6) According to the '2015 National 4-year-college Full-time Professor Compensation Report' by the Ministry of Education, the average annual salary of a full professor was 94,812,000 KRW.

use the KFTC classifications for Chaebol firms for 2001 to 2011. Our sample consists of listed non-financial Chaebol firms. Board and ownership data are collected manually from the firms' annual reports. Data on financial statements and stock prices are collected from the Korea Investor Service's database (KIS-VALUE). After removing firms with missing data, the final sample is made of 2,003 firm-year observations. All continuous variables are winsorized at the 1st and 99th percentiles. Our main variable of interest is the professors on the board. *#Professor* is the number of external directors who are currently or have formerly been professors. These academic external directors are categorized according to their educational background into *#Biz_Professor, #Law_Professor, #Econ_ Professor,* and *#Industry_Professor*.[7] *#Biz_ Professor* is the number of outside directors who are currently or formerly professors at a business school. *#Law_Professor is* the number of outside directors who are currently or formerly professors at a law school. *#Econ_Professor* is the number of outside directors who are currently or formerly professors at a school of economics. *#Industry_ Professor* is the number of outside directors

who are currently or formerly professors that are industry specialists (e.g., professors in engineering). *Board_Size is* the sum of inside, outside, and part-time directors (if any). *Board_Independence* is the number of outside directors divided by the total number of board members (*Board_Size*). *#Board_Od is* the number of outside directors. *Board_Meet* is the number of board meetings. *Biz_Professor_ Ratio* is *#Biz_Professor* divided by the total number of outside directors (*#Board_Od*). *Law_Professor_Ratio* is *#Law_Professor* divided by the total number of outside directors (*#Board_Od*). *Econ_Professor_Ratio* is *#Econ _Professor* divided by the total number of outside directors (*#Board_Od*). *Industry_Professor _Ratio* is *#Industry_Professor* divided by the total number of outside directors (*#Board_Od*). *TA2B* is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. *Controlling_Owner* is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. *Foreign_Ownership* is the percentage of foreign ownership. *Wedge* is the divergence between controlling shareholders' voting rights and cash flow rights. *Tobin_Q* is the ratio of market value of assets to book

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7) Prior literature has considered whether the academic director holds an administrative position in their institution (White et al. 2014; Francis et al. 2015). White et al.(2014) categorize academics into *Administrative, Business, and Specialized*, and includes the deans of business schools into *Administrative*, and not *Business*. Their categorization is interesting because the value effect of administrative differs within Business and Non-Business Administratives. To simplify and provide a more consistent categorization, this paper focuses only on the educational backgrounds of academic directors.

value of assets. *Ret* is the monthly compounded annual stock return. *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Loss* is 1 if Roa is less than zero, 0 otherwise. *Ocf* is operating cash flow divided by beginning-of-the-year total assets. *Volatility* is standard deviation of monthly stock returns over 12 months of the year. *Altman_Z* is Altman's Z score (Altman, 1968). *Size* is the natural logarithm of total assets. *Leverage* is total debt divided by total assets. *Mtb* is market value of equity divided by book value of equity. *Firm_Age* is number of years since the date of firm incorporation. *Sales_Growth* is the change in sales divided by lagged-year sales. *Rd* is research and development expenditure divided by total sales. *Ceo_Turnover* is 1 if the firm replaces its CEO during the year, and 0 otherwise. *Exec_Pay* is the average annual pay (salary, bonus, and stock options) of inside executive directors. *Od_Pay* is the average annual pay of outside directors.

3.2 Descriptive Statistics

Panel A of Table 1 shows the descriptive statistics of our sample. In our sample, the average (median) board is made of 6.855 (7.000) board members (*Board_Size*) with an average (median) of 3.071 (3.000) outside directors (*Board_Od*). Of these outside directors, the average (median) percentage of academic directors is 30.1% (25.0%), which suggests that on average there is one academic director on the board of each Chaebol firm. The average number of *#Biz_Professor, #Law_Professor, #Econ_Professor,* and *#Industry_Professor* is 0.476, 0.044, 0.061, 0.368, respectively. This shows that *Biz_Professor* and *Industry_Professor* are the most popular category of academic directors. The mean (median) *Tobin_Q* is 1.187 (1.012) and mean (median) *Roa* is 0.037 (0.038). The mean value of total assets is 4.318 trillion Korean Won, which amounts to approximately US$ 4 billion.

Panel B of Table 1 is the annual distribution of our sample's board characteristics. *Board_independence* shows a generally increasing trend. *#Professor* increases substantially in 2008 and remains generally constant. In sum, these time-series trends suggest that academic directors remain a consistently popular choice among Chaebol firms.

Table 1, Panel C is the univariate analysis results for the mean difference between firms that appoint academic directors (*D_Professor = 1*) and firms that do not appoint academic directors (*D_Professor = 0*). Boards that include academic directors are significantly larger (*Board_Size*), albeit by one director, meet less frequently (*Board_Meet*), have a larger proportion of foreign ownership (*Foreign_Ownership*), and have a smaller divergence

⟨Table 1⟩ Descriptive Statistics

Panel A: Descriptive Statistics of the Sample

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Governance characteristics						
Board_Size	2,003	6.855	2.468	5.000	7.000	8.000
Board_Independence	2,003	0.429	0.147	0.273	0.429	0.556
#Board_Od	2,003	3.071	1.745	2.000	3.000	4.000
#Professor	2,003	0.905	0.969	0.000	1.000	1.000
Professor_Ratio	2,003	0.301	0.328	0.000	0.250	0.500
D_Professor	2,003	0.576	0.494	0.000	1.000	1.000
#Biz_Professor	2,003	0.412	0.658	0.000	0.000	1.000
#Law_Professor	2,003	0.044	0.206	0.000	0.000	0.000
#Econ_Professor	2,003	0.061	0.239	0.000	0.000	0.000
#Industry_Professor	2,003	0.368	0.577	0.000	0.000	1.000
Board_Meet	2,003	14.579	10.107	8.000	11.000	17.000
Controlling_Owner	2,003	0.476	0.500	0.000	0.000	1.000
Foreign_Ownership	2,003	0.149	0.157	0.019	0.090	0.232
Wedge	2,003	0.283	0.209	0.083	0.300	0.427
Ceo_Turnover	2,003	0.252	0.434	0.000	0.000	1.000
Exec_Pay (M KRW)	1,553	668.205	739.457	223.000	421.000	808.000
Od_Pay (M KRW)	1,513	41.310	17.298	30.000	38.000	52.000
Economic characteristics						
Tobin_Q	2,003	1.187	0.588	0.827	1.012	1.344
Ret	2,003	0.239	0.647	-0.177	0.084	0.479
Roa	2,003	0.037	0.075	0.007	0.038	0.079
Loss	2,003	0.191	0.393	0.000	0.000	0.000
Ocf	2,003	0.066	0.085	0.015	0.057	0.113
Volatility	2,003	0.126	0.067	0.081	0.111	0.152
Altman_Z	2,003	3.354	2.792	1.857	2.706	3.860
Asset (T KRW)	2,003	4.318	10.903	0.372	1.196	3.786
Size	2,003	27.815	1.602	26.641	27.810	28.962
TA2B	2,003	0.375	0.484	0.000	0.000	1.000
Leverage	2,003	0.487	0.198	0.333	0.509	0.629
Mtb	2,003	1.383	1.186	0.598	1.026	1.743
Firm_Age	2,003	18.478	12.349	8.000	16.000	29.000
Sales_Growth	2,003	0.077	0.239	-0.032	0.059	0.164
Rd	2,003	0.002	0.006	0.000	0.000	0.000
|DA|	1,816	0.055	0.056	0.017	0.038	0.075

Panel B: Distribution of Board Characteristics by Year

Year	Number of Observations	Board_Size	#Board_Od	Board_ Independence	#Professor	Professor_ Ratio
2001	85	7.84	3.13	0.39	0.79	0.28
2002	91	7.55	2.90	0.37	0.75	0.28
2003	104	7.18	2.74	0.37	0.73	0.26
2004	115	7.05	2.76	0.37	0.76	0.28
2005	118	7.03	2.90	0.39	0.76	0.25
2006	143	7.10	2.95	0.39	0.78	0.27
2007	148	7.09	2.97	0.39	0.82	0.29
2008	123	7.43	3.25	0.42	1.02	0.34
2009	145	6.49	3.28	0.48	1.04	0.33
2010	157	6.32	3.20	0.48	0.99	0.32
2011	164	6.62	3.18	0.46	1.01	0.33
2012	194	6.73	3.21	0.45	1.01	0.32
2013	211	6.52	3.10	0.45	0.96	0.31
2014	205	6.40	3.12	0.46	0.96	0.31
Average		6.85	3.07	0.43	0.91	0.30

〈Table 1〉 Descriptive Statistics (continue)

Panel C: Univariate Analysis for Mean Differences

Variable	D_Professor = 1	D_Professor = 0	Difference	P-value
Board_Size	7.39	6.12	1.27	0.000***
Board_Independence	0.47	0.37	0.10	0.000***
Board_Meet	13.68	15.80	-2.12	0.000***
Controlling_Own	0.48	0.47	0.00	0.898
Foreign_Ownership	0.18	0.10	0.08	0.000***
Wedge	0.26	0.31	-0.04	0.000***
Tobin_Q	1.27	1.07	0.20	0.000***
Ret	0.22	0.27	-0.05	0.069*
Roa	0.04	0.04	0.00	0.872
Ocf	0.07	0.06	0.01	0.005***
Size	28.21	27.28	0.93	0.000***
Leverage	0.50	0.46	0.04	0.000***
Firm_Age	18.78	18.07	0.72	0.200
Sales_Growth	0.08	0.07	0.01	0.442
Rd	0.00	0.00	0.00	0.000***
Exec_Pay	799.31	474.58	324.74	0.000***
Od_Pay	44.45	36.58	7.87	0.000***

The symbols *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively. *Board_Size* is the sum of inside, outside, and part-time directors (if any). *Board_Independence* is the number of outside directors divided by the total number of board members. *#Board_Od* is the number of outside directors. *#Professor* is the number of outside directors who are currently or formerly professors. *Professor_Ratio* is the number of outside directors who are currently or formerly professors divided by the total number of outside directors. *D_Professor* is 1 if firm has at least one current or former professors, and 0 otherwise. *#Biz_Professor* is the number of outside directors who are currently or formerly professors at a business school. *#Law_Professor* is the number of outside directors who are currently or formerly professors at a law school. *#Econ_Professor* is the number of outside directors who are currently or formerly professors at a school of economics. *#Industry_Professor* is the number of outside directors who are currently or formerly professors who are industry specialists (e.g., professors in engineering). *Biz_Professor_Ratio* is *#Biz_Professor* divided by total number of outside directors. *Law_Professor_Ratio* is *# Law_Professor* divided by total number of outside directors. *Econ_Professor_Ratio* is *#Econ_Professor* divided by total number of outside directors. *Industry_Professor_Ratio* is *# Industry_Professor* divided by total number of outside directors. *Board_Meet* is the number of board meetings. *TA2B* is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. *Controlling_Owner* is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. *Foreign_Ownership* is foreign ownership. *Wedge* is the divergence between controlling shareholders' voting rights and cash flow rights. *Tobin_Q* is the ratio of market value of assets to book value of assets. *Ret* is the monthly compounded annual stock return. *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Loss* is 1 if *Roa* is less than zero, 0 otherwise. *Ocf* is operating cash flow divided by beginning-of-the-year total assets. *Volatility* is standard deviation of monthly stock returns over 12 months of the year. *Altman_Z* is Altman's Z score (Altman 1968). *Size* is the natural logarithm of total assets. *Leverage* is total debt divided by total assets. *Mtb* is market value of equity divided by book value of equity. *Firm_Age* is number of years since the date of firm incorporation. *Sales_Growth* is changes in sales divided by lagged-year sales. *Rd* is research and development expenditure divided by total sales. *Ceo_Turnover* is 1 if the firm replaces its CEO during the year, and 0 otherwise. *|DA|* is absolute value of discretionary accrual which is based on the modified Jones model (1991). *Exec_Pay* is the average annual pay (salary, bonus, and stock options) of inside executive directors. *Od_Pay* the is average annual pay of outside directors.

<Table 2> Pearson Correlation Matrix

	(1) ln(#Professor)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(2) ln(Board_Size)	0.36***														
(3) Board_Independence	0.40***	0.39***													
(4) ln(Board_Meet)	-0.12***	0.07***	-0.07***												
(5) Controlling_Own	0.04	0.24***	0.09***	0.15***											
(6) Foreign_Ownership	0.32***	0.41***	0.35***	-0.10***	0.05**										
(7) Wedge	-0.12***	-0.22***	-0.15***	0.04*	-0.16***	-0.28***									
(8) Tobin_Q	0.15***	0.03	0.06**	-0.21***	-0.21***	0.26***	-0.07***								
(9) Ret	-0.05**	-0.02	-0.08***	0.02	0.03	0.08***	-0.03	0.14***							
(10) Roa	0.02	0.06***	0.02	-0.14***	0.02	0.38***	-0.10***	0.29***	0.24***						
(11) Ocf	0.07***	0.08***	0.03	-0.16***	-0.11***	0.35***	-0.05*	0.31***	0.18***	0.45***					
(12) Size	0.37***	0.57***	0.64***	0.02	0.24***	0.57***	-0.25***	-0.01	-0.05**	0.14***	0.10***				
(13) Leverage	0.07***	0.10***	0.08***	0.29***	0.00	-0.15***	0.13***	-0.09***	0.00	-0.36***	-0.20***	0.16***			
(14) ln(Firm_Age)	0.08***	0.16***	0.17***	0.07***	0.21***	0.08***	-0.19***	-0.17***	0.03	-0.06***	-0.14***	0.30***	0.00		
(15) Sales_Growth	0.01	0.01	-0.06***	-0.02	0.00	0.02	0.03	0.11***	0.10***	0.23***	0.14***	0.02	0.01	-0.06***	
(16) Rd	0.13***	0.12***	0.10***	-0.08***	0.02	0.07***	-0.04*	0.11***	0.01	0.05**	0.06***	0.10***	-0.03	0.07***	0.01

The symbols *, **, and *** indicate significance at 10%, 5%, and 1 % levels, respectively. The symbols *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively. Ln(Board_Size) is the natural logarithm of the sum of inside, outside, and part-time directors (if any). Board_Independence is the number of outside directors divided by the total number of board members. Ln(Board_Meet) is the natural logarithm of the number of board meetings. TA2B is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. Controlling_Owner is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. Foreign_Ownership is foreign ownership. Wedge is the divergence between controlling shareholders' voting rights and cash flow rights. Tobin_Q is the ratio of market value of assets to book value of assets. Ret is the monthly compounded annual stock return. Roa is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. Loss is 1 if Roa is less than zero, 0 otherwise. Ocf is operating cash flow divided by beginning-of-the-year total assets. Volatility is standard deviation of monthly stock returns over 12 months of the year. Size is the natural logarithm of total assets. Leverage is total debt divided by total assets. Firm_Age is number of years since the date of firm incorporation. Sales_Growth is changes in sales divided by lagged-year sales. Rd is research and development expenditure divided by total sales.

between controlling shareholders' voting rights and cash flow rights (*Wedge*). Firms that appoint academic directors have a higher Tobin's Q (*Tobin_Q*), higher operating cash flow (*Ocf*), larger size (*Size*), and higher leverage (*Leverage*). These firms award both executives (*Exec_Pay*) and outside directors (*Od_Pay*) higher average annual compensation. We include these firm attributes in the regression models to control for their effect on firm performance.

Table 2 reports the Pearson Correlation Matrix. Ln(*#Professor*), the natural logarithm of *#Professor* correlates positively with the firm's performance variable, *Tobin_Q*. *ln(Board_Size)* and *Board_Independence* are positively correlated with firm size (*Size)*. This correlation reflects Korean regulatory requirements regarding board composition according to firm size (Hyun, Kim, Kwon, and Shin, 2014)

Ⅳ. Research Design and Empirical Results

4.1 Determinants of Appointing Academic Directors

To examine the determinants of appointing academic directors, we regress determinants of board structures identified by prior research.

(Linck et al., 2008; Masulis et al., 2012). We consider board, ownership, and firm economic characteristics that could affect board structure. The regression model is as follows:

$$
\begin{aligned}
Professor_t =\ & a_0 + a_1 ln(Board\_Size)_{t-1} \\
& + a_2 Board\_Independence_{t-1} + a_3 TA2B_{t-1} \\
& + a_4 Board\_Independence_{t-1} * TA2B_{t-1} \\
& + a_5 ln(Board\_Meet)_{t-1} \\
& + a_6 Controlling\_own_{t-1} \\
& + a_7 Foreign\_Ownership_{t-1} + a_8 Wedge_{t-1} \\
& + a_9 ln(Firm\_Age)_{t-1} + a_{10} Volatility_{t-1} \\
& + a_{11} Size_{t-1} + a_{12} Leverage_{t-1} + a_{13} Roa_{t-1} \\
& + a_{14} Ocf_{t-1} + a_{15} Altman\_Z_{t-1} \\
& + Fixed\ Effects + e, \quad\quad (1)
\end{aligned}
$$

where, *Professor_t* is *ln(#Professor_t)*, or *D_Professor*.

In equation (1), industry fixed effects are based on the two-digit Standard Industrial Classification (SIC) code industry classifications. Year fixed effects and firm fixed effects are also controlled for in the regression model. Larger boards (*ln(Board_Size)*), and a higher proportion of independent directors (*Board_Independence)* are expected to be positively related with the number of academic directors. Academic directors are often hired when expanding the board size (White et al., 2014). More independent boards are likely to appoint external directors; therefore, we conjecture that there would be a positive association between the number of academic direc-

tors and board independence. We include the indicator variable, *TA2B*, and its interaction with the variable *Board_ Independence* to incorporate the regulatory requirements (Cho and Kim, 2007; Choi, Park, and Yoo, 2007; Black and Kim, 2012).

Board activity (*ln(Board_Meet)*) and foreign ownership (*Foreign_Ownership*) can complement or substitute the governance mechanisms of the academic directors. Firms that hold frequent board meetings and have a high foreign ownership ratio are more likely to hire external directors that are effective monitors and advisors (Weisbach, 1988; Desender, Aguilera, Lópezpuertas-Lamy, and Crespi, 2016). Nonetheless, the existence of strong governance mechanisms may not lead to more academic director appointments if the academic directors are not qualified as effective monitors or advisors (Morck, Shleifer, and Vishny, 1988). *Wedge* represents the degree of entrenchment and incentive alignment (Morck et al., 1988; Fan and Wong, 2005). Chaebol firms with a large wedge may prefer weak monitors to maintain their current status quo. If academic directors are effective monitors, then there should be a negative relationship between *Wedge* and the number of academic directors. *Ln(Firm_Age)*, *Volatility*, *Size*, *Leverage, Ocf, Roa,* and *Altman_Z* represent firm characteristics that may affect board structure (Linck et al., 2008).

Table 3 shows both the OLS and logit co-efficient estimates for the determinants of *#Professor* and *D_Professor*. All standard errors are corrected for heteroskedasticity using Huber‐White robust standard errors. In congruence with our expectations, we find that larger boards and more independent boards appoint more academic directors. However, if firm size measured as the total assets greater than 2 Billion KRW, firms do not increase the number of academic directors in their boards ($\alpha_2 + \alpha_4 = -0.018$). Firms with a larger divergence between voting rights and cash flow rights hire more academic directors. Nonetheless, the logit regressions in Column (2) show slightly different results. All in all, the results imply that academic directors are often appointed to fill the boards of large firms, and firms with poor corporate governance are more likely to hire academic outsiders. Based on the adjusted R^2 of 63.3% and 34.1% in Column (1) and (2), we can assume that the cross-sectional variation in the number of academic directors is sufficiently explained by the board, ownership, and economic determinants.

4.2 Operating Performance and Market Performance Consequences of Appointing Academic Directors

If academic directors provide useful expertise that plays a significant role (e.g., advisory role or monitoring role) in increasing firm value, then firms that appoint academic

<Table 3> Determinants of Appointing Professor Outside Directors

Independent variables	Dependent variable			
	(1) OLS $\#Professor_t$		(2) Logit $D\_Professor$	
	Coeff.	t-stat.	Coeff.	z-stat.
$ln(Board\_Size)_{t-1}$	0.127**	(2.46)	1.468***	(5.17)
$Board\_Independence_{t-1}$	0.403***	(2.72)	3.757***	(4.06)
$TA2B_{t-1}$	0.251**	(1.99)	1.450	(1.49)
$Board\_Independence_{t-1} * TA2B_{t-1}$	−0.421*	(−1.74)	−3.011*	(−1.66)
$ln(Board\_Meet)_{t-1}$	0.018	(0.66)	−0.333*	(−1.90)
$Controlling\_Own_{t-1}$	0.022	(0.64)	−0.568***	(−2.64)
$Foreign\_Ownership_{t-1}$	0.104	(0.74)	2.819***	(3.56)
$Wedge_{t-1}$	0.230*	(1.69)	−0.764	(−1.42)
$ln(Firm\_Age)_{t-1}$	−0.052	(−1.07)	−0.363**	(−2.04)
$Volatility_{t-1}$	0.205	(1.18)	1.306	(0.98)
$Size_{t-1}$	0.092***	(2.61)	0.667***	(5.10)
$Leverage_{t-1}$	−0.161	(−1.43)	0.957	(1.56)
Roa_{t-1}	−0.447***	(−2.60)	−4.413***	(−3.47)
Ocf_{t-1}	0.018	(0.13)	0.356	(0.37)
$Altman\_Z_{t-1}$	−0.004	(−0.47)	0.125***	(3.25)
Intercept	−2.372**	(−2.32)	−21.559***	(−6.37)
Fixed Effects	Year, Industry, and Firm		Year, Industry, and Firm	
Standard error	Huber-White robust		Huber-White robust	
Observations	1,687		1,687	
Adjusted R^2	0.633		0.341	

The symbols *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively. *#Professor* is the number of the academic outsiders. *D_Professor* is 1 if firm has at least one current or former professors, and 0 otherwise. *Ln(Board_Size)* is the natural logarithm of the sum of inside, outside, and part-time directors (if any). *Board_Independence* is the number of outside directors divided by the total number of board members. *TA2B* is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. *Ln(Board_Meet)* is the natural logarithm of the number of board meetings. *Controlling_Owner* is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. *Foreign_Ownership* is foreign ownership. *Wedge* is divergence between controlling shareholders' voting rights and cash flow rights. *Ln(Firm_Age)* is the natural logarithm of the number of years since the date of firm incorporation. *Volatility* is standard deviation of monthly stock returns over 12 months of the year. *Size* is the natural logarithm of total assets. *Leverage* is total debt divided by total assets. *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Ocf* is operating cash flow divided by beginning-of-the-year total assets. *Altman_Z* is Altman's Z score (Altman 1968).

directors should show higher operating performance than firms without academic directors. However, if academic directors are not valuable advisors, then firms with academic directors should demonstrate lower operating performance.

To test for the effect of academic directors on firm operating and market performance, we estimate the following model, controlling for industry fixed effects, year fixed effects, and firm fixed effects:

$Firm\ Performance_t = \alpha_0 + \alpha_1 ln(\#Professors)_t$
$+ \alpha_2 ln(Board\_Size)_t + \alpha_3 Board\_Independence_t$
$+ \alpha_4 TA2B_t + \alpha_5 Board\_Independence_t * TA2B_t$
$+ \alpha_6 ln(Board\_Meet)_t + \alpha_7 Controlling\_own_t$
$+ \alpha_8 Foreign\_Ownership_t + \alpha_9 Wedge_t$
$+ \alpha_{10} Size_t + \alpha_{11} Leverage_t + \alpha_{12} ln(Firm\_Age)_t$
$+ \alpha_{13} Volatility_t + \alpha_{14} Roa_t + \alpha_{15} Ocf_t$
$+ \alpha_{16} Loss_{t-1} + \alpha_{17} Rd_t + \alpha_{18} Sales\_Growth_t$
$+ Fixed\ Effects + e,$ (2)

where, $ln(\#Academics)$ is $ln(\#Professor)$, $ln(\#Biz\_Professor)$, $ln(\#Law\_Professor)$, $ln(\#Econ\_Professor)$, or $ln(\#Industry\_Professor)$ and $Firm\ Performance_t$ is $Tobin\_Q$, or Roa.

Column (1) and Column (3) in Table 4 illustrate that the number of academic directors are significantly negatively associated with firm performance, proxied by return on assets and Tobin's Q. These results might be driven by the replacement of existing outside directors with academic outside directors. Overall results suggest that academic directors do not increase firm value on average.[8]

We further analyze the advisory role of academic directors by dividing the academics into educational backgrounds. The regression results for different types of academics are shown in Column (2) and (4) of Table 4, using $Tobin\_Q$ and Roa as dependent variables, respectively. We find significantly negative relationship between academic directors and firm performance for business professors, economics professors, and industry specialized professors. In sum, the results suggest that academics, regardless of their educational background, do not contribute to firm performance.[9]

From the findings in Table 3 that firms with poor corporate governance are more likely to hire academic directors, we conjecture that academic directors may not be good monitors.[10] Due to the poor monitoring of academic directors, firms with academic directors would have lower performance. We empirically prove our conjecture of poor monitoring ability of academic directors in the next section.

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8) We also investigate similar tests using *D_Professor* and *Professor_Ratio*. The results are robust although we use alternative proxies for academic directors.
9) Results remain qualitatively similar when we use the indicator variable, *D_Professor*.
10) As we mentioned in Section 2, due to regulations in Korea, a new appointment of academic directors could be the replacement of existing competent outside directors.

〈Table 4〉 Performance Impacts of Professor Outside Directors

Independent variables	Dependent variable							
	(1) OLS Tobin Q_t		(2) OLS Tobin Q_t		(3) OLS Roa_t		(4) OLS Roa_t	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
$ln(\#Professor)_t$	-0.066***	(-2.69)			-0.013***	(-2.98)		
$ln(\#Biz\_Professor)_t$			-0.069**	(-2.34)			-0.014***	(-2.60)
$ln(\#Law\_Professor)_t$			-0.077	(-1.27)			-0.020	(-1.45)
$ln(\#Econ\_Professor)_t$			-0.087*	(-1.79)			-0.022**	(-2.02)
$ln(\#Industry\_Professor)_t$			-0.052*	(-1.74)			-0.007	(-1.28)
$ln(Board\_Size)_t$	0.162***	(3.85)	0.166***	(3.92)	-0.007	(-0.77)	-0.006	(-0.68)
$Board\_Independence_t$	0.016	(0.13)	0.024	(0.19)	0.023	(0.93)	0.024	(0.97)
$TA2B_t$	0.208*	(1.80)	0.212*	(1.84)	0.044**	(2.37)	0.046**	(2.46)
$Board\_Independence_t * TA2B_t$	-0.437**	(-2.03)	-0.442**	(-2.05)	-0.085**	(-2.27)	-0.087**	(-2.31)
$ln(Board\_Meet)_t$	-0.033	(-1.60)	-0.032	(-1.56)	-0.013***	(-2.71)	-0.012***	(-2.68)
$Controlling\_Own_t$	0.045*	(1.86)	0.046*	(1.88)	0.008*	(1.66)	0.008*	(1.65)
$Foreign\_Ownership_t$	0.445***	(3.57)	0.447***	(3.59)	0.160***	(6.26)	0.159***	(6.27)
$Wedge_t$	-0.046	(-0.46)	-0.038	(-0.37)	-0.009	(-0.30)	-0.006	(-0.21)
$Size_t$	-0.033	(-1.14)	-0.031	(-1.11)	0.017**	(2.22)	0.017**	(2.23)
$Leverage_t$	0.434***	(4.98)	0.427***	(4.90)	-0.188***	(-9.81)	-0.190***	(-9.90)
$ln(Firm\_Age)_t$	-0.000	(-0.00)	0.001	(0.02)	0.010	(1.24)	0.010	(1.27)
$Volatility_t$	0.880***	(5.97)	0.878***	(5.95)	0.028	(1.01)	0.027	(0.98)
Roa_t	1.292***	(7.74)	1.280***	(7.67)				
Ocf_t	0.576***	(4.54)	0.575***	(4.54)				
$Loss_{t-1}$					0.009	(1.21)	0.009	(1.24)
Rd_t					-0.000	(-0.84)	-0.000	(-0.41)
$Sales\_Growth_t$					0.054***	(6.19)	0.053***	(6.14)
Intercept	0.743	(1.03)	0.698	(0.97)	-0.287	(-1.54)	-0.294	(-1.57)
Fixed effects	Year, Industry, and Firm		Year, Industry, and Firm		Year, Industry, and Firm		Year, Industry, and Firm	
Standard error	Huber-White robust		Huber-White robust		Huber-White robust		Huber-White robust	
Number of observations	2,003		2,003		2,003		2,003	
Adjusted R^2	0.741		0.741		0.502		0.502	

The symbols *, **, and *** indicate significance at 10%, 5%, and 1 % levels, respectively. *Tobin_Q* is the ratio of market value of assets to book value of assets. *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Ln(#Professor)* is the natural logarithm of the number of academic outsiders. *Ln(#Biz_Professor)* is the natural logarithm of the number of outside directors who are currently or formerly professors at a business school. *Ln(#Law_Professor)* is the natural logarithm of the number of outside directors who are currently or formerly professors at a law school. *Ln(#Econ_Professor)* is the natural logarithm of the number of outside directors who are currently or formerly professors at a school of economics. *Ln(#Industry_Professor)* is the natural logarithm of the number of outside directors who are currently or formerly professors who are industry specialists (e.g., professors in engineering). *Ln(Board_Size)* is the natural logarithm of the sum of inside, outside, and part-time directors (if any). *Board_Independence* is the number of outside directors divided by the total number of board members. *Ln(Board_Meet)* is the natural logarithm of the number of board meetings. *TA2B* is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. *Controlling_Owner* is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. *Foreign_Ownership* is foreign ownership. *Wedge* is divergence between controlling shareholders' voting rights and cash flow rights. *Size* is the natural logarithm of total assets. *Leverage* is total debt divided by total assets. *Ln(Firm_Age)* is natural logarithm of the number of years since the date of firm incorporation. *Volatility* is standard deviation of monthly stock returns over 12 months of the year. *Size* is the natural logarithm of total assets. *Ocf* is operating cash flow divided by beginning-of-the-year total assets. *Loss* is 1 if *Roa* is less than zero, 0 otherwise. *Sales_Growth* is changes in sales divided by lagged-year sales.

4.3 Are Academic Directors Good Monitors?

In theory, academics are the ideal monitors. Academics are trained to think critically, and do not have any interlinked business interests. Following prior literature (e.g., Weisbach, 1988; Yermack, 1996; Fich and Shivdasani, 2006; Masulis et al., 2012), we examine the monitoring capabilities of academic directors by examining the turnover and compensation of CEOs with weak performance.

Masulis et al.(2012) note that boards should replace poorly performing CEOs and award CEOs compensation that is aligned with the interests of the shareholders. Poorly performing CEOs are less likely to be replaced if the board is not an effective monitor (Weisbach, 1988).

Table 5 exhibits the relationship between academic directors and proxies for monitoring capabilities. Column (1) shows the logit regression results with the dependent variable as *Ceo_Turnover* which is an indicator variable that takes the value 1 if the CEO is replaced during the year and 0 otherwise. *Ln(#Professor)* is interacted with ΔRoa_t and Ret_t to observe whether boards with more academic directors are more likely to replace their CEOs after weak performance. If the coefficient on ΔRoa_t and Ret_t are significantly negative and the coefficient of the interaction variables are significantly positive, this indicates that while CEOs are replaced after

poor performance, they are less likely to be replaced when there are more academic directors. However, none of the coefficients for ΔRoa_t, Ret_t or the interaction variables are significant.

Excessive CEO compensation is another indicator of the monitoring ability of the board. If academic directors are weak monitors, boards with a higher number of academic directors would award greater excessive compensation to CEOs than boards that have fewer academic directors. Table 5 Column (2) examines this possibility using $\Delta Exec\_Pay$, the change in the natural logarithm of average annual pay awarded to executives, as the dependent variable. Negative coefficients on the interaction of ΔRoa_t or Ret_t and *#Professor* indicate that boards with more academic directors award higher excessive pay to CEOs, thus lowering the pay-for-performance sensitivity of executives for firms with academic directors. However, we do not find any significant relationship in the standalone or interaction variables with changes in excess CEO compensation.

Lastly, effective boards can deter earnings management of executives. In Column (3) of Table 5, the dependent variable is |DA|, the absolute value of discretionary accruals based on the modified Jones model (1991) and a proxy for earnings management. The positive coefficient of *#Professor* show that academic directors are associated with higher absolute values of discretionary accruals. Therefore,

〈Table 5〉 Impact of Professor Outside Directors on CEO Turnover and
Executive Pay-for-Performance Sensitivity

Independent variables	Dependent variable					
	(1) Logit Regression $Ceo\_Turnover_{t+1}$		(2) OLS $\Delta Exec\_Pay_t$		(3) OLS $|DA|_t$	
	Coeff.	z-stat.	Coeff.	t-stat.	Coeff.	t-stat.
$\Delta Roa_t * ln(\#Professor)_t$	0.303	(0.19)	−0.323	(−0.59)		
$Ret_t * ln(\#Professor)_t$	−0.015	(−0.08)	0.024	(0.47)		
ΔRoa_t	0.190	(0.15)	0.230	(0.61)		
Ret_t	−0.199	(−1.32)	0.054	(1.46)		
$ln(\#Professor)_t$	−0.141	(−1.06)	0.022	(0.37)	0.007*	(1.74)
$Controlling\_Owner_t$	−0.358***	(−2.62)			0.008*	(1.74)
$Foreign\_Ownership_t$	−0.263	(−0.55)			0.013	(0.60)
$Volatility_t$	0.307	(0.23)			0.044	(1.60)
$Size_t$	0.117	(1.54)			−0.019**	(−2.49)
Mtb_t	−0.064	(−0.93)			0.001	(0.61)
$Leverage_t$	−0.013	(−0.03)			0.025	(1.40)
$ln(Board\_Meet)_t$	0.032	(0.28)			0.004	(0.97)
$Board\_Independence_t$	0.037	(0.06)			0.016	(0.70)
$TA2B_t$	0.505	(0.70)			−0.006	(−0.32)
$Board\_Independence_t * TA2B_t$	−1.209	(−0.89)			0.002	(0.06)
$ln(Board\_Size)_t$	−0.015	(−0.08)			0.001	(0.06)
Roa_t	−1.171	(−1.11)				
Ocf_t					−0.011	(−0.31)
Intercept	0.303	(0.19)	−0.323	(−0.59)	0.517***	(2.67)
Fixed effects	Year and Industry		Year, Industry, and Firm		Year, Industry, and Firm	
Standard error	Firm clustering		Huber-White robust		Huber-White robust	
Number of observations	1,686		1,241		1,816	
Pseudo R^2	0.044					
Adjusted R^2			−0.076		0.280	

The symbols *, **, and *** indicate significance at 10%, 5%, and 1 % levels, respectively. *Ceo_Turnover* is 1 if the firm replaces its CEO during the year, and 0 otherwise. *Exec_Pay* is average annual pay (salary, bonus, and stock options) of inside executive directors. *Od_Pay* is average annual pay of outside directors. *Ln(#Professor)* is the natural logarithm of the number of academic outsiders. *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Ret* is monthly compounded annual stock returns. *Controlling_Owner* is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. *Foreign_Ownership* is foreign ownership. *Volatility* is standard deviation of monthly stock returns over 12 months of the year. *Size* is the natural logarithm of total assets. *Mtb* is market value of equity divided by book value of equity. *Leverage* is total debt divided by total assets. *Ln(Board_Meet)* is the natural logarithm of the number of board meetings. *Board_Independence* is the number of outside directors divided by the total number of board members. *TA2B* is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. *Ln(Board_Size)* is the natural logarithm of the sum of inside, outside, and part-time directors (if any). *Roa* is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. *Ocf* is operating cash flow divided by beginning-of-the-year total assets.

〈Table 6〉 Performance Impacts of Professor Outside Directors

Independent variables	Dependent variable			
	(1) PSM $Tobin\_Q_t$		(2) PSM Roa_t	
	Coeff.	t-stat.		
$ln(\#Professor)_t$	−0.080***	(−2.71)	−0.015***	(−3.25)
$ln(Board\_Size)_t$	0.140**	(2.57)	−0.003	(−0.26)
$Board\_Independence_t$	0.075	(0.57)	0.023	(0.84)
$TA2B_t$	0.260*	(1.79)	0.016	(0.80)
$Board\_Independence_t * TA2B_t$	−0.583**	(−2.25)	−0.048	(−1.16)
$ln(Board\_Meet)_t$	−0.014	(−0.53)	0.003	(0.58)
$Controlling\_Own_t$	0.032	(0.99)	0.005	(0.86)
$Foreign\_Ownership_t$	0.429***	(2.60)	0.159***	(5.22)
$Wedge_t$	0.062	(0.52)	−0.045	(−1.60)
$Size_t$	−0.034	(−0.93)	0.025***	(3.01)
$Leverage_t$	0.456***	(3.97)	−0.193***	(−9.22)
$ln(Firm\_Age)_t$	0.137*	(1.65)	0.006	(0.59)
$Volatility_t$	0.824***	(4.43)	0.088***	(3.08)
Roa_t	1.524***	(7.63)		
Ocf_t	0.590***	(3.85)		
$Loss_{t-1}$			−0.005	(−0.87)
Rd_t			−0.271	(−0.72)
$Sales\_Growth_t$			0.070***	(8.36)
Intercept	0.317	(0.34)	−0.545**	(−2.56)
Fixed effects	Year, Industry, and Firm		Year, Industry, and Firm	
Standard error	Huber−White robust		Huber−White robust	
Number of observations	1,382		1,382	
Adjusted R^2	0.772		0.588	

The symbols *, **, and *** indicate significance at 10%, 5%, and 1 % levels, respectively. $Ln(\#Professor)$ is the natural logarithm of the number of academic outsiders. $Ln(Board\_Size)$ is the natural logarithm of the sum of inside, outside, and part-time directors (if any). $Board\_Independence$ is the number of outside directors divided by the total number of board members. $TA2B$ is 1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise. $Ln(Board\_Meet)$ is the natural logarithm of the number of board meetings. $Controlling\_Owner$ is 1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise. $Foreign\_Ownership$ is foreign ownership. $Wedge$ is divergence between controlling shareholders' voting rights and cash flow rights. $Size$ is the natural logarithm of total assets. $Leverage$ is total debt divided by total assets. $Ln(Firm\_Age)$ is natural logarithm of the number of years since the date of firm incorporation. $Volatility$ is standard deviation of monthly stock returns over 12 months of the year. Roa is profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets. Ocf is operating cash flow divided by beginning-of-the-year total assets. $Loss$ is 1 if Roa is less than zero, 0 otherwise. Rd is research and development expenditure divided by total sales. $Sales\_Growth$ is changes in sales divided by lagged-year sales.

Column (3) shows that academic directors are weak monitors of earnings management. Overall, we do not find any evidence that supports the monitoring capabilities of academic directors.[11]

4.4 Robustness check

There is a potential endogeneity problem because the appointment of academic directors may not be random. There could be correlated omitted factors that simultaneously affect firm performance and the appointment of academic directors. We perform the propensity score matching (PSM) method to control for potential endogeneity biases. Using the logit model results in Column (2) of Table 3, we create a sample with matching firm characteristics. We then perform regressions of Tobin's Q and Roa on *#Professor* using the matched sample. The results in Table 6 confirm that the negative relationship between academic outside directors and firm performance is robust to potential endogeneity biases.

We further investigate the effect of hiring or firing academic directors on firm performance. Untabulated results indicate that when a firm appoints an academic director to the board, firm performance, proxied by Tobin's Q and ROA, becomes worse. Consistent with these results, firm performance is enhanced when a firm removes an academic director.

Ⅴ. Conclusion

In this paper, we investigate the performance impact of acaemic directors in Korean Chaebol firms. We find that firms with academic directors suffer from negative performance measured by Roa and Tobin's Q. We further categorize academic directors based on their academic background and find that academic directors are negatively associated with firm value regardless of their academic background. We also find that CEO turnover after poor firm performance and executives' pay-for-performance is not significantly associated with the existence of academic directors. Overall, our analysis indicates that academic directors do not contribute to the corporate governance of the board.

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11) Results remain qualitatively similar when we use the indicator variable, *D_Professor* and *Professor_Ratio*.

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⟨Appendix⟩

Variable Definitions

Variable		Definition
Board_Size	=	Board size, which is the sum of inside, outside, and part-time directors (if any);
Board_Independence	=	Board independence, which is the number of outside directors divided by the total number of board members (Board_Size);
#Board_Od	=	The number of outside directors;
#Professor	=	The number of outside directors who are current or former professors;
Professor_Ratio	=	The number of outside directors who are current or former professors divided by the total number of outside directors (#Board_Od);
D_Professor	=	1 if firm has at least one current or former professors, and 0 otherwise;
#Biz_Professor	=	The number of outside directors who are currently or formerly professors at a business school;
#Law_Professor	=	The number of outside directors who are currently or formerly professors at a law school;
#Econ_Professor	=	The number of outside directors who are currently or formerly professors at a school of economics;
#Industry_Professor	=	The number of outside directors who are currently or formerly professors who are industry specialists (e.g., professors in engineering);
Biz_Professor_Ratio	=	#Biz_Professor divided by total number of outside directors (#Board_Od);
Law_Professor_Ratio	=	#Law_Professor divided by total number of outside directors (#Board_Od);
Econ_Professor_Ratio	=	#Econ_Professor divided by total number of outside directors (#Board_Od);
Industry_Professor_Ratio	=	#Industry_Professor divided by total number of outside directors (#Board_Od);
Board_Meet	=	The number of board meetings;
TA2B	=	1 if total assets are equal to or higher than 2 billion dollars, and 0 otherwise
Controlling_Owner	=	1 if the largest controlling shareholder and/or an immediate family member is an executive director, and 0 otherwise;
Foreign_Ownership	=	Foreign ownership;
Wedge	=	Divergence between controlling shareholders' voting rights and cash flow rights;
Tobin_Q	=	The ratio of market value of assets to book value of assets;
Ret	=	Monthly compounded annual stock returns;
Roa	=	Profit from continued operations (net income minus income from discontinued operations) divided by beginning-of-the-year total assets;
Loss	=	1 if Roa is less than zero, 0 otherwise;
Ocf	=	Operating cash flow divided by beginning-of-the-year total assets;
Volatility	=	Standard deviation of monthly stock returns over 12 months of the year;
Altman_Z	=	Altman's Z score (Altman 1968);
Size	=	Natural logarithm of total assets;
Leverage	=	Total debt divided by total assets;
Mtb	=	Market value of equity divided by book value of equity;
Firm_Age	=	Number of years since the date of firm incorporation;
Sales_Growth	=	Changes in sales divided by lagged-year sales;
Rd	=	Research and development expenditure divided by total sales;
Ceo_Turnover	=	1 if the firm replaces its CEO during the year, and 0 otherwise;
|DA|	=	Absolute value of discretionary accrual which is based on the modified Jones model (1991);
Exec_Pay	=	Average annual pay (salary, bonus, and stock options) of inside executive directors;
Od_Pay	=	Average annual pay of outside directors.

교수 사외이사가 한국 재벌 기업 성과에 미치는 영향

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요 약

많은 사람들은 종종 재벌 회사의 사외 이사의 독립성과 효율성에 의문을 제기했다. 상법상 이사회의 50% 이상(자산총액 2조 이상 기업)을 사외이사로 구성해야 하기 때문에 한국 기업들은 상당수의 이사를 사외이사로 채워야 한다. 그러나 어떠한 사외이사를 선임하느냐에 따라 기업의 미래 성과와 여러 경영 정책이 달라질 수 있다.

중앙일보가 2012년에 보도한 기사에 따르면 교수들이 한국 상위 10대기업 이사진의 35% 이상을 차지하고 있다. 교수들은 한국 사회에서 전통적으로 독립적이고 전문성이 있다고 여겨졌기 때문에 사외이사로 적합한 후보군으로 여겨져 왔다. 그러나 이러한 교수-사외이사들이 사외이사로서 효과적으로 경영진을 감시하고 자문하는지에 대해서는 연구가 이루어지지 않았다.

미국에서 소수의 연구자들이 교수-사외이사의 역할에 대해 연구를 수행하였는데, 교수-사외이사가 기업경영에 미치는 역할에 대해 일관된 결론을 도출하지 못하였다 (White et al., 2014; Francis et al., 2015). 기업지배구조가 중요한 이슈인 한국의 재벌기업을 중심으로 교수-사외이사가 기업지배구조에 미치는 영향을 연구하였다는 데 본 연구의 공헌점이 있다. 본 연구에서는 교수-사외이사가 기업가치에 미치는 영향과 교수-사외이사를 선임하는 기업의 특징에 대해 연구를 수행하였다. 또한 교수-사외이사의 경영진 감시기능을 성과-경영진 교체 민감도, 성과-경영진보수 민감도 및 이익조정행태를 이용해서 분석을 수행하였다. 실증결과, 교수-사외이사는 기업가치에 부정적인 영향을 미치는데, 이는 교수-사외이사가 있는 기업들의 경우 성과-경영진 교체 민감도와 성과-경영진보수 민감도가 높지 않고, 이익조정을 감시하는데 취약한 점이 원인으로 나타났다. 요약하면, 본 연구의 실증결과에 따르면 교수-사외이사가 기업지배구조 개선에 큰 역할을 하지 못하는 것으로 나타났다.

주제어: 교수 사외이사, 기업지배구조, 기업 성과, 재벌

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