Board Structure and Directors' Role in Preventing Corporate Misconduct in the Construction Industry

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Abstract

The control of corporate misconduct has become one of the most significant challenges facing society today. Every year hundreds of firms are prosecuted for illegal behavior. Though there is growing interest in corporate governance, there is minimal research on how it influences corporate misconduct. This study draws on organization economics and the strategic management literature to empirically investigate the relationship between board characteristics and firm misconduct. Using panel data on 45 publicly listed Taiwan construction companies covering between 2005 and 2014, our regression analysis revealed four findings of particular interest. First, multiple directorships have a U-shaped effect on illegal corporate acts. Second, experience diversity has a significant role in preventing corporate misconduct. Third, the impact of education diversity is positive and significant on firms' illegal behaviors, implying that similar education background for directors could benefit corporate misconduct prevention. Finally, directors' education level only has a limited effect, which may be explained by the characteristics of the construction industry.

Keywords: Board Composition, Corporate Misconduct, Corporate Governance, Corporate Social Responsibility

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Introduction

Over the last few decades, corporate scandals such as occurred at Enron and Volkswagen have heightened concerns about insufficient oversight of top management. Most scholars (Fama and Jensen, 1983; Mace, 1971; Pearce and Zahra, 1991; Vance, 1964) concur that corporate boards have a responsibility to assist and monitor management as part of their fiduciary duty to maximize shareholders' wealth. As demands for greater accountability and transparency have grown stronger, the functioning of boards of directors has become a major issue in the corporate governance debate (Kiel and Nicholson, 2003; Ingley and Van Der Walt, 2005). This issue has, in turn, raised questions regarding board effectiveness and what the appropriate board structure should be.

Corporate board composition, as well as its impact on firm performance, is one of the most discussed issues in the economics, organization theory, and management literatures (e.g., Herman, 1981; Fama and Jensen, 1983; Mizruchi, 1983; Vance, 1983), yet there are relatively few studies on the effects of board characteristics in preventing firms' unethical acts or illegal practices. According to the literature on corporate misconduct (e.g., Baucus and Near, 1991; Gabbioneta et al., 2013), the main factors associated with engaging in irresponsible activities include larger firm size, operating in dynamic or competitive environments, or a prior record of violations. These findings imply certain environmental conditions or organizational structures tempt decision makers to conduct business illegally, but the underlying mechanism of the decision is still unclear and requires our attention.

From the perspectives of industry practitioners, the relation between board composition and occurrences of corporate misconduct is particularly important in the construction industry, as the industry remains a prominently high-risk sector since the construction works are always nonstandardized and unforeseen events may appear in the process of construction (Rebeiz and Salameh, 2006). Any poor managerial decision may result in a huge cost to society (Fan et al.,

2001a) because construction work always involves lots of labor, funds, materials, and others (Ofori, 1990). Likewise, most firms in the construction industry are operated on borrowings (Rebeiz and Salameh, 2006), and some managers may choose to win new client projects at the risk of breaking laws. That is, this industry has to be faced with numerous and severe ethical challenges including collusion, bidding payment, unreliable contractors on a daily basis (Ho, 2011).

To make matters worse, wrongful business practices in the construction industry often lead to fatal injuries to workers and residents (Transparency International, 2005). When Taiwan was struck by a magnitude-6.4 earthquake in 2016, the Wei-guan Golden Dragon Building crumbled and fell. 115 people were killed, and about 100 others were injured (Taiwan News, 2016). In Russia, hundreds of labors were killed in 2014 Winter Olympic construction. The employers of the construction firms were in charged with hiring large numbers of illegal workers for commercial profits (The Yale Globalist, 2014). Moreover, the case of the Deepwater Horizon accident, which killed 11 people and caused a devastating oil spill in the Gulf of Mexico (The Guardian, 2015), is also related to the scandal of construction site safety. BP's (British Petroleum) budget cuts were likely the main factor that results in defective management. The abovementioned cases indicate that misconduct and unethical attempt in the construction section are not something new to any party involved in the construction field. Construction firms' misconduct is always putting another party in disadvantage position or force to deal with the consequences. Therefore, it is vital for business owners and stakeholders to be able to identify situations where corporate misconduct has a greater likelihood of occurring.

On the theoretical front, fundamental theories of corporate governance begin with agency theory, addressing problems that arise due to differences between principals (shareholders) and agents' (Chief executive officers (CEO)) goals or desires. As agency theorists suggest (Fama

and Jensen, 1983; Young et al., 2000), the conflict of interests between principals and agents can be reduced using appropriate monitoring devices. Agency problems are primarily due to the separation of management from the wealth effects of ownership, as management staff may try to maximize their wealth at the expense of the stockholders. For example, some managers in the construction industry may choose to increase the firm's short-term profits by making some controversial and risky decisions (e.g., using some inferior materials and employing some low-quality labor) for the purpose to maximize their compensation but sacrifice firms' long-term growth. In order to reduce the conflict between the principals and agents, a board of directors, appointed by the principals, therefore is viewed as the most important mechanism (Fama and Jensen, 1983). From this perspective, boards of directors can play the important role of monitoring opportunistic behavior on the part of top management and consequently reining in corporate misconduct. However, a board of directors may not be able to exert an influence on decision-making. CEOs and the top management team may dominate boards (D'Aveni and Kesner, 1993; Kosnik, 1987; Mallette and Fowler, 1992; Stiles, 2001) because directors have been chosen by management themselves or have inadequate knowledge of the workings of the corporation.

To improve board effectiveness, early board reform proponents have advocated for such changes as reducing board size, ensuring more independent directors, separating the CEO and chairman positions, and requiring larger equity holdings by directors (Kesner and Johnson, 1990). While the importance of sufficient board independence has been acknowledged by scholars and practitioners (Baysinger and Hoskisson, 1990; Jensen and Zajac, 2004), there has been comparatively less research focusing on each director's expertise, experience, knowledge, reputation, and skills. Researchers have premised their work on agency theory and have focused on the role of incentives and structures in promoting effective governance with the implicit assumption that directors are typically knowledgeable and competent. This assumption

96 is now coming under question especially in the context of the project-orientated construction
97 industry (Miozzo and Dewick, 2002; Rujirayanyong and Shi, 2006). For each project, the
98 project team is established and disbanded (Betts and Wood-Harper, 1994; Halpin and
99 Woodhead, 1998) under the promotion of top management (Gareis, 1991). That is, top
100 managers have an advantage of possessing the significant information about projects and firms
101 over the board (Rebeiz, 2001).

102 The construction industry is a knowledge-based industry (Egbu, 2000). Some tacit
103 knowledge, regarding the experience and expertise kept in the construction professional's mind,
104 company culture, lessons learned, know-how, and other elusive yet valuable information is
105 vital for efficient working in projects and for improving organizational competitiveness. If a
106 gap exists between what directors are expected to achieve and the knowledge and relevant
107 experience they possess, directors could reduce the influence of the board on several activities
108 and functions, due to their lack of tacit knowledge about the firm and its environment and lack
109 of availability to the firm. Thus, revisiting the governance issue from the directors' ability
110 aspect seems essential and relevant (Ford, 1988; 1992; Carpenter and Westphal, 2001; Carter
111 and Lorsch, 2004).

112 Due to the fact that the board structure may be influenced by the characteristics of different
113 industries and the specific objectives and needs of individual firms (Jensen and Meckling,
114 1976), this study explores the corporate governance issue by empirically investigating
115 determinants of corporate misconduct in the scope of the construction industry. The focus is on
116 three categories of potential explanatory factors: directors' multiple directorship, industrial
117 experience, and educational background. Drawing upon primary data on corporate crimes and
118 penalties imposed on publicly traded Taiwan firms covering the period 2005-2014, the present
119 analysis found that the probability of becoming a lawsuit defendant can be determined by the
120 board's degree of multiple directorships, industrial experience background, and education

121 diversity, suggesting it is unwise to overlook directors' individual characteristics when
122 selecting the members of a board of directors.

123 The paper is organized as follows. In the following section, the hypotheses are developed
124 and discussed, and in the next section, the data and methodology are described. In the fourth
125 section, the results are presented and discussed, followed by concluding thoughts in the last
126 section.

127 Literature Review

128 *Corporate misconduct*

129 Corporate misconduct refers to the actions taken by businesses to conduct illegal operations
130 when firms perceive that the upside benefits of doing so will outweigh the downside risk (e.g.,
131 Mishina et al., 2010). Previous studies have investigated how misconduct perpetrated by one
132 or a few individuals within a firm can become an organizational phenomenon (Ashforth and
133 Anand, 2003; Brief et al., 2001; Shadnam and Lawrence, 2011). These studies emphasized the
134 role of top managers in fostering a culture that endorses misconduct and the use of formal
135 authority to direct subordinates to engage in misconduct (Kristof-Brown et al., 2005; Jordan et
136 al., 2013; Schaubroeck et al., 2012). This has been verified by several events in the construction
137 industry. In 2012, 19 workers were killed resulting from the crash of construction lift in Wuhan
138 China. The CEO of a construction equipment supplier was arrested due to the professional
139 negligence (China.org.cn, 2012). In 2014, an under-construction building in India collapsed
140 and killed 61 people. The investigation commission attributed the collapse to six persons, of
141 which one is the managing director of the developer (Business Standard News, 2014). Although
142 the influences of executives on corporate misconduct within a firm have been highlighted
143 theoretically and practically, the role of corporate boards has been neglected.

144 In searching for contributing factors to corporate misconduct, this study focuses on the
145 corporate boards as the central decision-making unit shaping firm strategies and policies. The

146 roles and responsibilities of directors and boards should be even more important in the
147 construction industry since elusive yet valuable information is kept and controlled by the
148 construction professionals. Directors are appointed to act on behalf of the shareholders to run
149 the day to day affairs of the business and become an integral part in the development of many
150 civil infrastructure projects. To this end, this study draws on previous research to identify the
151 role and impact of governance mechanisms in deterring unethical or illegal acts in each
152 organization. The focus is on three sets of potential explanatory factors: multiple directorships,
153 directors' industrial experience, and directors' educational background. Later, this research
154 explores how board depth, diversity in industry experience, and education affect firms'
155 behavior.

156 ***Agency Problems and Corporate Governance***

157 One of the key components of corporate governance is the monitoring role of the board of
158 directors. As Jensen and Meckling (1976) remarked, boards have long been considered to play
159 an important role in monitoring senior management. While managers are self-interested and do
160 not bear the full financial impacts of their decisions, the board of directors, as the representation
161 of shareholders and their first line of defense against potential misconduct by the management
162 team, is presumed to carry out the monitoring function to minimize costs that may arise from
163 the separation of ownership and control (Fama and Jensen, 1983). However, sometimes a board
164 of directors exerts little power and has limited influence over decision-making processes, even
165 though they are responsible for proactively pursuing or passively rubber-stamping corporate
166 strategy. The barriers to monitoring such as information and incentive alignment problems can
167 lead to a failure of governance mechanisms (Hirshleifer and Thakor, 1994).

168 To tackle the possible failure of governance, previous studies have shed some light on how
169 monitoring effectiveness can be enhanced. In line with agency theoretical frameworks, the
170 consensus is that a more independent board of directors helps achieve more effective corporate

governance and that large boards, inside board members, CEOs who doubles as chair of the board, and entrenched CEOs are considered less independent and less effective (Raheja, 2005; Bacon, 1993; Jensen, 1993). Some empirical testing in the construction industry (Rebeiz, 2001) has also suggested similar explanations for the determinants of board effectiveness. Rebeiz and Salameh (2006) indicate the independent directors and chairmanship of the board can influence the financial returns of engineering companies. Luo (2001) revealed the performance of construction joint ventures is related to the combined control of board and management.

Though there are various characteristics used to classify directors into truly independent and dependent categories, these classification schemes are anchored in the underlying logic of the agency role. However, when one takes into account the other roles of directors, agency-based classification schemes no longer seem most appropriate. What has not been well established is how directors' knowledge, experience, or capabilities influence monitoring effectiveness. Therefore, this research not only looks beyond board independence but empirically investigates the impact of director characteristics upon company misconduct.

Monitoring Effectiveness: The Ability Perspective

The absence of an empirical link between director characteristics and monitoring effectiveness may be due to previous research treating directors as a homogenous group, instead of exploring differences among them regarding their knowledge and skills. Reflecting this concern, Hillman, and Dalziel (2003) argue that board independence is a necessary, but not a sufficient condition for effective monitoring. Though independent directors may be motivated to be effective monitors, a board also must have relevant experience or knowledge to make the best decisions. However, previous studies tend to apply the agency perspective of classifying directors (e.g., insiders and outsiders) regardless of each director's individual capabilities. Therefore, this study further examines board composition from an ability perspective, since a well-established member structure could facilitate timely and frequent knowledge sharing among directors, and

196 thus further ensure that the whole process of decision-making is legally sound and more
197 effective.

198 The board of directors could provide firms with much important expertise, helpful direction
199 about strategic changes, and many other valuable resources as well as making some major
200 decisions for company development (Goodstein et al., 1994). According to *Principles of*
201 *Corporate Governance* published by Business Roundtable, directors should take advantage of
202 their various experience, skills, background, and thoughts to perform their responsibilities,
203 including setting the development direction, reviewing and approving corporate actions, and
204 monitoring actions' implementation (Business Roundtable, 2016: 8). This perspective is in line
205 with Stiles (2001), who holds that the board's role includes not only setting the strategic context
206 but also gatekeeping strategic proposals, and this gatekeeping can be carried out more
207 effectively when corporate boards have quality higher human capital, and thus enabled to
208 beneficially affect the corporate decision-making process.

209 ***Multiple Directorship and Corporate Misconduct***

210 The question of whether directors with multiple board appointments are too busy to fulfill their
211 monitoring responsibilities has been an ongoing debate for a long time (Ferris et al., 2003; Fich
212 and Shivdasani, 2006). Some argue that the increased time commitment associated with
213 multiple directorships causes such busy directors are less effective. When directors serve in
214 numerous firms, they may become overcommitted and fail to adequately perform their roles as
215 monitors of management. Such directorships lead to less independent and lower involvement
216 in decision-making and create a free-rider problem where no director has enough incentive to
217 devote resources to ensure that management is acting wholeheartedly in the stockholders'
218 financial interest (Grossman and Hart, 1980; Ruigrok et al., 2006). Fich and Shivdasani (2006)
219 agree with this viewpoint, suggesting that companies with busier boards exhibit lower market-
220 to-book ratios, yet the absence of an empirical link between busy board members and company

misconduct leaves room for further discussion.

Alternatively, some scholars argue that busy boards may be beneficial for shareholders. Fama and Jensen (1983) suggest that multiple directorships amount to a confirmation of a director's abilities since directors obtain additional board appointments by demonstrating their monitoring capability. Consistent with this view, Beasley (1996) indicates that companies whose outside directors hold more board seats are less likely to act illegally. Additional empirical results also show that multiple directorships can attest to director ability, and suggest a positive relationship between busy directors and monitoring effectiveness (Cotter et al., 1997; Brown and Maloney, 1999; Ferris et al., 2003). The above discussion provides a sketch of the debate and indicates the contradictory results in the literature and lead us to seek explanations beyond the existing empirical evidence. This study attempts to reconcile the findings in the literature by highlighting relationships found between directors' social networks and busyness.

According to Vafeas (1999) and Ferris et al. (2003), directors' multiple directorships can widen their network of contacts, enrich the directors' experience and expand their breadth of knowledge as well as gain more access to valuable resources outside of the firm (Sørensen, 2007; Stuart and Yim, 2010). The accumulation of knowledge increases the director's ability to evaluate various alternatives, discuss the risks associated with these options, and perform governance duties more effectively (Carney, 2005). As a result, the board of directors is more likely to identify and stop unethical or illegal actions. However, this study posits that the inhibiting effect of multiple directorships on corporate misconduct may decline after the number of directorships held by an individual reaches a high level. The increasing workloads consume considerable time and spur selective allocation (Ferriani et al., 2009) which may lead monitoring duties to be neglected. Furthermore, because of the limits of human cognition (Kahneman, 1973), Eppler and Mengis (2004) argue that exposure to a large volume of information through multiple directorships may impair information processing. The presence

of cognitive limitations may cause overlooking large amounts of information, inability to identify critical issues, and most importantly, greater tolerance of error (Sparrow, 1999). Oldroyd and Morris (2012) theorized that cognitive limitations decrease the value of network relationships because exposure to the abundance of information that arises from intense network connections can deteriorate into information overload, adversely impacting agents' monitoring effectiveness. Considering the probable dual function of multiple directorships, this research, therefore, builds the first hypothesis as follows:

Hypothesis 1: There is a U-shaped effect of directors' multiple directorships on the likelihood of corporate misconduct: it is negative as directorships increase initially but become positive as their directorships further increase.

Industry Experience and Corporate Misconduct

The industry is the major analytic environment of every company. The industry recipe, or collective industry action, is crucial to the decision-making process and in determining what is professionally, operationally, and ethically appropriate. Industry experience of directors, through their industry occupation, provides valuable industry-related information. Pfeffer and Salancik (1978) contend that obtaining industry-specific information from various sources through the directors of a board helps better equip the firm to handle uncertainty by gaining superior knowledge of its industry opportunities and trends. However, when directors are connected more deeply with industry, they will be more reluctant to doubt the usual ways of doing business and more hesitant to consider alternative options (Huff, 1982). Dearborn and Simon (1958) contended that decision makers would rely on their prior experience to recognize and identify corporate problems. Therefore, directors would prefer to use their industry wisdom or shared knowledge to filter other possible solutions or interpretations (Burrell and Morgan, 1979). Such in-depth industry experience, resulting in similar backgrounds, common life experiences and values works to positively reinforce one's attitudes and beliefs. Thus, as

industry embeddedness increases, it is harder for directors to detect or analyze abnormal situations, consequently weakening monitoring effectiveness.

Although different functional or industry background would prompt oneself to draw a distinction between themselves and others from a psychological perspective (Tsui et al., 1992), this is not necessary an undesirable move when it comes to making decisions. Jackson et al. (1995) suggest that the diverse perceiving or behavioral tendencies of directors could contribute to decision-making processes. Dissimilar industry backgrounds provide a corporate board a wider lens and abundant networks of resources (Ancona and Caldwell, 1992), permitting directors to assess information effectively. This could prevent board ineffectiveness and protect boards from being an instrument of management because directors could grasp the companies' status at any time, have some insider knowledge, and therefore be better equipped to prevent a firms' wrongful acts (Williamson, 1984). These arguments lead to the following hypothesis:

Hypothesis 2: The likelihood of corporate misconduct is negatively related to the diversity of industrial experience of the directors serving on the board.

Educational Background and Corporate Misconduct

In terms of board education, prior research has found that individuals with formal education and training in professional skills are more capable of finding solutions for the organization they represent (Souitaris, 2002; Gradstein and Justman, 2000). Among the most frequently identified factors in good corporate governance, diversity of education or professional background may be especially important in deterring people from committing illegal acts. Previous studies have demonstrated that such diversity enhances decision quality through critical and investigative interaction processes (Amason, 1996; Schwenk, 1990; Van der Vegt and Janssen, 2003).

The diversity among board member professional backgrounds is likely to enable identifying

and utilizing novel knowledge from a variety of sources, encourages the airing of different viewpoints, and decreases the likelihood of board complacency and narrow-mindedness (Kosnik, 1990). Thus, when the board is structurally diverse in terms of directors' education backgrounds, a stronger monitoring effect is expected. In addition to the structural dimension, the cognitive differences among board members would also have an impact on the boards' role in preventing illegal corporate actions. Cohen and Levinthal (1990) argue that the ability of a firm to absorb information from the external environment is a function of the absorptive abilities of its members. When the prior knowledge bases of directors are dissimilar and specialized due to heterogeneity in individual education backgrounds, board members are in a better position to recognize, understand, and assimilate information from a wider range of content domains. The diverse cognitive frames of reference of board members in terms of individual knowledge on technical practices would help directors to identify or extract useful information. As a result, managers cannot easily withhold inside information and the board of directors would less likely be cheated.

Hypothesis 3a: The likelihood of corporate misconduct is negatively related to the education diversity of the directors serving on the board.

Education level has long been considered to be related to the capability of information processing (Schroder et al., 1967) and knowledge learning (Singh, 2007; Chiang and He, 2010). As indicated in previously studies, the skills in acquiring requisite knowledge and methods learned in a higher education setting often become a necessary tool for tackling complex and challenging tasks. Gales and Kesner (1994) argue that the quality of advice and counsel provided by directors may be determined by the board's education level. Well-educated boards with specific expertise, professional skills, and knowledge can understand the inner workings of the organization better, therefore improving monitoring effectiveness.

Indeed, the education level of board members and by implication the quality of their advice

to the firms facilitates communication channels, just as directors can monitor more vigorously. Especially for some complex matters such as technical or innovation projects, education level has demonstrated to be a significant predictor of success (Pitcher and Smith, 2001; Carpenter and Westphal, 2001). Furthermore, since organizational routines such as firms' advanced R&D activities are unfamiliar to outsiders, external network board capital by itself may not be sufficient to enhance monitoring effectiveness. Particular skills (education) to assess the nature of capabilities of the firm and effectively identify potential misconduct are essential (Goes and Park, 1997). Some advanced education curricula could facilitate the formation of some common knowledge about what decisions are proper and within the law (Hambrick and Mason, 1984). Thus, the following hypothesis is presented:

Hypothesis 3b: The likelihood of corporate misconduct is negatively related to the education level of the directors serving on the board.

Methods

Sample and Data

Our samples were comprised of publicly listed Taiwanese construction firms, and the related information was merged from the Corporate Social Responsibility (CSR) database provided by the Taiwan Economic Journal (TEJ) database, the data sources of which were the firms' annual reports, press releases, and other public records. To reduce the effect of random factors, the average of each item over three consecutive years was calculated as the final data. According to the statistics from the Taiwan Stock Exchange Corporation (TWSE) in 2014, there are 49 publicly listed firms in construction sectors. However, by observing the sample firms' sales portfolios, we found that some sample is building material trading firms, which do not engage in manufacturing or construction. After removing these sample and firms with missing data for any variables, 45 firms were selected as our sample firms. About the observation period, this research project was conducted in mid-2015 so that 2014 is the latest year data are available.

346 In order to obtain more generalizable results, the data used in this study covers the period from
347 2005-2014 (10 years). 10-years observation period should be able to provide sufficient
348 information to capture a wide variety of business cycles as well as economic conditions, which
349 may influence construction firms' corporate decisions (e.g., Lin and Chang, 2015). The final
350 sample size was 45 construction firms, giving a total of 450 firm-year observations.
351 The information collected by each director included directors' education background,
352 directors' gender, the number of boards that the directors sat on, the number of insiders, whether
353 the other directorships are intra-industry or extra-industry, the number of years that the director
354 had served and the variability of this across board members, and the number of independent
355 directors. Some data on each firm were also collected, including the number of employees,
356 total assets, board size, and the number of instances of misconduct as well as return on assets.
357 ***Measures***
358 *Corporate misconduct*. Using the data from CSR database provided by Taiwan Economic
359 Journal (TEJ) database as mentioned above, the corporate misconduct of construction firms is
360 measured as the total number of litigated cases in which the companies were proved guilty in
361 the years encompassed within the scope of this study, from 2005 to 2014. In essence, corporate
362 misconduct here refers to the law-breaking behaviors that committed by the construction firms,
363 including corruption, bid shopping, collusion, professional negligence and other ethical
364 challenges in the construction industry (Vee and Skitmore, 2003; Fan et al., 2001a, b; FMI and
365 CMAA, 2004; Bowen et al., 2007).
366 *Multiple directorships.* When a director of one board sits on another board, he has multiple
367 directorships (Mizruchi, 1996). As the independent variable of Hypothesis 1, multiple
368 directorships is operationalized as the average number of other boards that directors serve on
369 (Ferris et al., 2003).
370 *Experience diversity.* Experience, as one of the task-related attributes, is considered to have

371 an important impact on directors' performance and decision-making process (Kaczmarek et al.,
372 2012). Its diversity could offer diverse ideas (Sundaramurthy and Lewis, 2003). Experience
373 diversity can be obtained by the calculation of the Blau Index (Blau, 1977), which has been
374 used for the calculation of the diversity of age, ethnicity (Chen et al., 2016), culture (Richard
375 et al., 2004) and other nominal features. It could be calculated as $1-\sum {p_i}^2$, where p_i
376 represents the proportion of the directors that has been classified in category i on the whole
377 board. Regarding the categories of experience diversity, our classification is mainly in line with
378 that as delineated by Sundaramurthy and Lewis (2003). The first category includes the director
379 who is affiliated within the firm as well, for example CEO-chair, and has firm-related
380 knowledge, and the second one refers to the external non-affiliated director who also sits on
381 boards in industries other than the construction industry and has some knowledge and
382 legislative change across industries. This study also follows Barroso et al. (2011) and adds a
383 third category, covering the director who also has a position on another board in the
384 construction industry and has intra-industry-related knowledge.

385 *Education diversity.* Education is always used as one of the social categories to classify
386 people when studying factors that influence behavior (Kaczmarek et al., 2012). Education
387 diversity can also be calculated by the Blau Index. For directors' education background, there
388 are five levels, namely doctor's degree, master's degree, bachelor's degree, high school
389 diploma, and other.

390 *Education level.* In line with Chiang and He (2010), Graham et al. (2012) and Baran and
391 Forst (2015), education level is calculated by the following equation.

$$Education\ Level = \sum_{i=1}^{5}(N_i \times W_i) \Big/ \sum_{i=1}^{5} N_i \quad (1)$$

392 Where i is the different degree of education; N_i represents the number of employees with i-
393 th education degree; W_i means the weight of i-th education (For doctor's degree, W_5=5;

394 master's degree W_4=4; bachelor's degree W_3=3; high school diploma W_2=2; and others
395 W_1=1).

396 *Control variables*. Taking into account firm characteristics, this study employs the natural
397 log of *the number of employees* and *total assets* to control for firm size and uses *return on*
398 *assets* to control for firm performance following Upadhyay et al. (2014). Considering corporate
399 governance structures, other information about each board and each director were collected.
400 According to Upadhyay et al. (2014), there are several factors impacting the effectiveness of a
401 board, including size and independence. This research controls for the log of *board size*
402 (Ln(board size)), operationalized as the log of the total number of directors, and *board*
403 *independence*, measured by the proportion of outside directors. The former is included because
404 the absolute size of a board could affect the board's monitoring and advising function (Baran
405 and Forst, 2015), and the latter indicates the impact of outsiders on decision-making (Dalton et
406 al., 1998). *The number of female directors* represents the board's gender distribution, which
407 has an impact on board decision-making process since female leaders are more scrutinizing
408 and less overconfident than male leaders (Barber and Odean, 2001; Huang and Kisgen, 2013;
409 Chen et al., 2016). Also, companies could be affected by long-serving directors because they
410 are proficient at firm-specific knowledge and could provide advise based on their experience
411 (Baran and Forst, 2015; De Maere et al., 2014). Therefore, directors' *average of tenure* and
412 *variation* will be controlled.

413 ***Analysis***

414 According to Hypothesis 1, the relationship between multiple directorships and misconduct
415 follows a U-shaped pattern, and then the quadratic term of the average number of the boards
416 that directors serve on was included. For Hypotheses 2, 3, and 4, the corresponding independent
417 variables had linear relationships with the dependent variable.

418 Taking different model effects influencing results into account, this study followed Liu et al.

(2016) to determine the proper model effects for individual and time direction. For individual direction, a Hausman Test was employed to select the random effect (null hypothesis) or the fixed effect (alternative hypothesis); for time direction, a Redundant Fixed Effect Likelihood Ratio Test (LR test) was used to choose the mixed effect (null hypothesis) or the fixed effect (alternative hypothesis).

Results

Considering that education diversity and education level both relate to director education background, a Pearson Correlation Test was conducted, and the results are shown in Table 1. The correlation coefficient of them was -0.094 at 5% level of significance, of which the absolute value was much less than 0.3, indicating that they were independent.

<Please insert Table 1 here>

The regression analysis was conducted by the above selection procedure of model effects for two models, one for control variables only and one for control variables along with independent variables. The obtained results are shown in Table 2.

<Please insert Table 2 here>

In terms of the model effect, the two models were different. In Model 1, which reports the results for the control variables only, the result of the Hausman Test didn't significantly reject the null hypothesis (p=0.2488), thus the random effect was selected in individual direction; while the result of the LR Test was significant, the null hypothesis was rejected, and the time direction had a fixed effect. In Model 2, which shows the results for the control and independent variables, the results of the Hausman Test and LR Test reject their null hypotheses significantly, and the effects of individual and time direction were both fixed.

As for the regression analysis, the results of the four hypotheses differed. The coefficients of multiple directorships and its square were negative and positive respectively at 1% level of significance. This indicates that there is a significantly U-shaped relationship between multiple

directorships and misconduct, supporting Hypothesis 1. Again as predicted, the coefficient of experience diversity on misconduct was negative and highly significant. This indicates that the directors with various experiences could prevent corporate misconduct to some extent, which is consistent with Hypothesis 2. The coefficient of education diversity was positive and significant at the 10% level. This suggests that the diverse education background of directors aggravated the chance of corporate misconduct, contrary to Hypothesis 3. Although education level and misconduct had a negative correlation, it didn't pass the significance test. Thus Hypothesis 4 wasn't verified.

Discussion and Conclusion

In the corporate governance literature, board independence has received considerable attention (Boyd, 1990; Daily and Dalton, 1994a, 1994b; Daily and Schwenk, 1996; Gales and Kesner, 1994). Chang et al. (2006) characterize the features of corporate boards in listed construction companies and found that construction companies tend to display lower board independence in terms of both duality and percentage of independent directors. Despite board independence is getting more and more attention from academia and industry, the other board-related issue for construction companies has still been neglected in the literature (Chang et al., 2006)

The role of knowledge and experience of board members has come to the forefront only more recently. To advance this stream of work, this study provides a deeper understanding of how multiple directorship and industry/education background may influence a director's ability to effectively monitor and govern companies. By employing primary data on corporate crimes and penalties imposed on publicly traded Taiwan construction firms in the period 2005-2014, this study was conducted to examine how a director's ability to deter illegal activities is predicted by his (or her) busyness, industry background, and education background. Our argument represents an attempt to relate board characteristics to illegal corporate behaviors. A general model was developed to shed light on the influence of directors on illegal corporate

behavior.

This study first finds the likelihood of committing corporate crime decreases as multiple directorship increases. This finding supports the notion that network relationships are effective in preventing behavior that leads to corporate misconduct. However, this study also finds that the negative effect of multiple directorships on corporate misconducts may decline after it reaches a high level. This result is consistent with the busyness hypothesis (Jiraporn et al., 2009) and has direct policy implications. As the empirical results suggest, it might not be prudent for shareholders to select directors exclusively based on reputation, as the most reputable directors will often already be on multiple boards and consequently must juggle the interests of many parties. The potential conflicts between different projects may become a serious problem in the construction industry since most of the owners and contractors usually have large ongoing construction portfolios rather than one-off construction projects. The inhibiting effect of corporate boards may decline because of multiple directorships, and eventually impaired the quality of decision-making in construction firms.

Second, corporate wrongdoing may be reduced through the board members' various industrial backgrounds, which corresponds with the notion that industry diversity could enhance directors' skill sets and widen their cognitive frames, therefore resulting in better monitoring capability (Ancona and Caldwell, 1992; Bantel and Jackson, 1989). As Hillman and her colleagues (2003, 2008) stated, effectively monitoring top management requires the ability of board members. Directors' heterogeneous expertise encompasses not only the quality of their advice and counsel but also their channels to external resources. Especially in the construction industry, diversifying industrial experience of a director is particularly important. Due to construction industry's fragmented and transient nature, it has always been a significant challenge for directors to capture and digest complex and various project know-how in a systematic manner. Our study departs from the existing wisdom on the importance of board

494 governance (Zona et al., 2013; Mahadeo et al., 2012) by demonstrating that a board equipped
495 with diverse knowledge and experience appears more relevant and effective in preventing
496 illegal corporate activities.

497 Third, contrary to our prediction, this research found that a firm with directors who have
498 dissimilar education levels is more likely to be involved in illegal activities. This may be
499 explained by differences among board members that lead to a reduction of social cohesion
500 (Nemeth, 1986; O'Reilly III et al.,1989; Hambrick et al., 1996) and the appearance of group
501 faultlines, which has a significant negative impact on monitoring effectiveness (Kaczmarek et
502 al., 2012). The divergent academic training and education backgrounds among members may
503 interfere with group processes and lead to disorganization or miscommunication. Moreover,
504 due to the pressure form tight construction schedule, low-profit margins, and the complexity,
505 diversity and non-standard production of construction projects, it requires decision makers in
506 project-based organizations to reach consensus quickly. However, lack of common knowledge
507 background among directors may hinder decision-making processes and reduce possibilities
508 for directors to operate cohesively and effectively (Jackson et al., 1995; Maznevski, 1994).

509 Finally, this study found that high education level has no significant effect on preventing
510 misconduct, implying that directors' educational and professional qualifications may not be an
511 effective tool in suppressing undesirable firm behavior. This finding is similar to what was
512 identified by Rose (2007), who demonstrated that directors' educational backgrounds do not
513 appear to impact firm performance. A possible explanation is that the board's work could be
514 performed well enough by directors with a certain education degree, for example, bachelor's
515 degree, by which directors have basic knowledge and skills to sufficiently understand corporate
516 information to monitor corporate conduct effectively. Another possible reason may be the
517 particular character of the construction industry, which emphasizes skills obtained through the
518 accumulation of experience (Edum-Fotwe and McCaffer, 2000).

519 This study has identified noteworthy relationships between board characteristics and
520 corporate misconduct. However, the study has some limitations as well. First, due to the lack
521 of availability of some necessary data and the relatively small industrial scale only 45
522 construction companies in Taiwan were used to explore the relationships of interest. Although
523 we have used a relatively long period to produce statistically reliable estimates, future studies
524 can consider replicating this study by in another context that has different industrial size to
525 examine the validity of findings. Second, while education and multiple directorships are
526 commonly used as proxies for directors' capability, they may not be the most precise ways to
527 evaluate director ability. Therefore, future studies could apply more fine-grained measures of
528 individual capability. In addition, our primary data was limited to archival sources. Although
529 this study relied on prior studies to infer what decision-making processes are like for boards or
530 groups, this research did not collect any data directly from board members. Future studies may
531 endeavor to collect primary sources of data that can uncover more regarding board processes
532 to explain how boards make decisions. Third, according to La Porta et al.'s (1999) investigation,
533 the efficacy of corporate governance may differ due to the capital market structure and relevant
534 institutions, even though the majority of empirical studies indicate that corporate governance
535 mechanisms have significant influences in reducing agency problems. The findings and lessons
536 learned from this study may serve as a valuable sample of firms in other East Asian countries
537 because of similarities in culture and capital structure. In the future studies, the cross-country
538 comparisons can be carried out to gain more insights regarding the impact of country
539 characteristics on corporate governance. Last but not least, Ho's (2011) observation in
540 construction industry, an individual's unethical behavior is related to corporate wrongdoing;
541 that is, behavioral science theories could be employed to explain the influences of board
542 governance on corporate misconduct, because the board monitoring activities come from board
543 directors' agreement and interaction in the boardroom. However, the directors' behavioral

intention toward unethical or illegal misconduct may be difficult to obtain. Future studies can consider other methods, such as survey and case interviews, to overcome the potential weaknesses of quantitative approach by collecting more detailed information about board directors' attitude and consequent corporate behavior.

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816 **Table 1** Correlation Matrix

	Return on Assets	Ln(Number of Employees)	Ln(Total Assets)	Average of Tenure	Tenure Variation	Number of Female Directors	Board Independence	Ln(Board Size)	Multiple Directorships	Experience Diversity	Education Diversity	Education Level	Corporate Misconduct
Return on Assets	1	0.114**	0.530***	0.358***	0.220***	0.097**	-0.052	-0.009	0.182***	0.176***	0.093**	-0.009	-0.119**
		(0.016)	(0.000)	(0.000)	(0.000)	(0.041)	(0.273)	(0.857)	(0.000)	(0.000)	(0.049)	(0.856)	(0.012)
Ln(Number of Employees)	0.114**	1	0.381***	0.295***	0.185***	-0.153***	0.048	0.450***	0.174***	0.150***	-0.038	0.175***	0.115**
	(0.016)		(0.000)	(0.000)	(0.000)	(0.001)	(0.308)	(0.000)	(0.000)	(0.001)	(0.420)	(0.000)	(0.015)
Ln(Total Assets)	0.530***	0.381***	1	0.487***	0.365***	0.034	-0.179***	0.198***	0.257***	0.123***	0.235***	0.135***	0.037
	(0.000)	(0.000)		(0.000)	(0.000)	(0.471)	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.004)	(0.433)
Average of Tenure	0.358***	0.295***	0.487***	1	0.729***	0.075	-0.207***	0.201***	0.073	0.093**	0.157***	0.093**	0.021
	(0.000)	(0.000)	(0.000)		(0.000)	(0.114)	(0.000)	(0.000)	(0.125)	(0.050)	(0.001)	(0.049)	(0.658)
Tenure Variation	0.220***	0.185***	0.365***	0.729***	1	-0.036	-0.089*	0.234***	0.005	0.051	0.145***	0.222***	0.068
	(0.000)	(0.000)	(0.000)	(0.000)		(0.446)	(0.059)	(0.000)	(0.923)	(0.282)	(0.002)	(0.000)	(0.151)
Number of Female Directors	0.097**	-0.153***	0.034	0.075	-0.036	1	-0.041	0.033	-0.151***	0.013	0.159***	-0.399***	-0.076
	(0.041)	(0.001)	(0.471)	(0.114)	(0.446)		(0.388)	(0.486)	(0.001)	(0.777)	(0.001)	(0.000)	(0.109)
Board Independence	-0.052	0.048	-0.179***	-0.207***	-0.089*	-0.041	1	0.215***	0.340***	0.232***	-0.060	0.129***	-0.049
	(0.273)	(0.308)	(0.000)	(0.000)	(0.059)	(0.388)		(0.000)	(0.000)	(0.000)	(0.205)	(0.006)	(0.297)
Ln(Board Size)	-0.009	0.450***	0.198***	0.201***	0.234***	0.033	0.215***	1	0.069	0.027	0.056	0.070	0.079*
	(0.857)	(0.000)	(0.000)	(0.000)	(0.000)	(0.486)	(0.000)		(0.146)	(0.572)	(0.235)	(0.137)	(0.096)
Multiple Directorships	0.182***	0.174***	0.257***	0.073	0.005	-0.151***	0.340***	0.069	1	0.447***	0.028	0.200***	-0.090*
	(0.000)	(0.000)	(0.000)	(0.125)	(0.923)	(0.001)	(0.000)	(0.146)		(0.000)	(0.552)	(0.000)	(0.057)

Table 1 Correlation Matrix (Continued)

	Return on Assets	Ln(Number of Employees)	Ln(Total Assets)	Average of Tenure	Tenure Variation	Number of Female Directors	Board Independence	Ln(Board Size)	Multiple Directorships	Experience Diversity	Education Diversity	Education Level	Corporate Misconduct
Experience Diversity	0.176*** (0.000)	0.150*** (0.001)	0.123*** (0.009)	0.093** (0.050)	0.051 (0.282)	0.013 (0.777)	0.232*** (0.000)	0.027 (0.572)	0.447*** (0.000)	1	0.108** (0.022)	0.233*** (0.000)	-0.218*** (0.000)
Education Diversity	0.093** (0.049)	-0.038 (0.420)	0.235*** (0.000)	0.157*** (0.001)	0.145*** (0.002)	0.159*** (0.001)	-0.060 (0.205)	0.056 (0.235)	0.028 (0.552)	0.108** (0.022)	1	0.094** (0.046)	-0.054 (0.249)
Education Level	-0.009 (0.856)	0.175*** (0.000)	0.135*** (0.004)	0.093** (0.049)	0.222*** (0.000)	-0.399*** (0.000)	0.129*** (0.006)	0.070 (0.137)	0.200*** (0.000)	0.233*** (0.000)	0.094** (0.046)	1	-0.054 (0.252)
Corporate Misconduct	-0.119** (0.012)	0.115** (0.015)	0.037 (0.433)	0.021 (0.658)	0.068 (0.151)	-0.076 (0.109)	-0.049 (0.297)	0.079* (0.096)	-0.090* (0.057)	-0.218*** (0.000)	-0.054 (0.249)	-0.054 (0.252)	1

Note: ***, ** and * refer to $p<0.01$, $p<0.05$ and $p<0.1$ respectively.

820 **Table 2** Impact of director experience and education on firm misconduct

Variables	Model 1		Model 2	
Constant	-0.9357**	(0.0424)	-1.3756*	(0.0867)
Return on Assets	-0.0086**	(0.0134)	-0.0091**	(0.0235)
Ln(Number of Employees)	0.0283	(0.3627)	0.0690	(0.1876)
Ln(Total Assets)	0.0457	(0.1172)	0.0834*	(0.0684)
Average of Tenure	-0.0046	(0.6782)	0.0044	(0.7679)
Tenure Variation	0.0004	(0.7169)	-0.0010	(0.6414)
Number of Female Directors	-0.0085	(0.6895)	0.0254	(0.4573)
Board Independence	-0.2634	(0.3845)	-0.3026	(0.5389)
Ln(Board Size)	0.2255*	(0.0819)	0.3871**	(0.0368)
Multiple Directorships			-0.3284***	(0.0003)
Square of Multiple Directorships			0.0445***	(0.0001)
Experience Diversity			-0.5266***	(0.0061)
Education Diversity			0.3987*	(0.0661)
Education Level			-0.1089	(0.2715)
Hausman Test	10.2366		20.7520*	
	(0.2488)		(0.0780)	
Likelihood Ratio Test	2.9151***		3.3995***	
	(0.0023)		(0.0005)	
Model Effect	RE FE		FE FE	
R-squared	0.0979		0.3913	
Durbin-Watson stat	0.7507		0.9214	
F-statistic (for model)	2.7587***		3.7297***	
	(0.0002)		(0.0000)	

821 Note: (1) ***, ** and * refer to $p<0.01$, $p<0.05$ and $p<0.1$ respectively; (2) RE represents random
822 effect, while FE represents fixed effect; (3) in the "Model Effect" row, the former refers to the effect
823 of individual direction, while the latter refers to the effect of time direction.