

**The effect of Female board on Firm value Evidence from the
Asia Pacific**



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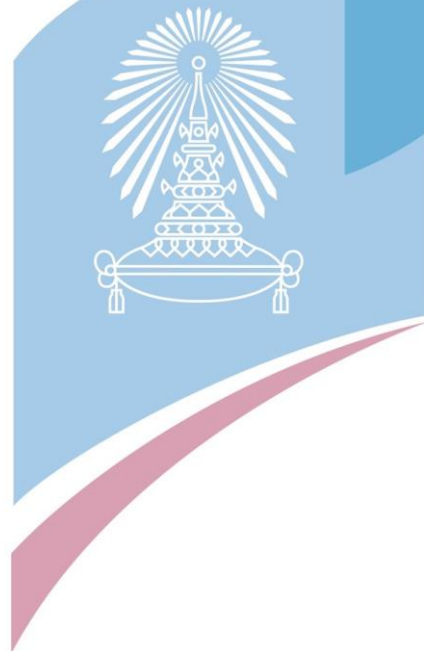
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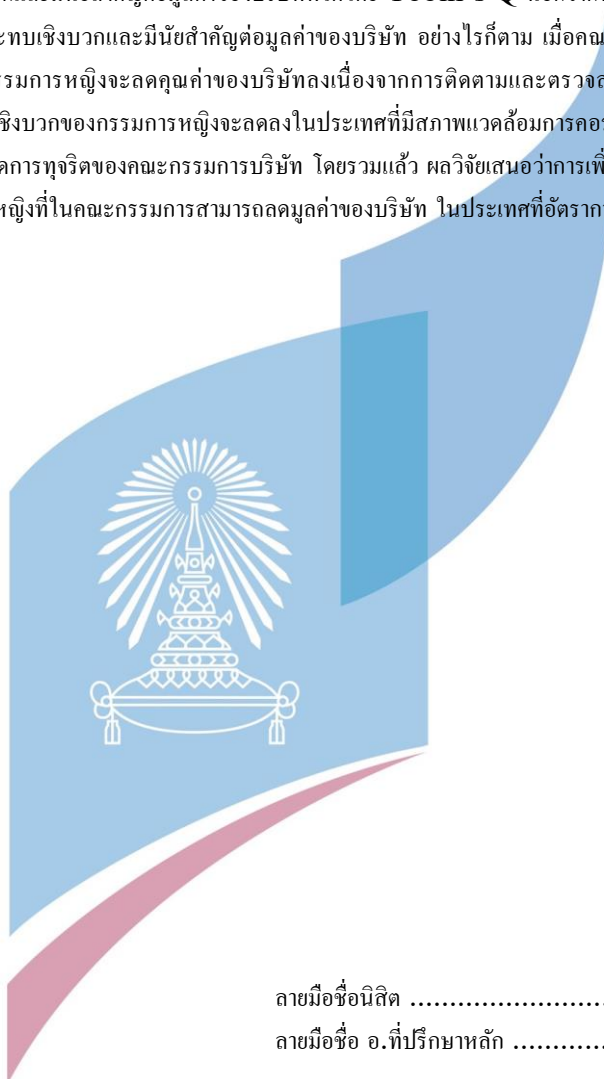
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ชัยธร กุลาเลิศ : ผลกระทบของผู้บริหารผู้หญิงต่อมูลค่าบริษัทกรณีศึกษากลุ่มประเทศเอเชียแปซิฟิก. (The effect of Female board on Firm value Evidence from the Asia Pacific) อ.ที่ปรึกษาหลัก : ผศ. ดร.ธนากร ลิขิตาภิวัฒน์

งานวิจัยนี้ได้ตรวจสอบความสัมพันธ์ระหว่างความหลากหลายทางเพศในคณะกรรมการบริษัทกับมูลค่าของบริษัทในกรณีศึกษาบริษัทในกลุ่มประเทศเอเชียแปซิฟิกระหว่างปี 2011 ถึง 2020 โดยใช้วิธี fixed effect และ two stage least squares เพื่อแก้ไขปัญหา endogeneity ที่เกิดขึ้นในโมเดลการศึกษา โดยผลการวิจัยพบว่าการเพิ่มกรรมการผู้หญิงส่งผลในเชิงบวกและมีนัยสำคัญต่อมูลค่าของบริษัทที่วัดโดย Tobin's Q นอกจากนี้ผลการวิจัยที่ได้แสดงให้เห็นว่ากรรมการอิสระมีผลกระทบเชิงบวกและมีนัยสำคัญต่อมูลค่าของบริษัท อย่างไรก็ตาม เมื่อคณะกรรมการประกอบด้วยกรรมการอิสระ การแต่งตั้งกรรมการหญิงจะลดคุณค่าของบริษัทลงเนื่องจากการติดตามและตรวจสอบผลประกอบการมากเกินไป นอกจากนี้ ผลกระทบเชิงบวกของกรรมการหญิงจะลดลงในประเทศที่มีสภาพแวดล้อมการคอร์รัปชันสูง เนื่องจากว่าความหลากหลายทางเพศช่วยลดการทุจริตของคณะกรรมการบริษัท โดยรวมแล้ว ผลวิจัยเสนอว่าการเพิ่มขึ้นของกรรมการผู้หญิงและการเพิ่มขึ้นของโควตาเพศหญิงในคณะกรรมการสามารถลดมูลค่าของบริษัท ในประเทศที่อัตราการคอร์รัปชันสูงได้



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This paper examines the relationship between board gender diversity and firm value of companies in the Asia-Pacific from 2011 to 2020. Fixed effects and two-stage least squares are employed to deal with endogeneity. We find that increasing female directors to the board has a positive and significant effect on firm value as measured by Tobin's Q. The result suggests that independent directors have a positive and significant impact on firm value. However, when the board is composed of independent directors, appointing female directors decreases the firm's value owing to over monitoring. Furthermore, the positive effect of female directors appears to be diminished in countries with higher corruption environments. This may be attributable to the fact that gender diversity reduces board corruption. Overall, we suggest that the present of female directors or mandating gender quotas on board can reduce firm value in countries where corruption is high.



Field of Study: Finance

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Student's Signature

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Advisor's Signature

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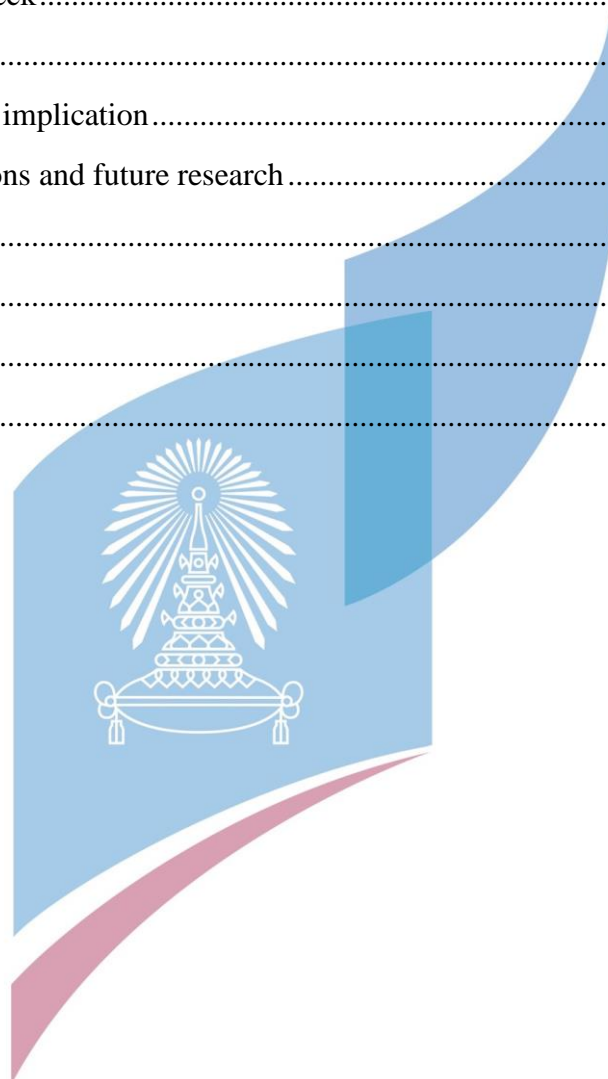
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Chapter1

Introduction

Gender equality has gained significant interest in recent years. Female directors' participation in value creation processes was supported by empirical data in many studies on gender diversity and business performance, but in Asia Pacific, that is a new notion. With the UN Sustainable Development Goals (SDGs), many businesses have adopted ethical and sustainable practices that promote gender equality and female empowerment. A comprehensive and effective women's involvement in decision-making processes at all levels is vital in the process of increasing value, productivity and profitability for companies, according to the 2030 Agenda (Romano, Cirillo et al. 2020).

Corporate scandals during the last decade have prompted further concern about board directors' decision, board composition and corporate governance. Consequently, investors loss in both market value and trust in financial market. The most well-known corporate scandals are, Maxwell corporation (1991), Enron(2001) and Parmalat (2003). For example, The Maxwell scandal has been called the biggest fraud of the 20th century. Moreover, it brought the issue of corporate governance on CEO duality into the public, business, and political sphere (Maier 2005).

The board of directors oversees firm strategic decisions and monitors firm performance, including managing capital and resource, mergers, acquisition, hiring and firing executives. In addition, board of directors' members provide an essential role in monitoring agency problems in the company (Fama 1980); (Jensen 1993). Diversity among board members is likely to bring a more diverse team of professionals and more knowledge and information to the board as a representing

shareholder interest (Burgess and Tharenou 2002) (Hillman, Cannella et al. 2002), which is one aspect of good corporate governance. Gender diversity is becoming more common in boardrooms to improve board effectiveness worldwide, notably in continental Europe. Having more female on the board is a policy agenda including quota law in Italy, Spain, Iceland, France, Germany, and EU 2020 Target (Torchia, Calabrò et al. 2018). In Norway, Netherlands and Sweden quota law requires all firms to have at least 40% female board representation. An important question is whether the outcome would have been different if more women ran the corporation. If it is true that more women as top executives or members of board improve firm performance, this may be a strong reason for having more women in top management. According to Kramer, Konrad et al. (2006) having three or more female board members has a significant influence on business performance compared to having two or less female board members. "The magic seems to occur when three or more women serve on a board together" This quote backs up critical mass theory, which says that "one is a token, two is a presence, and three is a voice." (Kristie 2011).

When it involves making critical business decisions, several studies demonstrate that female boards are more conscientious and demand more auditing than male executives (Huang and Kisgen 2013). Female boards are more careful and need more auditing than male board (Adams and Ferreira 2009); (Gul, Srinidhi et al. 2008). Women also adds new viewpoints and experiences, which can enhance board decisions and legitimize corporate operations(Hillman, Shropshire et al. 2007). Singh and Vinnicombe (2004) also further indicate that gender diversity on boards positively affects corporate governance and firm performance (Adams and Ferreira 2009). However, it may be unrealistic to expect boards to benefit from women talent

if the only number of women on boards raised. Another board characteristic, board independence, should moderate the effect of having female board and firm value.

Independent director used to serve monitoring function and improved corporate governance. Firms value increase if they have a significant number of independence directors on board since they are outsiders who have fewer conflict of interest on the company (Terjesen, Couto et al. 2016).

Unfortunately, the absence of female board members of Asia Pacific corporations against the principles of equality that the UN emphasizes and quota law in EU. Women are the minority on male-dominated boards can make it hard for them to contribute to the board process and board decisions (Groysberg and Bell 2013). In addition, Since Asia Pacific's corporate governance is substantially lower than US and western countries (Allen, Qian et al. 2005), Corruption perception index also report lower score meaning that those countries are observed for more corruption. Thus, in underdeveloped nations, a low corruption score has no harmful influence on firm performance (Rock and Bonnett 2004). The entrenched culture of corruption greatly contributes to Asia Pacific's underdevelopment. Those is realizing the need of the hour and the importance of Asian women in terms of respect their leadership and managerial skills, made it a position for women to be on boards in the corporate sector where observed most corruption.

Objective

This research seeks to close a gap in literature by investigating whether female board representation and will improve firm value in Asia Pacific as claimed by many researchers in western country and the moderation effect exerted by outside

membership. Then, this research examines on whether effect from female board representation may or may not work with the country with high corruption perception.

Contribution

By offering further evidence, this research adds to the literature on board gender diversity. First, we broaden scope the of research outside the U.S. and Europe countries by providing empirical evidence in Asia pacific with a deep root of male dominate culture. Women are unable to advance in their career. Second, we add to the literature by considering the moderate effect of independence director between gender diversity and firm value. Lastly, we provide evidence to support quota legislation for having more women directors and independent directors present in the board room in Asia pacific.

The rest of this article will continue in the following manner. Section 2 summarizes the literature. Section 3 discusses the data. Methodology framework is presented in Section 4. Section 5 summarizes the empirical findings. Section 6 is the conclusion.

Chapter 2

Literatures review

2.1 Perception toward women in Asia Pacific

Because of Asia's fast economic growth, the successful board is said to be multinational and empowered by functional, sector, and gender diversity (Yi 2012). However, female labor force participation and number of female board representation in Asia are often lower than in Europe and the USA (Süssmuth-Dyckerhoff, Wang et al. 2012). In term of number of female board representation and the scope of their duties, East Asia corporations show a big difference from Anglo-American

counterparts (Yi 2012). This is due to the fact that Asia culture norm expects women to take responsibility for managing household (Benson and Yukongdi 2005). It's not just gender stereotypes that are to blame for the lack of women in boardroom and top management roles. Job promotion, macho culture and the old boy network or social group (Matson and Duncan 2007) also bias toward men. Social attitudes about male superiority are built up at different levels of gender identity, value, and institutionalization. This means that a male-centered and female-subordinated social interaction grows up as deep root culture in this region (Jiang, Li et al. 2011). Furthermore, even after being appointed to the board, female directors find it difficult to participate in board decision-making (Adams and Ferreira 2009).

2.2 Board gender diversity and Firm performance

Globally, female board representation has risen dramatically in recent years, resulting in more gender diversity in the boardroom. The impact of board gender diversity on firm value has been studied in a number of ways, but the findings have been varied.

Prior literatures posit the positive effect between presence of female director in board with firm performance in term of enhance board effectiveness (Dalton, Daily et al. 1999); (Kiel and Nicholson 2003). The agency theory, which aim to overcome the agency cost on management private interest to prevent the loss of firm value, support more female board representation (Finegold, Benson et al. 2007). Gender diversity is seen as a beneficial corporate governance practice in terms of board composition since there is greater board diversity (Bujaki and McConomy 2010); (Rose 2007) and also increase board independence (Carter, Simkins et al. 2003). The benefits of having female in board room are posited as following. Women are more

willing to collaborate and to listen honestly (Konrad, Kramer et al. 2008), concern about their security-oriented than men are (Martín-Ugedo, Vera et al. 2017), care more of CSR issues, and encourage participatory decision making (Bart and McQueen 2013). These attributes lead to fewer conflicts and more effective board monitoring (Nielsen and Huse 2010). In addition, More women on board could lead more sensitive to CEO turnover, less likely that board members will miss meetings (Adams and Ferreira 2009) as well as enhance transparency disclosure (Gul, Srinidhi et al. 2011) leading to high quality of earnings (Srinidhi, Gul et al. 2011).

Another theory that supports board gender diversity is resource dependence theory. The skills, experience, and perspectives that women directors bring to the board help the board have better discussions and make more ethical decisions. Female directors are more likely than male directors to raise unpleasant issues (Konrad, Kramer et al. 2008).

On the contrary, board gender diversity has the negative relationship to firm performance as shown in past literatures (Smith, Smith et al. 2006). Female directors prioritize CSR above financial achievement (Pucheta-Martínez, Bel-Oms et al. 2018). Intra-group disagreement slows decision making (Darmadi 2013). Female directors may be hired not on the basis of their skills, competence and experience, but for their family relationship (Bianco, Ciavarella et al. 2015). Moreover, women are a risk-averse nature (Darmadi 2013), and having a weak communication between the board and managers because of too much monitoring (Bennouri, Chtioui et al. 2018). Finally, no correlation was observed between board gender diversity and firm value calculated by market to book value ratio (Rose 2007).

According to token status theory (Zimmer 1988) which is referring to someone who solo, or minority represent of demographic group and experience a verity of hardship in workplace, Bluedorn and Kanter (1977) stated that people tend to misinterpret female token managers as well as few female board members in way that are more linked to their femineity than their leadership skill. There may be people inside and outside company who observe a single female director as a token who doesn't have much of impact business decisions (Joecks, Pull et al. 2013). Liu, Wei et al. (2014) discovered that having three or more women on the board of directors creates a critical mass where women are not seen as outsiders and have a greater positive impact on firm value. "One is a token, two is a presence, and three is a voice" according to Kristie (2011), who advocates for critical mass theory in the context of board gender diversity. Thus, this research hypothesizes:

Hypothesis 1: Gender diversity in board room has a positive influence on firm value

2.3 Board Independence and Firm Performance

The board of directors is ultimately responsible for ensuring that managers work hard to achieve company objectives and for approving significant corporate decisions (Core, Holthausen et al. 1999). Independent directors served as a watchdog on the executive directors' and management's performance and activities to enhance board transparency and monitoring. According to Sánchez-Marín, Baixauli et al. (2010), large number of independent directors increase board's performance and decision making. Previous studies have looked into the effect that independent directors have on firm value, but results aren't clear (Terjesen, Couto et al. 2016). The

inconsistent outcomes might be explained by the institutional environment's variations.

Agency theory focus on the conflict of interest between principle (shareholder) and owner (manager) (Fama and Jensen 1983). The first governance mechanism is a board of directors, which specifies the owner's interests (Fama 1980) and attempts to restrict management opportunistic behavior (Jensen 1993). According to Agency view of the board, independent directors will not collude with inside directors to violate shareholder interests and are ready to properly supervise management actions due to the high cost of reputation (Weisbach 1988); (Borokhovich, Parrino et al. 1996). Additionally, they are often experts in organizational internal control and have the requisite ability to supervise the top management team more effectively (Fama and Jensen 1983) when independent directors dominated the board (Adams, Hermalin et al. 2010). The combination of internal and outsider director is a significant aspect in determining the board's performance (Core, Holthausen et al. 1999); (Hermalin and Weisbach 2003). In contrast, Independent directors that often serve on many boards of directors are frequently overworked, resulting in low firm performance (Kumar and Sivaramakrishnan 2008). The goal of powerful CEOs is to choose directors who will support their own objective, as shown by (Westphal and Zajac 1995).

Resource dependency theory, Pfeffer and Salancik (2003) considers the role of external resources (knowledge, social network, expertise and legitimacy) of independent director affecting firm behavior. Cannella, Hambrick et al. (2009) found that High-level board decision-making is benefit from the distinct experiences and insightful knowledge that independent directors have gained while working for various firms which contributes to firm's success (Terjesen, Couto et al. 2016). In

other word, since independent directors are unfamiliar with their companies, they may be unable to carry out their responsibilities (Rashid 2018).

Upper echelons theory, Hambrick and Mason (1984) explains the executive act which impact firm performance based on their experience, education, value and their personality. Independent director need to take use of the wide diversified set of expertise knowledge, skill and prior experience when making decision (Hambrick 2007), (Adams and Ferreira 2007). The possibility of more effective monitoring and increase firm value discovered by empowering independent director (Zhu, Ye et al. 2016). However, according to Hambrick (2007) , executives may not utilize their knowledge and skills in the board room. The present of independent director may not enhance firm value (Laux 2008); (Wang, Lu et al. 2011). As such, we expect that independent director has positive relationship with firm value.

Hypothesis 2: Independent director has a positive influence on firm value

2.4 Female directors, Independent directors and firm performance

Board's perceived independence may be influenced by its gender diversity if there is a predetermined number of independent directors on the board. Shareholders and stakeholders may truly feel that a board of directors dominated by males is even more deeply linked with top management than females on a board. Few female directors on large board may be seen as an indication that internal agent have over selection power of independent director. Therefore, the lack of women makes appointed as board of director raised concern to shareholder and stakeholder that the board isn't independence as a board with more women. Terjesen, Couto et al. (2016) noted that until the board is gender varied, independent directors have little influence

on firm performance. In contrast, the study on Malaysia stated board gender diversity and independent director is not having interaction effect with firm performance (Kweh, Ahmad et al. 2019). Given their limited access to insider knowledge about the operational operations of their companies, female independent directors have less opportunity to monitor and affect firm performance in china (Liu, Wei et al. 2014). This ambiguous result makes further research on this study. In this case, we also aim to determine experimentally that independent director influence the impact of gender diversity and improve board efficiency as well as firm value.

Hypothesis 3: Gender diversity in board room has higher influence on firm value when the board is comprised of independence director

2.5 Corruption

Generally, Corruption is widely seen as damaging to macroeconomic growth, investment and firm reputation (Mauro 1995); (Wei 2000). However, Corruption has been a part of the Asian way of life for a long time, but it doesn't seem to have an hamper on business there (Kaufmann and Wei 1999). Lui (1985) argue that corruption is “greases the wheels of commerce” which implies bribes or “grease”, alleviate lengthly administrative delay, facilitate progression on slow public service process and also reduce cost of capital, transaction cost casing positive impact on firm value in economy with weak institutional environment (Leff 1964). In developing areas which are most countries in Asia pacific, corruption may benefit for corporate growth by allowing opportunity to obtain inaccessible resouces and services. Also, in markets with weak institutions, strong government intervention, corruption may let enterprises avoid institutional barriers, allowing for increased productivity. The controlling shareholders offen use government connection to get what they want (Young, Peng et

al. 2008). Demir, Hu et al. (2022) posit that corporates in China that are publicly owned, export-oriented, more profitable, strong growth, or operate in low competitive industries are less negatively affected by corruption. Similarly, Vial and Hanoteau (2010) find that corruption benefits Indonesian manufacturing facility expansion. Mendoza, Lim et al. (2015) suggest that corruption promotes SMEs development in the Philippines, especially in places with low economic performance.

As the matter of fact in having more female board might possibly against corporate wrong doing according to evidence in Canada with respect to diverse board. The study discovered that 94% of boards with three or more women complied with internal conflict of interest guideline (no conflict of interest on their duty), compared to only 68% of all male boards (Ramirez 2003). 86% of board with three or more women enforced their employees and management to comply with code of conduct, compared to just 66% of all male board (Ramirez 2003). This study turn out the hypothesis as follow;

Hypothesis 4: The effect of board gender diversity on firm value is less in settings where the corruption perception is high.

Chapter 3

Data

This paper uses yearly sample firms in Asia Pacific region in period of 2016 to 2020 as of 31 December which all variables including percent of female board member, percent of independent director, CEO duality as binary, number of board meeting annually, number of directors in boardroom, total asset, total liability, and market value are retrieved from Thomson Reuter Eikon database except for CPI, Corruption perception index. Those sample firms must have reported number of board

characteristic in annual report. Firms with missing board data will be excluded. For calculate firm value, this paper uses the formula as following.

3.1 Dependent variable

$$\text{Tobin's } Q \text{ or firm value} = (MV+TL)/TA$$

In this study, Tobin's Q is utilized as a proxy for firm value. The market-based performance of total liability plus market value of equity, divided by total asset, is known as Tobin's Q (Tobin 1969). A value greater than one implies that shareholders believe the company is worth more than its book value; a value less than one suggests that the market believes the company will ultimately destroy shareholder value. Several corporate governance literatures have influenced the decision to equip Tobin's Q. Siddiqui (2015) argue that Tobin's Q provides a more accurate estimate of long term firm value than accounting values which are ROA and ROE. Those measurements consider as short-term measurement of firm value (Krause and Tse 2016).

3.2 Independent variable

This study uses two key variables, Percent of female director on board and Percent of independent director on board. Many studies use the percentage of female board as the measurement of board gender diversity (Adams and Ferreira 2009).

3.3 Control variables

The control variable that we included in regression model is categorized three group: board level, firm level, and corruption environment.

At board level, we control board size, CEO duality and board meeting. Board size measure by natural logarithm of total director in board (Anderson and Reeb 2004). The number of directors has a significant impact on the board's monitoring and control functions. There are some benefits to having a bigger board, like being able to

better monitor, but there are also some drawbacks, like less effective communication and decision-making (Lipton and Lorsch 1992); (Jensen 1993). CEO duality is binary and dummy variable. When the CEO and board chair are the same person, the value is 1, and when the CEO is not the board chair, the value is 0. Board meeting transforms into natural logarithm of number of board meeting for one year. To sustain efficient boardroom dynamics and create creative board behavior, board members must spend time together in meetings (Minichilli 2009).

At firm characteristic, we use Firm size and leverage. The natural logarithm of total asset determines the Firm size. Size of company is likely to have an effect on its financial success, since larger firms have a greater potential to affect firm performance (Short and Keasey 1999). For leverage, this paper use ratio of debt to total assets. Debt is one way to reduce agency problem.

We also include the Corruption Perception (CPI) index (Thakur, Kannadhasan et al. 2021), retrieved from CPI report from Transparency international. CPI Index measure on how corrupt people perceive in the public sector is in each country, as evaluated by expert assessment and opinion poll. The CPI is defined as “the misuse of entrusted power for private gain”. The lower score than 50 is perceived as more corrupt. The high score means that country perceived as less corrupt. We rescale and reverse the index to within a range of 0–100 to ensure consistency in the research, with greater values indicating higher degrees of corruption.

Table 1: Variables definition and sources

A. Dependence variable		
TOBIN'S Q	The Market value less total debt divided by total asset	Own calculations
B. Explanatory variables		
FEMALE	The percent of the female director on board	Refinitiv Eikon
BIND	The percent of the independent (external) director on board	Refinitiv Eikon
C. Control Variables		
BSIZE	The natural logarithm of total director on board	Refinitiv Eikon
MEDIUM BOARD	Dummy equal to 1 if number of directors on board is more than or equal 9 but less than 14, 0 otherwise	Refinitiv Eikon
LARGE BOARD	Dummy equal to 1 if number of directors on board is more than or equal 14, 0 otherwise	Refinitiv Eikon
Meeting	The natural logarithm of number of board meeting in one year	Refinitiv Eikon
CEOD	Dummy equal to 1 if CEO is chair of the board, 0 otherwise	Refinitiv Eikon
FSIZE	The natural logarithm of total asset	Refinitiv Eikon
LEV	The ratio of total debt to total asset	Refinitiv Eikon
CPI	Corruption perception index in percentage	Transparency International report
D. Instrumental variable		
FLPR	Female labor force participation rate in percentage	The Global Economy.com

Chapter 4 METHODOLOGY

4.1 Multiple Regression models

Our multiple regression models for evaluating four hypotheses using our panel data to quantify the effect of gender diversity and independent director are as follows:

$$\begin{aligned}
 \text{TOBIN'S } Q_{it} = & \beta_0 + \beta_1 \text{FEMALE}_{it} + \beta_2 \text{BIND}_{it} + \beta_3 \text{BSIZE}_{it} + \beta_4 \text{MEETING}_{it} \\
 & + \beta_5 \text{CEOD}_{it} + \beta_6 \text{FSIZE}_{it} + \beta_7 \text{LEV}_{it} + \beta_8 \text{CPI}_{it} + \varepsilon_{it}
 \end{aligned} \quad (1)$$

where TOBIN'S Q represent firm value; FEMALE is the proportion of female directors in the overall number of directors; BIND is percent of independence board directors to total directors; MEETINGS is the natural log of the number of board meetings held in a year; The natural log of the total number of board directors is BSIZE; CEOD is dummy variable, equal 1 if CEO is chair board , 0 otherwise; The natural log of total assets is referred to as FSIZE. LEV stands for debt-to-assets ratio; CPI stands for corruption perception index. ε_{it} is error terms for firm i at time t respectively. The equation (1) is same as equation (1.1). The logarithmic transformation is a valuable tool for normalizing skewed control variables and improving model fit by changing the distribution into a more regularly shaped bell curve.

$$\begin{aligned}
 \text{TOBIN'S } Q_{it} = & \beta_0 + \beta_1 \text{FEMALE}_{it} + \beta_2 \text{BIND}_{it} + \beta_3 \ln(\text{BD}_{it}) \\
 & + \beta_4 \ln(\text{NMEETING}_{it}) + \beta_5 \text{CEOD}_{it} + \beta_6 \ln(\text{TA}_{it}) + \beta_7 \text{LEV}_{it} + \beta_8 \text{CPI}_{it} + \varepsilon_{it}
 \end{aligned} \quad (1.1)$$

where BD represent number of total board of directors; NMEETING is number of board meeting; TA is total asset for firm i at time t.

Hypothesis 1: Gender diversity in board room has a positive influence on firm value

Hypothesis 2: Independent director has a positive influence on firm value

Our regression model is as follows to evaluate the influence of gender diversity and board independence on firm value:

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \beta_3 FEMALE_{it} * BIND_{it} + \sum_{k=4}^8 \beta_k X_{kit} + \varepsilon_{it} \quad (2)$$

where FEMALE*BIND is the interaction term for gender diversity and board independence. X_k is set of control variables.

Hypothesis 3: Gender diversity in board room has higher influence on firm value when the board is comprised of independent director.

Then, we will examine whether there is an improvement in firm value in gender diversity and intense corruption environment with following regression model in a multivariate analysis.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \beta_3 FEMALE_{it} * CPI_{it} + \sum_{k=4}^8 \beta_k X_{kit} + \varepsilon_{it} \quad (3)$$

where FEMALE_{it}*CPI_{it} is the interaction term for gender diversity and Corruption perception index. X_k is set of control variables.

Hypothesis 4: The effect of board gender diversity on firm value is less in settings where the corruption perception is high.

In empirical corporate finance literatures, the investigation of the relationship between board gender diversity and firm value faces endogeneity, which occurs due to simultaneity unobserved heterogeneity, and reverse causality (Wintoki, Linck et al. 2012). We admit that it is difficult to find exogenous factors. Simultaneity exists in equation (1) if $E(\varepsilon_{it} | BSIZE_{it}, FSIZE_{it}) \neq 0$ which may arise in any board variables and

TOBIN'S Q_{it} relation. One possible approach to the simultaneity issue is to use a system of equations. However, the system requires to identify strictly exogenous instruments. Unobserved heterogeneity exists when consider the factors that unobservable such as the selection of female director, omitted culture that could lead to spurious correlation to Tobin's Q and explanatory variables. To solve the time-invariant in our panel data, we add firm fix effect in linear model. Fixed Effect Regression Model (FEM) is as followed.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \sum_{k=4}^8 \beta_k X_{kit} + \beta_9 \alpha_i + \beta_{10} \lambda_t + \varepsilon_{it} \quad (4)$$

where α_i and λ_t are firm fixed-effects and year fixed-effects. We employ robust standard error to control serial correlation and heteroscedasticity in data with pool ordinary least square (OLS) regression (Petersen 2009). Then the 2SLS will be a robustness to control for endogeneity.

Hermalin and Weisbach (2001) highlight the issue of endogeneity problem that board related variable including board gender diversity, board independence, board size etc. are reverse causation with firm value. Ordinary least square (OLS) estimation of Equation (1), (2) and (3) would lead to biased coefficient estimator and inconsistent parameter. This research uses an instrumental variable (IV) in a two-stage least squares regression (2SLS) to avoid endogeneity and endogenous factors, as shown in the following system:

We obtain percentage of female labor force participation rate as the instrument variable (Z) that is correlate with percentage of female directors (endogenous variable) which at the same time uncorrelated with error to solve endogeneity problem. Instrument also need to follow with exclusion restriction. The percentage of female labor force participation satisfy both criteria. This is because the more

proportion of female labor force participation, the more likely to appoint female director in board. In contrast, female labor force participation does not participate in firm strategic management, so they aren't relating to firm value as a whole (Low, Roberts et al. 2015). According to the limitation of data in the proportion of female manager and number of female employees in each firm, we make an argument to use female labor force participation in each country as valid instrument. We argue that level of social norms in less gender discrimination toward female, The more female participation support women career to be appointed as the board member (Stoker, Velde et al. 2012).

$$FEMALE_{it} = \delta_0 + \delta_1 Z_1 + \delta_2 X_2 + \dots + \delta_k X_{kt} + \delta_9 \alpha_i + \delta_{10} \lambda_t + \eta_{it} \quad (5)$$

We assume that all X variables are endogenous. The idea of instrument variable (Z) that is correlated with FEMALE but not correlate with error term and Tobin's Q, is to extract the exogeneous variation in X. In the first stage, we aim to predict \widehat{FEMALE}_{it} . The use of \widehat{FEMALE}_{it} in the second stage is the way to fix the endogenous problem in X while Z is uncorrelated with error term and not cause directly to Tobin Q referring as exclusion restriction, which prove that \widehat{FEMALE}_{it} is exogenous ($Cov(X, Z) \neq 0$). Z is only correlate with Tobin's Q only through X included in regression but not through error term. At the second stage, we regress the dependent variable on all exogeneous variables.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 \widehat{FEMALE}_{it} + \beta_2 X_{2t} + \dots + \beta_9 \alpha_i + \beta_{10} \lambda_t + \varepsilon_{it} \quad (6)$$

4.2 Endogeneity

This is regarded as an endogeneity issue when the independent variable is correlated with the error term. Adams and Ferreira (2009) raise a concern of endogeneity in the reverse causality relationship between board gender diversity and firm value, since firm value may impact both the incentive for women to join boards and the motivation of boards to recruit female directors. Unobserved heterogeneity could be possible to occur, then we adopt instrument variable estimation approach in 2SLS.



Chapter 5

RESULT

5.1 Baseline model

In Table 1, we describe the list of all variables and the data sources in the empirical study. Table 2 shows descriptive statistics for TOBINS'Q, FEMALE, BIND, BSIZE, Meeting, CEOD, FSIZE, LEV, CPI, and female labor force participation rate after dropping unobserved board variables observation in Eikon Refinitiv database. The sample firms located in the countries consist of Cambodia, China, Hong Kong, Indonesia, Japan, Macao, Malaysia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Thailand, and Vietnam. The number of observations is 6,853. The mean value of TOBINS'Q (0.445) indicates that the firm's stock is undervalued. Female directors on boards and independent directors account for roughly an average of 9% and 38.7% of all board directors, respectively. The sample firms have an average of 11 board members and 9 board meetings per year. The average firm size is 481,780,898 thousand in total assets. The LEV mean value of 23.49 indicates that the samples have more debt than assets on average. The average CPI value is 41.3, indicating the sample firms are in corrupted countries. The sample countries' average female labor force participation rate (50 percent) implies that females are half as active in the labor market as males.

Table 2: Descriptive statistics

	N	Mean	Min	Max	SD	p25	p50	p75
TOBIN'SQ	6853	.445	0.000	17.73	.765	.123	.268	.481
FEMALE	6853	9.004	0.000	62.5	9.603	0	8.33	14.29
BIND	6853	38.669	0.000	93.75	17.761	27.27	37.5	50
BSIZE	6853	2.372	0.693	3.401	.314	2.197	2.398	2.565
Meeting	6853	2.214	0.000	4.605	.524	1.792	2.303	2.639
CEOD	6853	.29	0.000	1	.454	0	0	1
FSIZE	6853	19.993	12.337	28.039	2.434	18.487	19.971	21.454
LEV	6853	23.492	0.000	383.43	17.827	9.51	21.29	34.68
CPI	6853	41.344	8.000	79	18.214	25	38	62
FLPR	6853	50.085	18.600	76.12	11.964	49.13	51.74	55.05

This table presents the descriptive statistics of the variables used in the regressions of this study.

To check for multicollinearity, Table 3 reports the Pearson correlation matrix among variables used in this study. The correlation of 0.413 between FSIZE and the meeting is the highest. Additionally, we verified the variance inflation factor values in table A1 to rule out any major multicollinearity issues. Hence, there is no multicollinearity concern since the VIF is less than 10.

Table 3: Correlation matrix

Variables	TOBIN'S Q	FEMALE	BIND	BFSIZE	Meeting	CEOD	FSIZE	LEV	CPI	FLPR
TOBIN'S Q	1.000									
FEMALE	-0.101***	1.000								
BIND	0.037***	0.262***	1.000							
BFSIZE	-0.032***	0.003	-0.254***	1.000						
Meeting	-0.110***	-0.121***	-0.303***	0.090***	1.000					
CEOD	0.075***	-0.109***	-0.040***	-0.007	0.016	1.000				
FSIZE	-0.088***	-0.185***	-0.157***	0.128***	0.413***	0.059***	1.000			
LEV	0.140***	-0.003	-0.010	0.070***	-0.025**	0.013	0.028**	1.000		
CPI	0.126***	0.115***	0.231***	-0.046***	-0.181***	-0.032***	0.039***	0.100***	1.000	
FLPR	-0.102***	-0.061***	-0.103***	-0.019	0.060***	-0.064***	-0.121***	-0.004	-0.262***	1.000

The table reports Pearson correlations coefficients of the variables used in the regressions of this study which are computed as two tail p values. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively.

To check for heteroskedasticity, this study conducts the Modified Wald statistic for groupwise heteroskedasticity in the fixed effect model. Thus, this study finds that there is heteroskedasticity concern as we reject null hypothesis of homoskedasticity. Then, we conduct Huber-White's Robust Standard Errors approach in our models to construct another standard error that is a consistent estimator of standard deviation of $\hat{\beta}$. After that we conduct time-fixed effects test, which is used to assess if time-fixed effects are necessary. We reject the null hypothesis that all time dummy variable coefficients are equal to 0. As a result, the model must include time-fixed effects.

We merely anticipate endogeneity since an endogeneity problem cannot be detected. To further verify endogeneity, we investigate the effect of instrument variables by comparing regression coefficients between the fixed effects model in table 4 and the 2SLS model with fixed effect base line in table 5. If the coefficients between the two models do not match, we shall continue to use the 2SLS model. If the coefficients of the two models are identical, the result will be reported using the fixed effect model. Comparing the coefficient results between fixed effect and 2SLS reveals that our models have endogeneity. The results of this study will be reported using 2SLS as the main model.

5.2 The impact of Female directors, Independent director on Firm value

Table 4 reports the result of fixed effect regression when we control for time invariance to reduce the omitted variable bias in firm characteristics, such as corporate culture. We use pool OLS regression with firm and year dummy fixed effects as controls for the specific characteristics to test our hypothesis on the relationships between the proportion of female directors on board and firm value

(Tobin's Q) in column (1); the proportion of independence directors and firm value in column (2); the interaction effect of female directors and independence directors on firm value in column (3); and the relationship between the interaction effect of female directors and independence directors on firm value in column (4).

Table 4's column 1 is for testing hypothesis 1. The results show that the coefficient of FEMALE is negative and significant at 1% level impact with firm value (Tobin's Q). The results indicated that having a female director on a board doesn't have a positive influence on firm value. Increasing 1% of female directors results in a -0.00861 increase in Tobin's Q. The higher the proportion of female directors, the lower the performance on firm value. These findings are in line with previous studies (Smith, Smith et al. 2006). Female directors may lack competence and experience to carry out their responsibilities. Thus, the results do not support hypothesis 1.

We test the relationship between the percentage of independent director and Tobin's Q in column 2. The results show that the coefficient of BIND is positive but statistically insignificant and economically unimportant. The results indicate that independent directors may not influence firm value. Thus, the results are inconclusive for hypothesis 2.

Next, we test hypothesis 3 by examining the interaction of the percentage of female directors and of independent directors (FEMALE*BIND). The results from column 3 show that the presence of a female director has a negative and statistically significant effect on firm value when the board has an independent director. The results indicate that the negative relationship between gender diversity and firm value is stronger when the board includes independent directors. The presence of

independent directors decreases firm value when there is an increase in gender diversity. Our findings reveal that hypothesis 3 is not supported.

Finally, we test hypothesis 4 by examining the interaction effect of gender diversity and the corruption perception index (FEMALE*CPI). The results show that the coefficient of the interaction variable FEMALE*CPI is negative and significant. The results indicate that as gender diversity increases, the negative effect on firm value and an even more negative effect when firms are in high-corruption countries. These results support hypothesis 4.

However, the fixed effect is only the method to deal with omitted variables. The results below are biased and inconsistent because of endogeneity in reverse causality.

Table 4: Tobin's Q and gender diversity with time varying fixed effect (dependent variable Tobin's Q)

VARIABLES	(1) Fixed Effects	(2) Fixed Effects	(3) Fixed Effects	(4) Fixed Effects
FEMALE	-0.00861*** (0.00304)		0.00728 (0.00593)	0.0141** (0.00573)
FEMALE*BIND			-0.000347*** (0.000115)	
BIND		0.00207 (0.00146)	0.00476*** (0.00169)	0.00159 (0.00150)
BFSIZE	-0.120* (0.0696)	-0.131* (0.0693)	-0.117* (0.0693)	-0.126* (0.0695)
Meeting	-0.0658	-0.0678	-0.0558	-0.0614

	(0.0459)	(0.0455)	(0.0452)	(0.0450)
CEOD	-0.115***	-0.117***	-0.109**	-0.111***
	(0.0437)	(0.0443)	(0.0434)	(0.0430)
FSIZE	-0.269***	-0.250**	-0.251**	-0.239**
	(0.0979)	(0.0997)	(0.0995)	(0.0982)
LEV	0.00629**	0.00586**	0.00629**	0.00643**
	(0.00283)	(0.00284)	(0.00283)	(0.00282)
CPI	0.0331***	0.0335***	0.0323***	0.0336***
	(0.00636)	(0.00638)	(0.00625)	(0.00647)
FEMALE*CPI				-0.000514***
				(0.000155)
Constant	5.567***	5.103**	5.025**	4.896**
	(1.941)	(1.992)	(1.992)	(1.966)
Observations	6,853	6,863	6,853	6,853
Adjusted R-squared	0.326	0.324	0.329	0.331
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	31.72	31.63	29.89	28.36

*The table reports coefficient between female directorship on board and Tobin's Q and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'S Q is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. BSIZE is the natural logarithm of total director on board. Meeting is the natural logarithm of number of board meeting in one year. CEOD is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

5.3 Instrument variable

The coefficients between table 4 and table 5 are not consistent. This demonstrates that the FEMALE variable is endogenously due to reverse causality

related to firm value. The addressing of the endogeneity problem of gender diversity suggests the preferences approach of 2SLS rather than OLS with firm and year-fixed effect specification, which requires the strong assumption of exogenous variables. As a result, we use the IV technique to re-estimate the above models by using 2SLS. However, Adams and Ferreira (2019) are concerned about the difficulty of coming up with valid instruments because the factors that are highly correlated with endogenous variables are board-related characteristic variables, which are included in the regression model. Therefore, we use an instrument that does not use board-related variables. This study argues that FLPR (female labor force participation rate) is a valid instrument and free from overidentifying restrictions because FLPR is correlated with the percent of female directors but not with firm value error. Firms with a more female labor market are more likely to have female directors on their boards. first stage of regression, FEMALE is instrumented by FLPR. Then we obtain the second-stage regression. To address the endogeneity problem, Table 5 reports the regression analysis in the second stage of the 2SLS of board gender diversity and independent directors to firm value while controlling with fixed effects and standard errors that are correct from heteroskedasticity.

Table 5: Tobin's Q and gender diversity-2SLS with fixed effect (dependent variable Tobin's Q)

VARIABLES	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
FEMALE	0.137** (0.0570)		0.148*** (0.0479)	0.0913*** (0.0289)
FEMALE*BIND			-0.00283*** (0.000836)	
BIND		0.0278*** (0.00771)	0.0209*** (0.00542)	-0.00108 (0.00168)
BFSIZE	-0.275** (0.107)	-0.101** (0.0510)	-0.154** (0.0601)	-0.167*** (0.0516)
Meeting	-0.122* (0.0597)	-0.0426 (0.0381)	-0.0126 (0.0437)	-0.0611* (0.0361)
CEOD	-0.162*** (0.0473)	-0.100*** (0.0302)	-0.0882*** (0.0330)	-0.110*** (0.0286)
FSIZE	-0.0783 (0.0952)	-0.148** (0.0607)	-0.150** (0.0637)	-0.162*** (0.0587)
LEV	-0.000884 (0.00346)	0.00552*** (0.00191)	0.00503** (0.00205)	0.00625*** (0.00188)
CPI	0.0444*** (0.00796)	0.0294*** (0.00448)	0.0319*** (0.00464)	0.0373*** (0.00490)
FEMALE*CPI				-0.00198*** (0.000543)

Observations	6,770	6,780	6,770	6,770
Adjusted R-squared	-0.904	0.137	0.009	0.165
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	41.78	77.38	67.06	72.41

*The table reports coefficients in second-stage regression in 2sls and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'SQ is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. BSIZE is the natural logarithm of total director on board. Meeting is the natural logarithm of number of board meeting in one year. CEO is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

In column 1, the coefficient on the percentage of female directors is positive and is statistically significant at 5%. According to the findings, the more female directors on a board, the higher the firm's value (Tobin's Q). Our results support hypothesis 1. This finding is consistent with previous literature (Kiel and Nicholson 2003).

In column 2, we test two hypotheses. The coefficient of the percentage of independent directors is positive and is statistically significant at 1% level. These results indicate that the greater the percentage of independent directors, the more influential firm value, which supports hypothesis 2. This finding is consistent with Sánchez-Marín, Baixauli et al. (2010).

The result in table 5 column 3 shows the coefficient of the interaction between the percentage of female directors and the percentage of independent directors. The interaction coefficient is negative and is statistically significant at 1% level, which suggests that female directors decrease firm value when the board has more

independent directors. The results suggest that independent directors change the relationship between female directors and firm value by reducing the positive impact of female directors on firm value. These results do not support hypothesis 3. Over monitoring in those firms, according to Agency theory, boards that consist of both female directors and independent directors reduce firm value. We argue that the risk culture of the board is risk averse, so the board lacks innovative decision making in strategy setting.

The effect of the gender diversity and corruption perception index on firm value in column 4 is the same as in table 4. The coefficient of the interaction term (FEMALE*CPI) is negative and statistically significant at 1% level. This reveals that a 1% increase in the proportion of female directors or gender diversity decreases firm value by 0.00198 when sample firms are in highly corrupt countries. These results support hypothesis 4. We expect the impact of greater board gender diversity to be weaker in the corrupted countries where female directors can be able to monitor, participate, and increase board effectiveness to reduce the positive effect on firm value in the Asia-Pacific region that is enhanced by corruption action. Female directors are against corruption behavior in the company and drive the company to conform to the anti-corruption policy. We conclude that female directors in high-corruption countries will change the positive effect of corruption on firm value in companies in the Asia-Pacific region to have a negative effect on firm value.

For control variables, board size is negatively associated with firm value. Generally, board size and firm value have a positive correlation based on agency theory. The larger board improves firm value because of the more directors monitoring and supervising the firm's strategy and operations. Interestingly, the board

meeting has been associated with negative firm value due to abnormal board activity (Vafeas 1999). CEO duality and total assets are significantly inversely related to firm value, suggesting more CEOs who have a dual role with the chair board have lower firm value and total assets are the denominator of TOBINS'Q. Total debt to total assets is positive, indicating that as the company borrows more money, the debt ratio will decrease. In this case, the corruption perception index has a significant relationship with firm value. More precisely, the results on control variables are similar to previous literature.

We speculate that board size has a negative and significant association with firm value after addressing the endogeneity of gender diversity as shown in table 5. Then we include 2 dummy variables on the number of total directors into MEDIUMBOARD and LARGEBOARD as an additional explanatory variable in the model, as shown in equation 7, to further identify the validity of our study.

$$\begin{aligned}
 \text{TOBIN'S } Q_{it} = & \beta_0 + \beta_1 \text{FEMALE}_{it} + \beta_2 \text{BIND}_{it} + \beta_3 \text{MEDIUMBOARD}_{it} \\
 & + \beta_4 \text{LARGEBOARD}_{it} + \sum_{k=5}^9 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}
 \end{aligned} \tag{7}$$

5.4 Robustness check

The purpose of this section is to check whether our main results are held. This study re-estimates the regression model in equation 7 with fixed effect regression in table 6 and 2SLS with fixed effect baseline in table 7. For robustness testing of our results, we take exponential on BSIZE and classify them into small, medium, and large board sizes. With the dummy variable trap, we create two dummy variables of board size, including (1) MEDIUM BOARD, whose total number of directors is more

than or equal to 9 but less than 14, and (2) LARGE BOARD, whose total number of directors is more than or equal to 14 people.

Table 6 reports the negative and insignificant portions of the medium and large boards to firm value. We regress to another outcome with 2SLS. The result of the robustness test in table 7 is consistent with the previous result in table 4. The large board size is negative and 5% significant with firm value, while the medium board provides a negative and insignificant result.

Table 6: Robust check on various level of board size with fixed effect regression of the relationship between gender diversity and firm value

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \beta_3 MEDIUMBOARD_{it} + \beta_4 LARGEBOARD_{it} + \sum_{k=5}^9 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}$$

VARIABLES	(1) Fixed Effects	(2) Fixed Effects	(3) Fixed Effects	(4) Fixed Effects
FEMALE	-0.00844*** (0.00305)		0.00725 (0.00592)	0.0139** (0.00570)
FEMALE*BIND			-0.000347*** (0.000115)	
BIND		0.00211 (0.00146)	0.00481*** (0.00170)	0.00165 (0.00150)
MEDIUM BOARD	-0.0116 (0.0429)	-0.0158 (0.0425)	-0.00948 (0.0428)	-0.0119 (0.0425)
LARGE BOARD	-0.0640 (0.0558)	-0.0722 (0.0554)	-0.0625 (0.0555)	-0.0661 (0.0551)

Meeting	-0.0653 (0.0457)	-0.0674 (0.0453)	-0.0552 (0.0450)	-0.0608 (0.0448)
CEOD	-0.114*** (0.0438)	-0.116*** (0.0444)	-0.108** (0.0435)	-0.110** (0.0431)
FSIZE	-0.271*** (0.0979)	-0.252** (0.0997)	-0.252** (0.0995)	-0.240** (0.0982)
LEV	0.00629** (0.00284)	0.00585** (0.00285)	0.00629** (0.00283)	0.00643** (0.00283)
CPI	0.0329*** (0.00634)	0.0333*** (0.00635)	0.0322*** (0.00622)	0.0334*** (0.00644)
FEMALE*CPI				-0.000510*** (0.000154)
Constant	5.336*** (1.942)	4.846** (1.996)	4.793** (1.993)	4.650** (1.970)
Observations	6,853	6,863	6,853	6,853
Adjusted R-squared	0.326	0.323	0.329	0.330
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	30.75	30.84	29.25	27.78

*The table reports coefficient between female directorship on board and Tobin's Q and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'SQ is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. Medium board is dummy variable which is equal to 1 if number of directors on board is more than or equal 9 but less than 14, 0 otherwise. Large board is dummy variable which is equal to 1 if number of directors on board is more than 14, 0 otherwise. Meeting is the natural logarithm of number of board meeting in one year. CEOD is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

Table 7: Robust check on various level of board size with 2sls regression of the relationship between gender diversity and firm value

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \beta_3 MEDIUMBOARD_{it} + \beta_4 LARGEBOARD_{it} + \sum_{k=5}^9 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}$$

VARIABLES	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
FEMALE	0.136** (0.0571)		0.147*** (0.0479)	0.0902*** (0.0289)
FEMALE*BIND			-0.00281*** (0.000836)	
BIND		0.0276*** (0.00771)	0.0208*** (0.00542)	-0.000985 (0.00168)
Medium board	-0.0764 (0.0606)	0.00240 (0.0369)	-0.0203 (0.0405)	-0.0239 (0.0373)
Large board	-0.189** (0.0824)	-0.0539 (0.0449)	-0.0894* (0.0494)	-0.0885** (0.0442)
Meeting	-0.121** (0.0595)	-0.0428 (0.0380)	-0.0123 (0.0436)	-0.0601* (0.0360)
CEOD	-0.160*** (0.0472)	-0.0995*** (0.0302)	-0.0873*** (0.0330)	-0.109*** (0.0286)
FSIZE	-0.0810 (0.0947)	-0.151** (0.0605)	-0.152** (0.0634)	-0.165*** (0.0585)
LEV	-0.000863 (0.00346)	0.00552*** (0.00191)	0.00504** (0.00205)	0.00625*** (0.00189)
CPI	0.0441***	0.0293***	0.0317***	0.0370***

	(0.00792)	(0.00447)	(0.00463)	(0.00488)
FEMALE*CPI				-0.00196*** (0.000543)
Observations	6,770	6,780	6,770	6,770
Adjusted R-squared	-0.896	0.138	0.013	0.166
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	39.57	74.76	64.90	70.31

*The table reports coefficients in second-stage regression in 2sls and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'SQ is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. Medium board is dummy variable which is equal to 1 if number of directors on board is more than or equal 9 but less than 14, 0 otherwise. Large board is dummy variable which is equal to 1 if number of directors on board is more than 14, 0 otherwise. Meeting is the natural logarithm of number of board meeting in one year. CEOD is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

We also replace TOBIN'S Q_{it} with TOBIN'S Q_{it+1} to measure next consecutive year of firm value. We suspect that gender diversity in this year may affect firm value in next year. On our models, we reran fixed effect regression in Table 8, Table 10, and 2sls in Table 9, Table 11. The results in Table 9 support our main result where FEMALE is positive and significantly related to TOBIN'S Q_{it+1} . This is the empirical evidence on the gender diversity impact throughout the same period.

Table 8: Robust check of the relationship between gender diversity and firm value in $T+1$ with fixed effect regression

$$TOBIN'S Q_{it+1} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \sum_{k=4}^8 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}$$

VARIABLES	(1) Fixed Effects	(2) Fixed Effects	(3) Fixed Effects	(4) Fixed Effects
FEMALE	-0.00614** (0.00288)		0.00320 (0.00455)	0.0105** (0.00455)
FEMALEBIND			-0.000208*** (7.82e-05)	
BIND		0.000576 (0.00129)	0.00214 (0.00149)	0.000341 (0.00134)
BFSIZE	-0.115* (0.0594)	-0.124** (0.0597)	-0.118** (0.0592)	-0.121** (0.0596)
Meeting	-0.0149 (0.0384)	-0.0194 (0.0379)	-0.0105 (0.0383)	-0.0125 (0.0380)
CEOD	-0.0647** (0.0304)	-0.0672** (0.0308)	-0.0620** (0.0304)	-0.0629** (0.0301)
FSIZE	-0.176** (0.0727)	-0.166** (0.0736)	-0.167** (0.0729)	-0.163** (0.0726)
LEV	0.00715*** (0.00261)	0.00685*** (0.00262)	0.00714*** (0.00261)	0.00731*** (0.00259)
CPI	0.0300*** (0.00602)	0.0304*** (0.00603)	0.0297*** (0.00598)	0.0306*** (0.00612)
FEMALECPI				-0.000375***

				(0.000128)
Constant	3.623** (1.432)	3.400** (1.459)	3.372** (1.446)	3.337** (1.440)
Observations	5,882	5,893	5,882	5,882
Adjusted R-squared	0.298	0.298	0.299	0.301
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	28.43	27.95	25.64	25.04

*This table reports the impact of gender diversity (FEMALE) on next year firm value (TOBIN'S Q_{it+1}), reports coefficients in fixed effect regression and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'S Q is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. BSIZE is the natural logarithm of total director on board. Meeting is the natural logarithm of number of board meeting in one year. CEO is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

Table 9: Robust check of the relationship between gender diversity and firm value in $T+1$ with 2sls regression

$$TOBIN'S Q_{it+1} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \sum_{k=4}^8 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}$$

	(1)	(2)	(3)	(4)
VARIABLES	2SLS	2SLS	2SLS	2SLS
FEMALE	0.103* (0.0578)		0.166** (0.0786)	0.0911** (0.0413)

FEMALEBIND			-0.00311**	
			(0.00138)	
BIND		0.0304**	0.0209**	-0.00161
		(0.0137)	(0.00907)	(0.00154)
BSIZE	-0.243**	-0.108**	-0.203***	-0.163***
	(0.0981)	(0.0545)	(0.0741)	(0.0535)
Meeting	-0.0754	-0.00544	0.0282	-0.0112
	(0.0587)	(0.0360)	(0.0455)	(0.0342)
CEOD	-0.125***	-0.0548*	-0.0472	-0.0645**
	(0.0460)	(0.0289)	(0.0327)	(0.0267)
FSIZE	-0.0340	-0.0696	-0.0337	-0.103*
	(0.0822)	(0.0610)	(0.0716)	(0.0548)
LEV	0.00174	0.00700***	0.00542**	0.00728***
	(0.00342)	(0.00226)	(0.00241)	(0.00219)
CPI	0.0359***	0.0248***	0.0289***	0.0340***
	(0.00682)	(0.00562)	(0.00539)	(0.00548)
FEMALECPI				-0.00190**
				(0.000762)
Observations	5,730	5,742	5,730	5,730
Adjusted R-squared	-0.573	0.060	-0.145	0.114
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	30.23	42.57	36.50	40.58

This table reports the impact of gender diversity (*FEMALE*) on next year firm value (*TOBIN'S Q_{it+1}*), reports coefficients in second-stage regression in 2sls and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. *TOBIN'S Q* is market value less total debt divided by total asset. *FEMALE* is the percent of female director on board. *BIND* is the percent of independent director on board. *BFSIZE* is the natural logarithm of total director on board. *Meeting* is the natural logarithm of number of board meeting in one year. *CEOD* is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. *FSIZE* is the natural logarithm of total asset. *LEV* is debt to total asset. *CPI* is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).

We then observe board size with the same method in Table 6 and Table 7.

Similarly, the results in Table 11 still support our main conclusion. *LARGE BOARD* produces significant negative relationship with firm value in next year.

Table 10: Robust check on various level of board size with fixed effect regression on the relationship between gender diversity and firm value in *T+1*

$$TOBIN'S Q_{it+1} = \beta_0 + \beta_1 FEMALE_{it+1} + \beta_2 BIND_{it} + \beta_3 MEDIUMBOARD_{it} + \beta_4 LARGEBOARD_{it} + \sum_{k=5}^9 \beta_k X_{kit} + \beta_{10} \alpha_t + \beta_{11} \lambda_t + \varepsilon_{it}$$

	(1)	(2)	(3)	(4)
VARIABLES	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
FEMALE	-0.00623** (0.00289)		0.00299 (0.00456)	0.0102** (0.00453)
FEMALEBIND			-0.000205*** (7.82e-05)	
BIND		0.000605 (0.00129)	0.00215 (0.00150)	0.000377 (0.00134)
MEDIUMBOARD	-0.00648 (0.0411)	-0.0106 (0.0411)	-0.00576 (0.0411)	-0.00600 (0.0409)
LARGEBOARD	-0.0261	-0.0333	-0.0268	-0.0286

	(0.0483)	(0.0483)	(0.0481)	(0.0480)
Meeting	-0.0139	-0.0187	-0.00954	-0.0115
	(0.0382)	(0.0377)	(0.0382)	(0.0378)
CEOD	-0.0640**	-0.0666**	-0.0613**	-0.0622**
	(0.0306)	(0.0309)	(0.0306)	(0.0302)
FSIZE	-0.177**	-0.167**	-0.168**	-0.164**
	(0.0728)	(0.0738)	(0.0730)	(0.0727)
LEV	0.00716***	0.00685***	0.00715***	0.00731***
	(0.00262)	(0.00263)	(0.00262)	(0.00260)
CPI	0.0298***	0.0301***	0.0295***	0.0303***
	(0.00600)	(0.00601)	(0.00596)	(0.00610)
FEMALECPI				-0.000371***
				(0.000128)
Constant	3.376**	3.132**	3.118**	3.075**
	(1.441)	(1.472)	(1.455)	(1.451)
Observations	5,882	5,893	5,882	5,882
Adjusted R-squared	0.298	0.297	0.299	0.300
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	27.79	27.17	25.20	24.68

*This table reports the impact of gender diversity (FEMALE) on next year firm value (TOBIN'S Q_{it+1}), reports coefficients in fixed effect regression and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'S Q is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. Medium board is dummy variable which is equal to 1 if number of directors on board is more than or equal 9 but less than 14, 0 otherwise. Large board is dummy variable which is equal to 1 if number of directors on board is more than 14, 0 otherwise. Meeting is the natural logarithm of number of board meeting in one year. CEOD is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).]*

Table 11: Robust check on various level of board size with 2sls regression on the relationship between gender diversity and firm value in T+1

$$TOBIN'S Q_{it+1} = \beta_0 + \beta_1 FEMALE_{it} + \beta_2 BIND_{it} + \beta_3 MEDIUMBOARD_{it} + \beta_4$$

$$LARGEBOARD_{it} + \sum_{k=5}^9 \beta_k X_{kit} + \beta_{10} \alpha_i + \beta_{11} \lambda_t + \varepsilon_{it}$$

VARIABLES	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
FEMALE	0.101* (0.0570)		0.160** (0.0772)	0.0884** (0.0409)
FEMALEBIND			-0.00301** (0.00136)	
BIND		0.0297** (0.0136)	0.0203** (0.00892)	-0.00151 (0.00153)
MEDIUMBOARD	-0.0532 (0.0508)	0.00585 (0.0385)	-0.0159 (0.0395)	-0.0115 (0.0352)
LARGEBOARD	-0.116* (0.0700)	-0.0243 (0.0453)	-0.0668 (0.0508)	-0.0502 (0.0416)
Meeting	-0.0717 (0.0576)	-0.00558 (0.0357)	0.0283 (0.0448)	-0.0100 (0.0340)
CEOD	-0.123*** (0.0455)	-0.0543* (0.0289)	-0.0466 (0.0325)	-0.0635** (0.0267)
FSIZE	-0.0379 (0.0811)	-0.0722 (0.0607)	-0.0388 (0.0705)	-0.106* (0.0547)
LEV	0.00188 (0.00338)	0.00700*** (0.00226)	0.00549** (0.00240)	0.00730*** (0.00219)
CPI	0.0354***	0.0247***	0.0286***	0.0336***

	(0.00672)	(0.00560)	(0.00536)	(0.00544)
FEMALECPI				-0.00185** (0.000755)
Observations	5,730	5,742	5,730	5,730
Adjusted R-squared	-0.539	0.065	-0.125	0.117
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-stat	28.72	40.21	34.88	38.56

*This table reports the impact of gender diversity (FEMALE) on next year firm value (TOBIN'S Q_{it+1}), reports coefficients in second-stage regression in 2sls and presents Robust standard errors in parentheses. The sample consists of firms' observations in Asia Pacific from 2011 to 2020. All variables are defined in Table 1. TOBIN'S Q is market value less total debt divided by total asset. FEMALE is the percent of female director on board. BIND is the percent of independent director on board. Medium board is dummy variable which is equal to 1 if number of directors on board is more than or equal 9 but less than 14, 0 otherwise. Large board is dummy variable which is equal to 1 if number of directors on board is more than 14, 0 otherwise. Meeting is the natural logarithm of number of board meeting in one year. CEOD is dummy variable which is equal to 1 if CEO is chair of the board, 0 otherwise. FSIZE is the natural logarithm of total asset. LEV is debt to total asset. CPI is corruption perception index. Firm fixed effects and year fixed effects are included to control for different levels of unobserved heterogeneity. The *, **, and *** marks denote the statistical significance at the 10%, 5%, and 1% level, respectively (two tail).*

5.5 Discussion

Are female directors different from their male counterparts? The answer is yes in terms of the social group prejudice toward males, and most corporations are male dominated. Women seem to be excluded from the old boys' club when men are in the majority. This study doesn't claim that women are generally risk-averse or have more consistent performance outcomes. Instead, we investigate not only whether board gender diversity affects firm value, but also whether independent director and corruption factors influence this relationship. Even though some governments in many countries have recognized the necessity of gender balanced boards of directors in the context of independence frameworks of boards. Corporate governance codes of

conduct address the obligation to have independent directors on board, while just a few codes address gender composition of boards.

The findings of our research indicate a more gender diverse board is more likely to increase board independence, effectiveness, and firm value (Carpenter, Geletkanycz et al. 2004). We expect that the role of female directors in corporate governance has increased the effectiveness of independent directors, as having a gender diverse board could bring a difference in innovation, perspective, and insight and even improvement in employee morale. However, empirical evidence suggests that female directors and independent directors jointly lower firm value. The reason is over-monitoring by top management. Along with a drop in employee engagement and satisfaction, the rate of employee turnover may also go up.

Our empirical result provides insight into corporate corruption in developing countries, taking into account the impact of gender diversification on firm value. We claim that the presence of female directors on boards of directors reduces capital and investment misallocation, board-level corruption, and dishonest and unethical corruption. The presence of a woman has become a symbol of increased transparency, efficiency, and control over corporate performance. Theoretically, corruption increases company performance in developing countries because of the entrenchment of excessive government interference that necessitates firms to bribe in order to compete in the market. When a board of directors has numerous female members, who seem to be tough and ethical, it will compel the board to limit self-opportunistic behavior. If a corporation has female board members in a country with a high level of corruption, its value drops.

5.5.1 Practical implication

The findings of this study suggest that gender diversity in top management positions may help to increase firm value and encourage women to pursue top management positions. If corporations want to convey the proper signals regarding board effectiveness and anti-corruption board level, they should consider gender diversity. However, it will take time for corporations in the Asia-Pacific area to allow more women to hold executive or leadership positions.

After resolving endogeneity concerns in a theoretical viewpoint, this study supports agency theory, resource dependence theory, and upper echelons.

5.5.2 Limitations and future research

Our study has various limitations that should be considered in future gender diversity research. First, board data, such as the number of female directors in most Asian Pacific companies, is scarce. The findings may not be relevant to the global context since the sample is limited to a single region. Because data availability on the Eikon database is restricted in a number of corporations in each country, future research should investigate utilizing another database, equipping an alternate approach to gather board data, and extending the panel study's reach over a longer time.

In addition, future study might look at the actual number of female independent directors, as well as female directors who are not independent, and concentrate on a different statistical method to get a more accurate answer. The fit model used to reduce the endogeneity bias is GMM (Generalized Method of Moments) is considered to be superior to 2sls to cope with endogeneity.

Chapter 6

Conclusion

This study examines the relationship between board gender diversity and firm value of companies in Asia-Pacific countries from 2011 to 2020 on a yearly basis. Our findings demonstrate that the percent of female directors and the percent of independent directors have a significant and positive impact on firm value (Tobin's Q). Female directors can enhance the board effectiveness, use expertise knowledge to maximize shareholder's wealth and give good signal to the public about the company's ethical conduct. Independent directors reduce the act of management entrenchment, increase the knowledge from outside about the corporation as well as enhance corporate governance. Our finding supports the existence of significant negative relation between the interaction between board gender diversity and independent directors with firm value. Our findings suggest that increasing board gender diversity in a board if that board consists of independent directors reduces firm value owing to over monitoring which will lead to high management turnover. Finally, we try to investigate whether the corruption in each country undermines the positive effect between board gender diversity and firm value. Our findings support the fact that an increase of female directors will reduce board-level corruption behavior. Having a large number of female directors in high corruption country reduce the positive effect of corruption on firm value. Other control variables are consistent with prior literatures. This evidence persuades Asian Pacific companies to expand the number of women in top management positions for the benefit of the organization as a whole.



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