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Diversity in Diversity: The Demand for and Profitability of Sub-boards in Thai Listed Corporations

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ABSTRACT

This paper takes a more expansive approach by investigating the most appropriate diversity mix across sub-boards in Thai publicly listed corporations. We predict and find that industry based sub-boards strategically demand and supply directors that embody different attributes and skills, consistent with shareholder agency and stakeholder resource dependency theories. That is, in order to generate additional firm profitability, "diversity in diversity" is required. Diversity is more valuable in independent directors with regard to firm tenure and study majors. In contrast, non-diversity provides more value in having executive directors with direct industry experience. In particular, the value added from diversity mix is highly dependent on the counterbalancing skill attributes between executive and independent directors. The knowledge that differential sub-board diversity attributes is an important economic strategy, is useful for regulators and managers to target desirable board characteristics and investors to evaluate the potential profitability of board appointments.

JEL Classifications: G30, G34

Keywords: corporate governance, board diversity, agency, external resource dependencies

I. INTRODUCTION

These days there is a general call for diversity in corporate boards—usually meaning gender diversity. However, what is meant by board diversity? What type of diversity is more productive in terms of financial returns for shareholders? Is diversity more productive in internally appointed executive/non-executive directors or independent outside directors? Is there differential impact across industries? These are questions we ask in this paper.

Motivation is provided by the fact that the structure and expertise of the board of directors is one of the key internal corporate governance mechanisms that drive business success. This is supported by the Thai Institute of Directors and the Stock Exchange of Thailand who view board structure and expertise as fundamental grand challenges that require significant action to coordinate and collaborate efforts across shareholders and other stakeholders. Justification is based on two main theories: agency theory and resource dependence theory.

The former emphasises the monitoring role that boards perform over management strategy from a shareholder perspective. In this case, the purpose of appointing directors as agents of shareholders is to monitor efficiency in performance, quality of operations, internal audit and to mitigate internal resource channelling (see for example, Fama and Jensen 1983; Zahra and Pearce, 1989; Stiles and Taylor, 2001; Hillman and Daniel, 2003). Agency theory research is more internally focussed, examining such issues as board structure, board size, education and skills, the separation of duties (e.g., between chairman and CEO), and internal monitoring by independent directors (Yermack, 2006; Adams and Ferreira, 2009; Globerman et al., 2011).

Resource dependence theory is an outward extension that highlights the potential role the board performs as a mediator between the firm and uncertain external conditions. It requires directors to be aware of the need for economic and environmental linkages between the firm and outside resources. In this case, the emphasis on a director's contribution is to provide a greater concentration on external stakeholders, and contribute such qualities as external networking, other board experience, social awareness, and business and political connections—that is, to absorb and mitigate critical elements of environmental uncertainty into the firm. Although executive director decisions have more individual weight than non-executive decisions, in aggregate, the latter may have greater external resource impacts.

In Thailand, board corporate governance is provided by the enactment of the Stock Exchange of Thailand (SET) - Principles of Good Corporate Governance in 2012. In the section containing responsibilities of the board, SET states that the board should consist of directors with various qualifications, which are skills, experience and expertise that are useful to the company. Apart from SET, the Thai Institute of Director (TIOD) is the other organisation that plays an important role on enhancing and promoting good corporate governance practices in Thai publicly listed firms. In 2007, TIOD introduced 'Director Nomination Best Practices' which indicate that the board should appoint a Nomination Committee whose functions include reviewing the current board structure and providing recommendations on director qualifications and the skills matrix submitted to the board. Such a 'best practice approach' also specifies the board's business competencies as acceptable skills in accounting and finance, organisation and human resources management, risk management, and industry knowledge. Apart from directors'

characteristics and a board-specific skill set, the Nomination Committee should consider a board's diversity and balance, such as representatives from various stakeholders, personal and professional experience and backgrounds. In addition, the Securities and Exchange Commission highlights an appropriate gender and age balance and diversity in the board in Principle 3 Strengthen Board Effectiveness of their Corporate Governance Code for listed companies 2017. Hence, there is a strong focus on board diversity.

Nevertheless, the effectiveness of board diversity is still an open research issue. On the one hand, wide board diversity can result in improvements in monitoring and strategic advice by appointing directors that contribute a wide skill and expertise set to the firm (Anderson et al., 2011; Hillman, 2015). However, in contrast, board diversity may cause problems on coordination and communication in the board (Milliken and Martins, 1996). For example, diverse teams are administratively slower and less likely to respond to competitor initiatives (Treichler, 1995), and board independence and diversity is negatively correlated with contemporaneous and subsequent operating performance (Bhagat and Black, 2002; Bhagat and Bolton, 2008). Furthermore, Low et al. (2015) on extending research to Asia, suggest a reduced performance impact from adding female directors is due to tokenism induced by mandated gender quotas. Hence, if gender diversity slows decision making and induces conflict and resolution problems because of different world views and inexperienced appointments, then effectiveness is reduced.

A fair proportion of studies on boardroom diversity concentrate on gender diversity, but benefits from diversity can also stem from other types of diversity. For example, diversity can be classified into such task-related diversity as educational or functional background, as well as such non-task-related diversity as gender, age, race or nationality (Adams et al., 2015). Recently, Sitthipongpanich and Polsiri (2015), focusing on the role of CEO characteristics in Thailand, show higher firm value if family CEOs are young, have business expertise or have strong alumni networks. Investigating the banking sector, Nguyen et al. (2015) also report increased shareholder wealth after the announcement of new executive directors in the UK if the appointees are young, have a good educational background and prior relevant expertise. And in Turkey, Keymak and Bektas (2008) report a negative impact from older more tenured directors.

To summarise, the study of board diversity is wide-ranging and raises numerous issues that challenge or support the general notion of diversity. Whilst an efficient board demands a diversity of characteristic skills that directors can contribute to the internal and external requirements and shareholder profitability, in some areas, diversity may be non-productive. What we seek to answer is what sort of diversity should occur and in what areas? That is, which cohort of directors should effectively contribute to profitability with which specific or diverse set of skills?

In this paper, we take a wide-ranging definition of director diversity. After we hand collect data on 6038 directors in 638 Thai listed firm years (2015-16) we document descriptive statistics for executive directors, non-executive directors and independent directors as well as calculate a diversity index for gender, age, education, academic study majors, financial expertise, experience and political appointments and compare across finance and non-finance industries. Descriptive statistics show that there is greater diversity in education, study majors, financial expertise, tenure and industry experience in independent directors consistent with a demand for more rounded contributions from independents. This contrasts with executive directors who have less diversity (greater concentration) in higher education qualifications with business administration as their

major along with financial expertise, and are older and have longer relative firm tenure. Greater concentration of these attributes is observed in the finance industry.

Our next step was to asses which diversity characteristics are associated with firm profitability. To do so, we regress all diversity indices on return on equity (ROE) and control for firm factors of size, leverage and sales growth; segment by director cohort (executive, non-executive, independent), and delineate into finance and non-finance firms.

Our dominant finding using parsimonious regressions, is that diversity in independent directorships provides the greater positive influence in increasing ROA, in support of resource dependency theory. On the other hand, diversity in firm based director appointments significantly varies across finance and non-finance firms. Executive director diversity in gender, firm tenure and political connections add profitability for non-finance firms, whilst industry experience and financial expertise diversity reduces profitability. In financial firms, executive director diversity does not generally add value—with significant negative coefficients on education, industry experience and political network, with only a positive coefficient on age diversity. Consistent across all director cohorts and industry is the positive impact of firm tenure diversity, and the negative impact of education and financial diversity. These results strongly support agency theory in that executives who have strongly focussed attributes in education and financial expertise improve profitability. This is more especially the case in the finance industry. In short, successful Thai firms add financial value by providing a mixture of resource dependency attributes on firm tenure and study major (through independent directors) and agency theory benefits to shareholders by employing executive directors who provide focussed experience in industry.

This paper fills several research gaps. First, we extend governance diversity research in Asia by showing that the demand and supply of diversity and their theoretical explanations is situation-specific across director cohort and industry. This is shown by delineating three sub-boards (executive, non-executive, independent directors), and revealing differential demand and supply attributes in accordance with the predictions of agency and external stakeholder theories. Second, we determine when (non-) diversity is effective in generating financial profitability. Third, we extend governance research that only focuses on the effects of the quantity of directors, such as the split between the proportion of executive and independent directors. Finally, to the best of our knowledge, we undertake diversity attributes on a micro sub-board basis in Asia, and to identify the requirement for "diversity in diversity" across corporate boards and industry in generating profitable outcomes.

The remainder of the paper now proceeds as follows. Section 2 reviews background literature, section 3 presents research methodology and the data sample, section 4 reports results, and section 5 concludes the paper.

II. BACKGROUND REVIEW

A. Gender

We include gender balance as one issue that has been motivated via political, legislative and regulative movements, due to moral and social justifications to better reflect the current demographic of the workforce (Fairfax, 2011; Iannotta et al., 2016). For example,

the European Commission requires for at least 40% female on board from the end of 2020, the US Securities and Exchange Commission requires 20% female participation on board, and the ASEAN corporate governance scorecard 2016 inspires a company to have at least one female independent director. Nevertheless, existing research studies document a low percentage of female directors on boards. Examples include, 15.00% in Turkey (Ararat et al., 2015), 14.5% in Denmark (Norden, 2006), 18% in Italy (Bianco et al., 2015), 3% in Switzerland (Ruigrok et al., 2007) and 10.5% and 15.7% in the UK and Norway (Brammer et al., 2007, Grosvold et al., 2007). In the US, females only represent 17.7% of board directorships, but 94.5% of these female directors were quasi-outsiders sitting on the non-executive board (Equilar, 2018). In Thailand, 16.22% of board membership (Sitthipongpanich et al., 2012) and 9.88% of females are CEOs (Bialowas and Sitthipongpanich, 2014).

The majority of board gender diversity research examines the impact on corporate economic performance with little consensus on this relationship (Adams and Ferreira, 2009; Carter et al., 2010; Post and Byron, 2015). This is despite females bringing to the board several incremental and positive qualities. For example, females have higher expectations of board task performance, and they spend more time analysing the nature and logic of board strategy and identifying areas for improvement (Nielsen and Huse, 2010), and they also exhibit a greater propensity to rigorously engage in deliberations of risk assessment (Dhir, 2015).[1]

On the other hand, studies in the fields of economics and psychology report that women are less likely to undertake risky projects (Byrnes et al., 1999; Barber and Odean, 2001). This might explain firm lower risk-return attributes and profitability and may also be attributed to a directors' risk aversion invoked to protect personal tenure (see Wilson and Altanlar, 2011; Berger et al., 2014; Levi et al., 2014). Whether a diversity in female directors in Thailand provides a mechanism to induce boards to make risky (but informed choices) and improve economic performance, is an open research question we address.

B. Age

In general, experience, maturity and the quality of business and social networks increase with age. Koufopoulos et al. (2008) highlight the complementary attributes of age as a greater psychological commitment by older directors combined with a greater grasp of new ideas by younger directors. On the other hand, O'Brien and Robertson (2009) point out that whilst older directors may lack creativity and resilience, younger directors may lack self-mastery and authenticity.

Recent empirical studies show that directors' average age is approximately 55 years with the youngest age about 40 years, and the oldest about 70. For example, the range of directors age in Turkey is 40 – 72 years (Ararat et al., 2015), the range in Denmark is 40 – 68 years (Norden, 2006), and in an earlier Thai study, Sitthipongpanich et al. (2012) report the range of directors' age at 40 – 70 years old between 2001 and 2005.

In short, board age diversity tends to improve the variety of ideas in the boardroom

[1] Various outcomes include more effective communication (Gul et al., 2008), leadership by trust (Trinidad and Normore, 2005), lower board meeting attendance problems because they are less 'busy' (Adams and Ferreira, 2009), and increased quality of audit and accounting reports (Gul et al., 2008).

from the steadiness and experience of older directors when combined with the dynamics and aggressiveness of younger directors (Andersen et al., 2011). In other words, generational diversity can lead to improved monitoring as a result of balancing the young directors' enthusiasm, energy and risk appetite with older directors' experience, caution and risk awareness. Hence, in this study, we document diversity in directors' age and assess whether age diversity provides a valuable economic asset across different director cohorts.

C. Education

The level of education potentially represents an individuals' technical level of knowledge on decision making. However, there is also a possible discernible trade-off between the more analytical skills of directors with postgraduate degrees and the more intuitive skills/tacit knowledge of directors with limited education (Hambrick and Mason, 1984; Finkelstein and Hambrick, 1996; Datta and Rajagopalan, 1998). Ararat et al. (2015) and Sitthipongpanich et al. (2012) report that in Turkey and Thailand, most firms have directors with postgraduate degrees with the exception being in smaller and younger firms.

Andersen et al. (2011) document that a board with education diversity facilitates higher firm value again due to their complementary skill sets. In support, Bell et al. (2011) report that the source of directors' effective cognitive difference arises from the aggregated levels of education rather than the type of education. On the other hand, several studies do not find support on the influence of education level on firm value, such as Bathula (2008) in New Zealand and Kim and Lim (2010) in Korea. We document and examine the financial impact of education diversity in Thailand.

D. Study Majors

Whilst general education might be productive, the analysis of study majors provides an additional focus on the propensity to appoint directors with specific and specialist types of education. There are two issues: (i) should boards appoint directors with a broader skill set outside business studies, which may enhance their ability to contribute to external resource enhancement, or (ii) make appointments with general management majors or even more specifically with expertise in accounting and finance.

Kim and Lim's (2010) research supports the notion that a wider diversity in study majors can help directors provide broader advice to senior managers in Korea. In addition, directors with a law background are commonly found in firms requiring political connections to government (Agrawal and Knoeber, 2001). Sitthipongpanich et al. (2012) report that, in most of the sample firms in Thailand, former bureaucrats are appointed as directors but also highlight the importance of board diversity in age, study majors, and alumni networks to firm performance. Hence, broader education and experience appears to aid in enhancing external resource networks.

Other studies show that a more specific focus on business degree qualifications, that tend to reflect specific knowledge over accounting and finance specialisations, provide a greater in-depth knowledge in the business decision making. Examples of studies in this area in the US are Agrawal and Knoeber (2001), Yermack (2006) and Hsu (2010). Thus, a specific focus on business majors and specialised accounting and finance may be more important adjuncts to increasing economic effectiveness.

Hence, the demand and supply of specific expert areas in education and the diversity between formal and less formal education and how they impact financial performance, all form part of our research analysis.

E. Experience and Expertise

Following on from above, expertise might correspond to directors' abilities and competence gained either from working externally in another industry or having longer tenure in the same firm. External expertise diversity can lead to wider and deeper expertise to monitor and advise managers. For example, high profile academic and consulting ability can especially provide credential routes to the boardroom for females (Adams and Flynn, 2005). Internal experience, defined as having longer tenure within the firm, provides a deeper specific understanding of firm operations, strategy and governance. Expectations are that both types of experience will have a positive relationship with the quality of corporate governance and profitability. There is, however, conflict in studies, with Andersen et al. (2011) and Hagendorff and Keasey (2012)[2] finding a positive relationship between expertise diversity and firm value, whilst Kim and Lim (2010) and Fracassi and Tate (2012) show a negative relationship. We analyse both internal and external experiences.

F. Social and Political Networks

With regard to external resource connections, social and political networks are characteristically recognised as having a positive impact on the process of strategic decision making and increasing firm value (McMillan and Woddruff, 1999). Empirical evidence by Agrawal and Knoeber (2001) and Nicholson and Kiel, 2007) for the US, Khwaja and Mian (2005) for Pakistan and Siegel (2007) for Korea, find that a firm increases the opportunity for access to external resources using political networks and gains useful information through social networks. Shin et al. (2018) also find a positive effect from appointing politically connected outside directors in Korean chaebol firms. Moreover, using ex-military and ex-bureaucrats as a proxy for political networks, Peng et al. (2001) report a positive role of military directors in increasing firm value in Thai multinational firms.

However, on internal network connections (and by association director tenure), there is mixed evidence caused by endogeneity in director selection. CEOs may be reluctant to share private information with independent directors (Adams and Ferreira, 2009; Schmidt, 2015), and network ties lead to distortions in director selection and retention which then leads to weaker corporate governance (Kuhnen, 2009). In essence, senior management with strong external network connections presages the appointment of close colleagues that engage in 'group think', which in turn weakens board monitoring, increases resource channelling and CEO tenure and compensation, and reduces shareholder value (Hwang and Kim, 2009; Fracassi and Tate, 2012).

The above review serves to highlight a number of potential impacts where director appointments could strengthen or weaken firm governance. A number are potentially

[2] That is, tenure diversity prevents boards from entering a narrow mindset and aids the critical assessment of project value relevance (see Hagendorff and Keasey, 2012).

complementary and would increase the synergy of governance, but they may also work to reduce governance effectiveness. For example, by increasing the ability to access external resources (wider external networks, diversity in education), but reduce the ability to monitor agency costs and form effective financial strategies. We consider these issues through the lens of diversity impact defined in a wide denotation.

III. METHODOLOGY AND SAMPLE

A. Methodology

Various ways have been used to define and measure board diversity in the literature to account for differences among directors on the attributes (i.e. observable/ demographic) and opinions (i.e. unobservable/ cognitive). Our approach is to hand collect individual director data and then aggregate into a holistic board in order to measure the differences amongst directors in each firm. Then following Kim and Lim (2010), Hagendorff and Keasey (2012) and Sitthipongpahich et al. (2012), we measure board diversity in terms of the percentage of such particular aspect relative to total directors and by applying the modified Herfindahl Diversity Index (HDI). Board diversity is classified into eight categories: gender, age, education, experience, industry expertise, financial expertise, study majors and political networks. The detailed calculation of each diversity category is as follows:

Gender diversity

(a) The percentage of female directors on board
(b) The percentage of companies with at least one female director
(c) Gender diversity index

$$\text{Gender diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{gender_g}{total\ number\ of\ directors}\right)^2\right] \quad (1)$$

where $gender_g$ = the number of directors in each gender cohort (g), i.e. female and male.

Age diversity

(a) Average age of directors
(b) The percentage of directors in 4 age cohorts: less than 30 years, 31-45 years old, 46-60 years old, and older than 60 years old.
(c) Age diversity index

$$\text{Age diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{age_g}{total\ number\ of\ directors}\right)^2\right] \quad (2)$$

where age_g = the number of directors in each age cohort (g).

Education diversity

(a) The percentage of directors in 4 highest education cohorts: below Bachelors degree, Bachelors degree, Masters degree and Doctoral degree.
(b) Education diversity index

$$\text{Education diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{edu_g}{total\ number\ of\ directors}\right)^2\right] \quad (3)$$

where edu_g = the number of directors in each education cohort (g).

Experience diversity from his/her tenure

(a) Average tenure

(b) The percentage of directors in 4 experience cohorts: less than 3 years, 4-6 years, 7-9 years, and more than 9 years
(c) Firm tenure diversity index

$$\text{Firm tenure diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{experience_g}{total\ number\ of\ directors}\right)^2\right] \quad (4)$$

where $experience_g$ = the number of directors in each experience cohort (g).

Industry expertise diversity

(a) The percentage of directors who have direct industry experience
(b) Industry expertise index

$$\text{Industry expertise index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{indust_g}{total\ number\ of\ firms}\right)^2\right] \quad (5)$$

where $indust_g$ = the number of directors in each industry expertise cohort (g)

Finance expertise diversity

(a) The percentage of directors with accounting/finance expertise or experience
(b) Finance expertise index

$$\text{Finance expertise index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{accfin_g}{total\ number\ of\ firms}\right)^2\right] \quad (6)$$

where $accfin_g$ = the number of directors in the accounting/finance expertise cohort (g)

Study major diversity

(a) The percentage of directors in 9 study major cohorts: business administration, finance, accounting, management, economics, law, arts, engineer, and science.
(b) Study major diversity index

$$\text{Study major diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{major_g}{total\ number\ of\ directors}\right)^2\right], \quad (7)$$

where $major_g$ = the number of directors in each study major cohort (g).

Political network

(a) The percentage of directors who are political bureaucrats (i.e. military and police).
(b) Political network diversity index

$$\text{Political network diversity index} = 1 - \left[\sum_{g=1}^{n}\left(\frac{political_g}{total\ number\ of\ firms}\right)^2\right] \quad (8)$$

where $political_g$ = the number of directors in each political network cohort (g).

Essentially, as the percentage allocated to each component within each category becomes more evenly spread, the squared distribution becomes lower and hence the index increases, and thus represents greater diversity.[3]

In addition, we present raw descriptive statistics of board characteristics, including the number of observations, mean, median, maximum and minimum. This is undertaken for three separate director cohorts: executive directors, non-executive directors and independent directors, based on the assumption that these boards have different hierarchical powers and therefore demand and attract directors who effectively contribute in various ways. The research question being: Are there some categories of unique skills

[3] For example, the board size is balanced between women and men when the diversity index is 0.50, e.g. 13 women from total 26 directors. The unbalanced board in when either there is a very low number of women or a very high number of women; the diversity index will be lower (e.g. 0.355) in either the case of 6 women from 26 directors or 20 women from 26 directors.

required by different director cohorts, or are particular core skills commonly required across all directors?

We also undertake a separate analysis by industry (non-finance firms and finance firms), because of distinctly different regulations, corporate governance requirements and a perceived demand and supply of directors with more specialised finance qualifications and experience.

IV. Sample

Our sample consists of firms listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (mai) over the 2015-2016 years. Director qualifications and characteristics data is hand collected from the companies' annual registration statement (Form 56-1). The firms in the analysis contain a complete information set of each individual board qualification and characteristics.

Industry split is undertaken because it is well known that financial firms have specialised operations with performance difficult to assess by non-specialists who do not fully understand the complex nature of operations (Haggard and Howe, 2012). Moreover, information opacity in banking and finance firms has significantly increased in recent years with the use of collateralised debt obligations, sub-prime mortgages, derivatives within a complex 'shadow banking system' (Bhagat and Bolton, 2013). In addition, Gorton (2009) and Beltratti and Stulz (2012) suggest that appointments of non-executive directors without the required skills in banks leads to lower financial performance. Thus, expectations of demand, supply and effectiveness of directors are expected to vary across both industry and director cohorts.

Table 1
Sample Distribution Director Distributions in the Thai Stock Exchange - 2015-2016

Total number of director observations	6,038
Total number of executive directors	1,890
Total number of non-executive directors	1,656
Total number of independent directors	2,492
Total number of firm-years	638
By market	
SET	478
mai	160
By industry	
Financials	80
Consumer	34
Agricultural & Food	40
Industrial	76
Property & Construction	98
Resources	36
Services	70
Technology	44
mai	160

We hand collect 319 firms listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (mai) during 2015-2016. Data contains 638 firms years (558 non-financial; 80 financial) and 6,038 director observations split between

5,225 in non-finance firms (covering eight industries) and 813 in finance firms. Details are reported in Table 1.

V. RESULTS

A. Descriptive Statistics

Descriptive statistics of director diversity characteristics for gender, age, education, firm tenure, industry expertise, accounting/finance expertise, study major, and political networks are separately reported in the Tables below. They provide an overview of demand and supply within each metric, across the industry and within each director hierarchy category. In this way, we are able to initially observe the relative strength of each category to the agency and resource dependency requirements of boards.

1. Gender Diversity

Table 2 shows that, for executive directors, female participation is relatively low with a mean percentage of 23% with maximum and minimum values of 100% and 0%, with 57% of companies having at least one female executive director on board. There is little divergence across the industry. However, when compared to other countries, the Thai participation rate of female executive directors on board is relatively high compared to the aggregate participation in Asian countries (e.g., Singapore Institute of Directors & Institute of Singapore Chartered Accountants (2014) at 9.7%, Ararat et al. (2015) in Turkey at 15%, and comparable to developed countries (e.g., Spencer Stuart (2019) in the UK at 30.16% and Spencer Stuart (2020) in the US at 28%).

Table 2
Directors' Gender Diversity

Director Hierarchy	Full Sample				Non-Finance				Finance			
	Mean	Median	Max	Min	Mean	Median	Max	Min	Mean	Median	Max	Min
A. Executive directors												
Female directors as % of total directors	23%	17%	100%	0%	23%	17%	100%	0%	21%	14%	71%	0%
Dummy if the company has at least one female director	57%	100%	100%	0%	57%	100%	100%	0%	55%	100%	100%	0%
Gender Diversity Index	*0.23*	*0.24*	*0.50*	-	*0.23*	*0.24*	*0.50*	-	*0.22*	*0.24*	*0.50*	-
B. Non-executive directors												
Female directors as % of total directors	18%	0%	100%	0%	19%	0%	100%	0%	15%	0%	100%	0%
Dummy if the company has at least one female director	48%	100%	100%	0%	48%	0%	100%	0%	47%	0%	100%	0%
Gender Diversity Index	*0.18*	-	*0.50*	-	*0.18*	-	*0.50*	-	*0.16*	-	*0.50*	-
C. Independent directors												
Female directors as % of total directors	17%	10%	77%	0%	17%	8%	77%	0%	17%	19%	62%	0%

Dummy if the company has at least one female director	52%	100%	100%	0%	51%	100%	100%	0%	60%	100%	100%	0%
Gender Diversity Index	*0.20*	*0.18*	*0.50*	*-*	*0.20*	*0.15*	*0.50*	*-*	*0.23*	*0.31*	*0.50*	*-*

Table 2 reports descriptive statistics including mean, median, maximum and minimum of directors' gender diversity measurements. The sample is based on 638 Thai listed firms over the period of 2015 – 2016. Female directors as % of total directors is the percentage of female directors on board in each director type, Dummy if the company has at least one female director is an indicator variable that takes the value of one where the company has at least one female director on board, and zero otherwise. Gender Diversity Index is the modified Herfindahl Diversity Index by gender cohort. The analysis is divided into non-finance firms and finance firms by director types: Executive directors (Panel A), non-executive directors (Panel B), and independent directors (Panel C).

Comparing across director hierarchy, we see that executive directors have the greater percentage of females at 23%, falling to 18% for non-executive directors and 17% for independent directors, with similar ratios across both non-finance and finance industries. The diversity index follows similar trends across director categories and industry. At most, we can say is that demand and supply of females is slightly higher in the executive director ranks.

2. Age diversity

Table 3 reports an average age for executive directors at 54 years, with the youngest age at 32.5 years and the oldest age at 73.8 years with a diversity index of 0.34. The low diversity index reflects the fact that 81% of executive directors are over the age of 45 years. The highest diversity skewness (0.26) is in the finance industry, with 90% aged over 45 years. Comparing non-executive and independent directors, we see that the age cohorts get progressively older at 58 and 62 years, again with very little difference across industry decomposition. In summary, we can say that there is a propensity to appoint older directors to boards, with a greater bias to appoint executive directors in the 46-60 years bracket in the finance industry. What is not completely expected is the increased director age in non-executive and independent directors, when we might expect boards to demand younger directors who are valued for providing differential social positions and strategy.

We also note that, in aggregate, directors in our sample are comparable to those reported in the existing literature in other markets. For example, Denmark at 54 years with the range of 40 – 68 years by Norden (2006), and Turkey at 54 years with a range of 40 – 72 years by Ararat et al. (2015). Distributions are also consistent with the Thai results in Sitthipongpanich et al. (2012) with Thai directors' average age reported at 55 years old with a range of 40 – 70.

Table 3
Directors' Age Diversity

Director Hierarchy	Full Sample				Non-Finance				Finance			
	Mean	Median	Max	Min	Mean	Median	Max	Min	Mean	Median	Max	Min
A. Executive directors												
Average age of executive directors	54.09	54	73.83	32.5	53.89	54	73.83	34	55.37	55.07	66.33	32.5

Less than 30 years old	1%	0%	67%	0%	1%	0%	67%	0%	0%	0%	0%	0%
31-45 years old	18%	0%	100%	0%	19%	0%	100%	0%	11%	0%	100%	0%
46-60 years old	56%	57%	100%	0%	55%	50%	100%	0%	63%	69%	100%	0%
Older than 60 years old	25%	20%	100%	0%	25%	20%	100%	0%	27%	18%	100%	0%
Age Diversity Index	*0.34*	*0.44*	*0.67*	-	*0.35*	*0.44*	*0.67*	-	*0.26*	*0.3*	*0.64*	-
B. Non-executive directors												
Average age of non-executive directors	57.73	57.82	82.8	29.5	57.86	57.7	82.8	29.5	56.94	58.1	70.18	34.5
Less than 30 years old	1%	0%	75%	0%	1%	0%	75%	0%	0%	0%	0%	0%
31-45 years old	14%	0%	100%	0%	14%	0%	100%	0%	16%	8%	100%	0%
46-60 years old	42%	40%	100%	0%	42%	40%	100%	0%	44%	42%	100%	0%
Older than 60 years old	43%	40%	100%	0%	44%	40%	100%	0%	40%	36%	100%	0%
Age Diversity Index	*0.36*	*0.44*	*0.75*	-	*0.35*	*0.44*	*0.75*	-	*0.39*	*0.44*	*0.66*	-
C. Independent directors												
Average age of independent directors	62.4	62.79	81.14	40.17	62.26	62.52	81.14	40.17	63.4	63.85	74.1	49.57
Less than 30 years old	0%	0%	17%	0%	0%	0%	17%	0%	0%	0%	0%	0%
31-45 years old	5%	0%	100%	0%	5%	0%	100%	0%	2%	0%	29%	0%
46-60 years old	34%	32%	100%	0%	34%	33%	100%	0%	31%	25%	100%	0%
Older than 60 years old	61%	67%	100%	0%	61%	67%	100%	0%	67%	74%	100%	0%
Age Diversity Index	*0.33*	*0.38*	*0.67*	-	*0.32*	*0.38*	*0.67*	-	*0.34*	*0.38*	*0.65*	-

Table 3 reports descriptive statistics of directors' age over four age cohorts: less than 30 years, 31-45 years, 46-60 years, and older than 60 years. Age Diversity Index is the modified Herfindahl Diversity Index by age cohort. Data are divided into non-finance firms and finance firms and director hierarchy.

3. Education diversity

The majority of directors hold Master's degrees with a very small minority of holding below a bachelor's degree as shown in Table 4. The education diversity index is lowest for executive directors which reflects the fact that a higher proportion holds a masters with 68% in the finance industry. Education diversity index is highest for independent directors, not because they have a lower proportion of non-degrees (or practical experience) but because they hold a greater number of doctoral degrees. The education diversity indices are generally lower than those reported by Sitthipongpanich et al. (2012) at 0.57, indicating a greater level of candidates with university qualifications.

Table 4
Directors' Education Diversity

Director Hierarchy	Full Sample Mean	Median	Max	Min	Non-Finance Mean	Median	Max	Min	Finance Mean	Median	Max	Min
A. Executive directors												
Below bachelor's degree	5%	0%	100%	0%	6%	0%	100%	0%	2%	0%	33%	0%
Bachelor's degree	33%	29%	100%	0%	35%	33%	100%	0%	23%	19%	100%	0%
Master's degree	56%	60%	100%	0%	54%	57%	100%	0%	68%	71%	100%	0%
Doctoral degree	6%	0%	100%	0%	6%	0%	100%	0%	7%	0%	67%	0%
Education Diversity Index	*0.32*	*0.42*	*0.73*	-	*0.32*	*0.44*	*0.73*	-	*0.31*	*0.41*	*0.67*	-
B. Non-executive directors												
Below bachelor's degree	7%	0%	100%	0%	8%	0%	100%	0%	1%	0%	22%	0%
Bachelor's degree	30%	25%	100%	0%	30%	25%	100%	0%	25%	20%	80%	0%
Master's degree	52%	50%	100%	0%	51%	50%	100%	0%	63%	68%	100%	0%
Doctoral degree	11%	0%	100%	0%	11%	0%	100%	0%	11%	0%	100%	0%
Education Diversity Index	*0.37*	*0.44*	*0.74*	-	*0.36*	*0.44*	*0.74*	-	*0.38*	*0.41*	*0.69*	-
C. Independent directors												
Below bachelor's degree	1%	0%	33%	0%	1%	0%	33%	0%	1%	0%	20%	0%
Bachelor's degree	25%	25%	100%	0%	25%	25%	100%	0%	20%	18%	75%	0%
Master's degree	57%	62%	100%	0%	56%	62%	100%	0%	62%	63%	100%	20%
Doctoral degree	17%	13%	86%	0%	17%	13%	86%	0%	18%	19%	67%	0%
Education Diversity Index	*0.41*	*0.44*	*0.75*	-	*0.41*	*0.44*	*0.75*	-	*0.44*	*0.45*	*0.64*	-

Table 4 reports percentage of directors in four education cohorts: below Bachelors degree, Bachelors degree, Masters degree and Doctoral degree. Education Diversity Index is the modified Herfindahl Diversity Index by education cohort. The analysis is divided into non-finance firms and finance firms by director hierarchy.

Overall we interpret that directors in Thailand generally hold high levels of educational qualifications, the diversity index is reduced by a skewness towards master and doctorate qualifications, and the lower diversity recorded since Sitthipongpanich et al. (2012) results from increased appointments of candidates with higher education qualifications. In short, a reduced diversity metric signals higher education quality.

4. Study major diversity

Table 5 shows that the study major most commonly held by directors is business administration, representing a demand for and supply of wider business qualifications. The highest is found in executive directors in the finance industry (44%) and declines down to 26% for independent directors in the full sample. When added together with the other business majors of finance, accounting, management and economics, business type qualifications represent 71% of all qualifications in the finance industry and 60% in non-finance. These aggregated figures remain consistent across all director cohorts.

Table 5
Directors' Study Major Diversity

Director Hierarchy	Full Sample Mean	Full Sample Median	Full Sample Max	Full Sample Min	Non-Finance Mean	Non-Finance Median	Non-Finance Max	Non-Finance Min	Finance Mean	Finance Median	Finance Max	Finance Min
A. Executive directors												
Business Administration	38%	36%	100%	0%	37%	33%	100%	0%	44%	39%	100%	0%
Finance	4%	0%	60%	0%	4%	0%	50%	0%	8%	0%	60%	0%
Accounting	9%	0%	100%	0%	9%	0%	100%	0%	6%	0%	40%	0%
Management	5%	0%	100%	0%	5%	0%	100%	0%	6%	0%	100%	0%
Economic	6%	0%	67%	0%	5%	0%	67%	0%	7%	0%	25%	0%
Law	7%	0%	60%	0%	7%	0%	60%	0%	11%	0%	50%	0%
Arts	6%	0%	100%	0%	6%	0%	100%	0%	4%	0%	30%	0%
Engineer	17%	9%	100%	0%	18%	11%	100%	0%	7%	0%	33%	0%
Science	6%	0%	50%	0%	6%	0%	50%	0%	6%	0%	50%	0%
Study Major diversity index	*0.58*	*0.64*	*0.84*	-	*0.58*	*0.63*	*0.84*	-	*0.59*	*0.67*	*0.84*	-
B. Non-executive directors												
Business Administration	35%	33%	100%	0%	35%	33%	100%	0%	36%	33%	100%	0%
Finance	4%	0%	50%	0%	4%	0%	50%	0%	6%	0%	38%	0%
Accounting	8%	0%	100%	0%	7%	0%	100%	0%	11%	8%	43%	0%
Management	5%	0%	67%	0%	5%	0%	67%	0%	6%	0%	38%	0%
Economic	8%	0%	75%	0%	7%	0%	75%	0%	11%	8%	50%	0%
Law	10%	0%	100%	0%	9%	0%	100%	0%	15%	13%	100%	0%
Arts	6%	0%	100%	0%	6%	0%	100%	0%	5%	0%	40%	0%
Engineer	16%	7%	100%	0%	18%	10%	100%	0%	4%	0%	20%	0%
Science	7%	0%	50%	0%	7%	0%	50%	0%	6%	0%	29%	0%
Study Major diversity index	*0.6*	*0.67*	*0.86*	-	*0.59*	*0.66*	*0.84*	-	*0.64*	*0.72*	*0.86*	-
C. Independent directors												
Business Administration	26%	25%	86%	0%	26%	25%	86%	0%	30%	29%	67%	0%
Finance	5%	0%	40%	0%	4%	0%	40%	0%	6%	0%	33%	0%
Accounting	16%	14%	75%	0%	16%	14%	75%	0%	15%	16%	50%	0%
Management	4%	0%	30%	0%	4%	0%	30%	0%	3%	0%	22%	0%
Economic	8%	4%	50%	0%	8%	0%	50%	0%	13%	14%	42%	0%
Law	17%	14%	73%	0%	17%	14%	73%	0%	15%	11%	50%	0%
Arts	5%	0%	43%	0%	5%	0%	43%	0%	4%	0%	38%	0%
Engineer	11%	7%	67%	0%	12%	7%	67%	0%	9%	3%	45%	0%
Science	7%	0%	56%	0%	7%	0%	50%	0%	6%	0%	56%	0%
Study Major diversity index	*0.71*	*0.74*	*0.88*	*0.24*	*0.71*	*0.74*	*0.88*	*0.24*	*0.71*	*0.73*	*0.85*	*0.44*

Table 5 reports descriptive statistics of the percentage of directors in 11 study major cohorts. Study major diversity index is the modified Herfindahl Diversity Index by study major cohort.

Of interest in non-finance is the low relative level of specialised finance and accounting majors in executive directors (4%, 9%), but an increase in independent appointments (4%, 16%) along with 17% in law. In non-finance industries, the appointment of specialised engineer majors is significantly higher in the executive/non-

executive director cohorts (18%), which rationally represents specialised demand in industrial/construction firms. Hence, the demand for specialised majors is a function of industry, the perceived comparative advantage over employing general business management qualified directors, or appointment as a consultant independent directors—such as in accounting. Of final note is that the diversity index for study majors is the highest observed in our study (0.58-0.71), signifying a concerted demand for business administration qualifications.

5. Financial expertise diversity

Table 6 follows on from the above by drilling down to the expertise in financial applications.

Table 6
Directors' Financial Expertise

Director Hierarchy	Full Sample				Non-Finance				Finance			
	Mean	Median	Max	Min	Mean	Median	Max	Min	Mean	Median	Max	Min
A. Executive directors												
Percentage of director who have financial expertise	28%	20%	100%	0%	20%	17%	100%	0%	88%	100%	100%	40%
Financial expertise diversity index	*0.2*	*0.17*	*0.5*	-	*0.2*	*0.2*	*0.5*	-	*0.15*	-	*0.5*	-
B. Non-executive directors												
Percentage of director who have financial expertise	27%	20%	100%	0%	21%	14%	100%	0%	69%	76%	100%	0%
Financial expertise diversity index	*0.22*	*0.24*	*0.5*	-	*0.21*	*0.22*	*0.5*	-	*0.24*	*0.29*	*0.5*	-
C. Independent directors												
Percentage of director who have financial expertise	35%	33%	100%	0%	33%	33%	100%	0%	48%	50%	100%	0%
Financial expertise diversity index	*0.36*	*0.44*	*0.5*	-	*0.35*	*0.44*	*0.5*	-	*0.41*	*0.44*	*0.5*	-

Table 6 reports descriptive statistics of directors who have financial expertise when a director holds a CPA or CFA, graduated in the field of accounting or finance, or has working experience in the finance industry in an accounting/finance denominated position.

If specialised knowledge of finance is a requirement for sound economic performance, then higher numbers with financial appointments should be observed. Of note is that our definition of financial expertise not only encompasses graduates in the fields of accounting and finance but additionally incorporates CPA and CFA qualifications as well as work experience.

There is a distinct split between directors with financial expertise across industries. In non-finance, the mean for executive directors is 20%, but this increases to 33% for independent directors. For the finance industry, the mean, as expected, is much higher at 88% and declines to 48% for independent directors, and represents a concentrated demand for specific expertise. Of note is that the diversity indices are relatively low for both industries reflecting the fact there is a high proportion of financial expertise required

in finance, and a low proportion of financial expertise located in non-finance firms. In later tests, we examine whether this divergence affects profitability.

6. Work experience diversity

Table 7 shows that the average tenure of executive directors is over nine years with 41% holding appointments greater than nine years, reflecting a firm's demand for retention of executive directors with core firm based knowledge. A maximum tenure of over 29 years is found in the non-finance industry category. However, 28% of tenure is also less than 3 years with a tenure diversity spread of about 40%, which subtly reflects non-fixation of retention possibly related to performance or industry demand. Finally, executive directors also have a high level of prior direct experience in the same industry with an average of 82%. Industry comparative statistical breakdowns are similar.

Table 7
Directors' Experience Diversity – Internal Firm and Industry Wide

Director Hierarchy	Full Sample				NonFinance				Finance			
	Mean	Median	Max	Min	Mean	Median	Max	Min	Mean	Median	Max	Min
A. Executive directors												
Average Firm Tenure	9.36	8.72	29.57	0.6	9.41	9.01	29.57	0.6	9.03	8.36	24.54	1.63
Less than 3 years	28%	20%	100%	0%	28%	18%	100%	0%	27%	23%	100%	0%
46 years	19%	13%	100%	0%	19%	13%	100%	0%	19%	13%	100%	0%
79 years	12%	0%	100%	0%	11%	0%	100%	0%	15%	0%	67%	0%
More than 9 years	41%	40%	100%	0%	41%	40%	100%	0%	39%	41%	100%	0%
Tenure diversity index	*0.39*	*0.48*			*0.39*	*0.48*			*0.42*	*0.49*		
Percentage of directors with direct industry experience	82%	100%	100%	0%	82%	100%	100%	0%	85%	100%	100%	40%
Industry experience diversity index	*0.17*		*0.5*		*0.17*		*0.5*		*0.18*		*0.5*	
B. Nonexecutive directors												
Average Firm Tenure	8.38	7.33	29.18	0.67	8.54	7.46	29.18	0.67	7.36	5.69	21.85	0.83
Less than 3 years	34%	29%	100%	0%	32%	25%	100%	0%	45%	40%	100%	0%
46 years	19%	0%	100%	0%	19%	0%	100%	0%	15%	11%	70%	0%
79 years	12%	0%	100%	0%	12%	0%	100%	0%	13%	10%	50%	0%
More than 9 years	35%	25%	100%	0%	37%	25%	100%	0%	27%	17%	100%	0%
Tenure diversity index	*0.36*	*0.44*			*0.34*	*0.44*			*0.45*	*0.49*		
Percentage of directors with external industry experience	41%	38%	100%	0%	38%	33%	100%	0%	60%	65%	100%	0%
Industry experience diversity index	*0.25*	*0.32*	*0.5*		*0.25*	*0.32*	*0.5*		*0.28*	*0.36*	*0.5*	
C. Independent directors												
Average Firm Tenure	6.58	6.47	16.07	0.63	6.47	6.31	16.07	0.63	7.34	7.42	15.56	2.21

Less than 3 years	33%	25%	100%	0%	34%	25%	100%	0%	30%	27%	100%	0%
46 years	23%	14%	100%	0%	23%	14%	100%	0%	25%	16%	100%	0%
79 years	17%	0%	100%	0%	18%	0%	100%	0%	15%	7%	67%	0%
More than 9 years	27%	20%	100%	0%	26%	17%	100%	0%	31%	31%	100%	0%
Tenure diversity index	*0.41*	*0.48*			*0.4*	*0.47*			*0.47*	*0.52*		
Percentage of directors with external industry experience	16%	12%	100%	0%	14%	7%	100%	0%	29%	21%	89%	0%
Industry experience diversity index	*0.19*	*0.2*	*0.5*		*0.18*	*0.07*	*0.5*		*0.31*	*0.32*	*0.5*	

Table 7 reports descriptive statistics of directors' experience diversity by years of internal firm tenure and by direct work experience in the same industry.

Non-executive and independent director average tenures are lower at 8.38 and 6.58 years, reflecting reasonably high internal tenures but with a slightly higher turnover rate. Tenure diversity indices at 0.45 (for non-executive directors) and 0.47 (for independent directors) are higher in the finance industry, reflecting higher turnover with levels of tenure of less than three years. Maximum tenure periods also fall to lower levels compared to executive directors. Finally, the percentage of independent directors with direct industry experience is significantly lower at 14% for non-finance firms and 29% for finance firms.

7. Political diversity

Table 8 indicates that political appointments at the executive level are low, with only 5% of firms appointing a political bureaucrat with a diversity index less than 10%. Political appointments increase for independent directors which represents a demand for directors that can fulfil external resource dependency requirements, with one firm having a high 83% of political appointments. Comparing across industries, finance firms who have a higher demand for financial expertise, have less political appointments with lower averages and lower maximums.

Table 8
Directors' Political Diversity

Director Hierarchy	Full Sample				Non-Finance				Finance			
	Mean	Median	Max	Min	Mean	Median	Max	Min	Mean	Median	Max	Min
A. Executive directors												
Percentage of director who are political bureaucrats	5%	0%	50%	0%	5%	0%	50%	0%	5%	0%	29%	0%
Political diversity index	*0.08*	-	*0.5*	-	*0.08*	-	*0.5*	-	*0.08*	-	*0.41*	-
B. Non-executive directors												
Percentage of director who are political bureaucrats	6%	0%	70%	0%	6%	0%	70%	0%	4%	0%	29%	0%
Political diversity index	*0.08*	-	*0.5*	-	*0.08*	-	*0.5*	-	*0.07*	-	*0.41*	-

C. Independent directors												
Percentage of director who are political bureaucrats	10%	0%	83%	0%	10%	0%	83%	0%	7%	0%	25%	0%
Political diversity index	*0.14*	-	*0.5*	-	*0.14*	-	*0.5*	-	*0.11*	-	*0.38*	-

The Table reports descriptive statistics of the percentage of directors who are political bureaucrats Political Diversity Index is the modified Herfindahl Diversity Index by political bureaucrat cohort.

In summary, female directors represent 23% of executive directors, slightly lower for non-executive/independent directors, and the average age is in the 54-62 year range with executives at the younger end. Both these statistics are comparable with past research in developed markets. Thai directors are relatively highly educated with the majority of directors holding masters degrees, dominated by studies in general business administration. Apart from directors' graduation in business administration, the specialised degrees in law, accounting and engineer are more associated with independent director appointments. Finance specialists dominate the finance industry, with accounting, engineering and law more prominent in non-finance industries. Finally, political appointments are mostly less than 10%, significantly lower in finance and higher in independent directors in non-finance firms.

B. Board Diversity and Financial Performance

A major issue in the business world is how diversity impacts economic performance. For example, does diversity in female directors increase profitability or does diversity in education (lower graduate appointments) reduce profitability? We examine these and the other documented diversity measures by regressing each diversity index on the return on equity (ROE) as a measure of accounting financial performance. However, before undertaking the regressions, we further decompose into three size sub-groups and find varying ratios and diversity indices associated with firm size. Consequently, we add size (i.e. market capitalisation) as a control along with sales growth (i.e. change of revenue from the last year) as further controls for potential positive influences on performance. Moreover, leverage (i.e. total liabilities to equity) as a measure of financial risk is also added as a potential negative impact. Informed by our statistical analysis, we then separate financial firms because they represent a more complex and opaque industry where the skill sets of directors are required to be more precisely based on expert financial knowledge.

Table 9
Impact of Board Diversity on Financial Performance (ROE)

	All Firms		Non-Finance Firms						Finance Firms					
	All Directors		Executive		Non-executive		Independent		Executive		Non-executive		Independent	
Gender diversity Index	4.57	***	5.33	***							-14.61	*	4.64	*
Age diversity Index	0.43	***			3.73	***	2.62	***	7.06	***			-9.88	***
Education diversity Index	-16.35	***					-7.00	***	-5.16	***				
Firm tenure diversity index	5.92	***	5.06	***			2.19	***			13.78	***	12.83	***

Industry experience diversity index	2.66	**	-1.84	***					-9.41	***			10.92	*
Study major diversity index	-4.71						4.38	**					21.78	***
Political diversity index	-0.16		7.73	***	-2.33	***	3.43	***	-4.86	*	-13.13	***		
Financial expertise diversity index	-6.11	***	-5.52	***	-3.65	*							-22.78	***
Firm size	5.44	***	4.76	***	4.39	***	4.50	***	4.16	***	5.18	***	4.11	***
Sales growth	0.01		0.02	***			0.01	**	0.09	**	0.08	***	0.08	***
Leverage	-4.42	***	-6.51	***	-6.27	***	-6.49	***	-1.30	***	-1.86	**	-1.80	***
Intercept	-97.53	***	-91.02	***	-82.19	***	-85.69	***	-72.66	***	-98.73	***	-84.42	***
Number of director observations	6,038		1,669		1,401		2155		221		255		337	
Adjusted r-square	0.29		0.39		0.36		0.37		0.26		0.27		0.36	

Table 9 reports results from regressions of the effect of director's qualification characteristics diversity on return on equity (ROE), after controlling for firm specific factors: Thai corporate governance rating, firm size by market capitalisation, leverage by total liabilities to equity, and sales growth by change of revenue from last year. Board diversity is measured by various dimensions of the modified Herfindahl Diversity Index (HDI) including: Gender, Age, Education, Firm tenure, Industry experience, Study major, Political, and Financial expertise HDI. The sample is based on 6038 directors in 638 Thai listed firm years over the period of 2015 – 2016. The analysis is divided into non-finance firms and finance firms by director type: aggregated board of directors, executive directors, non-executive directors, and independent directors. Regressions on the separate director cohorts are estimated by running the most parsimonious model by adjusted r-square with white-cross section used to rectify heterogeneity. *, **, *** represent significance at the 10%, 5% and 1% levels.

Table 9 presents multiple regression results. The first column reports aggregated results from running regressions for all directors. The next six regressions are the *parsimonious* results after disaggregating by director cohort and industry. By first running aggregate regressions, and then decomposing according to director hierarchical, we are able to more clearly observe segmented impact not washed out in the aggregate. That is, we hypothesise and predict that diversity components increase or decrease firm financial performance as a function of different segmented director contributions.

We first note that control variables are consistent with expected signs. Firm size and sales growth have a persistent positive and significant impact on profitability, and leverage as a measure of financial risk has a consistently negative impact on profitability. Then, we continue our discussion by concentrating on the significant individual diversity components that are important across director/industry cohorts and which drive profitability.

We first observe that, in the aggregate, all of the diversity coefficients are significant except for study major diversity and political diversity. Gender, age, firm tenure, and industry experience diversity are significantly positive in line with expectations that individually they increase profitability. On the other hand, but education and financial expertise are significantly negative in line with expectations that more concentrated expertise increases profitability. We now examine whether these coefficients are consistent across all director cohorts who are more probably appointed based on contributions that diversify and add synergy to executive directors. Hence, to gain more precise estimates, we decompose by industry and director cohort to reveal if there are disparate impacts on profitability. We control for multi-collinearity and only report parsimonious models that retain coefficients that significantly load.

1. Gender diversity

When reading across the cohorts, we see that the aggregated positive gender diversity (more female directors), is only a positive contributor to profitability in the executive board for non-finance firms and for independent directors in finance firms. In a practical sense, this is also represented by the descriptive statistics that show the proportion of female executive director appointments is at its highest in non-finance firms at 23%. This result is consistent with agency theory arguments that female executives spend more time on strategy, identifying areas for improvement, and in increasing the quality of communication and financial reporting (Gul et al., 2008; Nielsen and Huse, 2010; Dhir, 2015). However, in finance, female independent directors are lower at 17%, but 76% of them are financial experts (*cf* males 42%), which shows a strong external demand for financially literate females. Finally, the negative coefficient on non-executive directors associated with the lowest ratio of females (15%), signifies that finance firms should look to convert their external demand for females into internal hires.

2. Age Diversity

When age diversity is disaggregated, it reveals that age diversity in non-executive and independent directors are the drivers of profitability in non-finance firms and for executive directors in finance firms. However, in the finance industry, age diversity is negative for independent directors, and when combined with a preponderance of elder appointments with a biased 80-90% concentration in the over 45 age groupings (Table 3), this reflects an overwhelming demand for a combination of middle age appointments with experience, rather than more finance expertise in order to add synergy to executive directors. In contrast, the a positive influence is made on profitability from age diversity in non-executive and independent directors (in non-finance firms), which is consistent with outside resource dependency theory. The theory predicts an increased synergy between outside networking and internal monitoring when combined with the steadiness and experience of older directors and the dynamics and aggressiveness of younger directors (Koufopoulos et al., 2008; Anderson et al., 2011). This, in turn, is perceptively shown in the regressions, whereby adding diversity is associated with increased profitability.

3. Education Diversity

Education diversity measures the diversity in academic qualifications from non-bachelor through to doctorate. The aggregated negative coefficient remains negative for non-finance independents and finance executives, signifying that education diversity does not add to profitability. An examination of the demand and supply provides further support to the negative education diversity coefficients. First of all, Thai directors are highly qualified with all director cohorts recording over 60% masters or doctoral degrees. Second, the majority of demand is for master's degrees in business administration which is consistently greater than 50%. In this context, one can fully justify why diversity logically loads as a negative factor—more concentrated and higher academically qualified directors add to firm profitability.

4. Firm Tenure Diversity:

Firm tenure diversity represents trade-offs between retention of corporate knowledge and director turnover to incorporate fresher ideas. Is it more profitable to have longer association or greater turnover? Certainly, in independent directors greater profitability is obtained from tenure diversity. This is consistent with firms and investors valuing the trade-off between experience gained from a long tenure at the firm and the strategic insights from creating an inflow of newer directors. That is, tenure diversity may prevent boards from entering a narrow mindset and provide a critical assessment of project value relevance (Anderson et al., 2011; Hagendorff and Keasey, 2012). Moreover, we see wide practical application by observing an even spread across all tenure components and relatively high tenure diversity indices of about 40%. The exception is executives in the finance industry who retain longer tenure through their specialised finance knowledge in a complex industry setting.

5. Industry Experience:

Of consideration is a possible trade-off between firm tenure diversity and the degree of outside industrial experience that a director brings to the board. What is more valuable? For example, is the experience of longer-tenured directors, who develop a shared understanding of each other's roles and expertise, more important than appointing directors with established outside the industry experience? We see that the appointment of directors with wider industry experience diversity is not a dominant factor in determining profitability, with the positive aggregated coefficient becoming negative for both executive director cohorts. Reinforced with the older age of executives, we conclude that direct firm experience is less valuable in creating profitable outcomes. The exception is in independent directors in the finance industry, where outside industry diversity has a positive association with profitability. This makes practical sense if the finance industry requires specialisation in their executive and non-executives, but demands greater diversity in feedback from independent directors.

6. Study Major Diversity:

We examine the nine study majors detailed in Table 5. The assumption being that diversity in education will provide well-rounded directors who can contribute strategy from a wider experience and skill base that leads to increased profitability. After decomposing, we see that this is the case only for independent directors consistent with Kim and Lim (2010) and Sittipongpanich et al. (2012) in Asian markets. But it does not load for the other directors indicating that it is precise and targeted knowledge in management, finance and accounting (established above) that increase profitability.

7. Political Diversity:

The aggregated coefficient on political diversity loads as non-significant. However, decomposition reveals where political appointments add to and subtract from profitability. Political appointments of executive and independent directors in non-finance firms show a strong positive association with profitability. This indicates a demand to alleviate

resource dependencies associated with greater stakeholder obligations and is consistent with the results that the appointment of former government employees adds to profitability in Asian markets (Kim and Lim, 2010). On the other hand, political appointments in finance do not work to improve profitability, representing the internationally competitive and specialised nature of this industry and the demand for directors with specific non-political based skills.

8. Financial Expertise Diversity:

Financial expertise diversity can have different interpretations depending on the industry. For example, financial expertise is required in the finance industry because of the commercial nature and requirements, but maybe less demanded in non-finance firms. For example, only 20% of executive directors have financial expertise, but in finance firms, the ratio is 88%. This binomial distribution concurrently induces low diversity indices. Moreover, the negative coefficients in non-finance firms indicate that financial expertise at the executive and non-executive levels does not contribute to profitability and more general skills are required. This is consistent with the negative results obtained by Kim and Lim (2010) in Korea. Likewise, the negative coefficient for independent directors in finance, indicates that financial expertise is supplied at higher levels and more general skills may be more productive for independent directors. In this context, negative coefficients indicate that well-rounded expertise is important to the appointment of executives and non-executive directors in non-financial firms, but not to independent directors in financial firms.

VI. SUMMARY AND CONCLUSIONS

This study contributes to corporate governance research by summarising and investigating the quality and financial impact of diversity across multiple dimensions. Our expectation is that industry-based director cohorts will strategically supply directors that embody differential attributes demanded by shareholder agency and stakeholder resource dependency theories. Initial evidence in support of this conjecture is supplied in terms of detailed diversity descriptions and calculations of diversity indices. Descriptive statistics show greater diversity in education, study majors, financial expertise, tenure and industry experience in independent directors consistent with a demand for more rounded contributions from independents. This contrasts with executive directors who have less diversity (greater concentration) in higher education qualifications with business administration as their major, and are younger and have longer relative firm tenure. Greater concentration of these attributes is observed in the finance industry. Our next step was to analyse which diversity index was associated with firm profitability.

Using parsimonious regressions, our dominant finding is that diversity in firm based director appointments substantially vary in terms of economic impact across finance and non-finance firms. We summarise on the basis of sub-board appointment and industry. For non-finance executive directors' gender, tenure and political diversity add to profitability. Diversity in industry experience and financial expertise reduce profitability indicating that directed and specific skills in these areas are more productive. For non-finance independent directorships, age, tenure, study major and political diversity add to profitability. Education diversity does not; confirming that the

concentrated demand for tertiary education at, at least, the bachelor and masters level is based on economic factors.

For executive directors in the finance industry, diversity in education, industry experience and political connections reduces value. Generally confirming that finance executive appointments require targeted finance skills and not generalised qualities. However, this specialisation is offset by the economic value added by the diversity attributes of independent directors (in gender, tenure, industry experience and study majors).

Hence, in both industry classifications, offsetting balances in the degree of diversity between executive/independent appointments is vital for profit generation. Shareholders should be aware of these profitable attributes. On the other hand, the diversity attributes of non-executive directors do not have a dominant role in profit generation, and therefore should be considered (whilst still important) as a secondary strategic issue.

This paper fills several gaps in the research literature. First, we extend governance diversity research in Thailand by showing that the demand and supply of diversity is situation-specific. Second, the three sub-boards we examine (executive, non-executive, independent directors), reveal differential demand and supply attributes in accordance with the predictions of agency and external stakeholder theories. Third, we show when and why diversity is effective in generating financial profitability. Fourth, we extend governance research that only focuses on the effects of the quantity of directors, such as the split between the proportion of executive and independent directors, or singularly on either one. That is, we examine director cohort quality using a battery of diversity indices based on expectations of skills that directors should bring to the board in terms of agency and external resource dependency requirements.

These findings can be used by regulators to formulate recommendations to specifically target desirable board characteristics that best mitigate agency and external resource costs, and to re-evaluate the effectiveness of quotas suggested by national edicts and business priorities. Suggested further research could examine and extend specific board contributions to firm performance, economic value, and risk-taking across Asia, and to corporate strategic change within smaller non-listed family and professional managed firms.

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