BOARD GENDER DIVERSITY AND CORPORATE RISK TAKING

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ABSTRACT

This study examines the relationship between board gender diversity and corporate risk taking among Malaysian companies. Pooled Ordinary Least Square (OLS) regression and Panel Data regression are used in this study to examine the relationship between these variables. The selected samples include of Malaysian listed companies in the main board Bursa Malaysia. Final sample consists of 634 non-financial companies with 6,816 firm-year observations for a sample period of 15 years that is from the year 2000 until 2014. Results indicate that the presence of women directors can mitigate corporate risk taking while; male-only board leads to higher level of firm risk taking. These results are consistently significant when different measures are used to proxy for risk taking. Consistently, both pooled OLS and panel data regressions confirm the findings. In addition, fixed effects panel data regression is found to better explained the hypothesised relationship than random effects. This study concludes that board gender diversity can be used as a monitoring agent to mitigate corporate risk taking, supporting the regulator's initiative to promote gender diversity in the corporate boardrooms.

Keywords: Board gender diversity, Corporate risk taking

ABSTRAK

Kajian ini mengkaji hubungan diantara kepelbagaian gender lembaga pengarah dan pengambilan risiko korporat dikalangan syarikat-syarikat di Malaysia. *Pooled Ordinary Least Square (OLS)* regresi dan Data Panel regresi digunakan di dalam kajian ini untuk mengkaji hubungan antara pembolehubah. Sampel dipilih termasuk syarikat-syarikat di Malaysia yang tersenarai di papan utama Bursa Malaysia. Sampel terakhir terdiri daripada 634 syarikat bukan kewangan dengan 6816 pemerhatian firma-tahunan untuk sampel masa 15 tahun yang bermula tahun 2000 hingga 2014. Keputusan menunjukkan bahawa kehadiran pengarah wanita boleh mengurangkan pengambilan risiko korporat sementara, lembaga pengarah lelaki sahaja menyumbang kepada pengambilan risiko tahap tinggi syarikat. Keputusan ini signifikan secara konsisten apabila perbezaan ukuran yang digunakan sebagai proksi kepada pengambilan risiko. Secara konsisten, kedua-dua *pooled OLS* dan data panel regrasi mengesahkan dapatan kajian. Tambahan pula, data panel kesan tetap regrasi ditemui lebih baik dalam menjelaskan hubungan hipotesis daripada kesan rawak. Kajian ini menyimpulkan bahawa kepelbagaian gender lembaga pengarah digunakan sebagai ajen pemantauan untuk mengurangkan pengambilan risiko korporat dan menyokong inisiatif pengatur untuk menggalakkan kepelbagaian gender dalam bilik lembaga pengarah.

Kata kunci: Kepelbagaian gender lembaga pengarah, Pengambilan risiko korporat

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LIST OF ABBREVIATIONS

CEO	: Chief Executive Officer
CFO	: Chief Finance Officer
EBIT	: Earnings before Interest and Tax
MCCG	: Malaysian Code on Corporate Governance
OLS	: Ordinary Least Square
R&D	: Research and Development
RISK1	: Volatility of firm's ROA over three years overlapping period
RISK2	: Difference between maximum and minimum ROA in three years interval
ROA	: Return on Asset
VIF	: Variance Inflation Factor

CHAPTER 1

INTRODUCTION

This chapter is divided into several sections which are:

1.1 Background of the study

1.2 Problem statement

1.3 Research question

1.4 Research objective

1.5 Scope of study

1.6 Significant of study

1.7 Organization of study

1.1 Background of the Study

Corporate risk taking is important and have great influence on firms performance (John, Litov, and Yeung, 2008). The firms' performance can significantly be affected by the firms risk taking behaviours. Growth-oriented corporate risk taking could contribute to the growth of firms and shareholders' value. In fact, firms need to take certain level of risk to create economic value, but excessive risk taking can cause adverse effect. Excessive in risk taking and mismanagement of risk exposures are the reasons that lead to the collapse of Lehman Brothers and the financial crisis in 2008 (Waring, 2013).

Corporate risk taking is dealing with uncertainty as a part of business development. The effectiveness of corporate risk taking is the key responsibility of the board. The board evaluates the risk, where the board is assumed to recognize the possible outcomes and make decision on risk taking because excessive risk taking could lead to adverse results that could have negative impact on firm performance. Hence, corporate risk taking is crucial for firms' sustainability.

Board of director is part of governance structure of a firm (Fama and Jensen, 1983) that is important in decision making process. Decision making consists of decisions about the firm's investment choices. The investment decision is crucial for the firm in order to gain profit from the choices. Furthermore, board of directors is responsible to lead the companies in achieving the firms' objectives and to protect the shareholders wealth. In other words, board becomes a key mechanism that monitor the management, protect the shareholders interest and also advise the management on the strategy identification and implementation (Xie, Davidson, and DaDalt, 2003; De Andres and Vallelado, 2008). As the firm's front liners, board has to ensure that the firm conducts in compliance with the laws and ethical values. Board must also maintain the effectiveness of the governance structure in order to ensure the right management of risk and level of internal control (MCCG, 2012).

In recent years board gender diversity has become an issue receiving considerable attention within the issues of corporate governance. Female representative in corporate decision making becomes a significant consideration for policymakers. For examples, all

public firms in Norway are mandated to fulfill the 40% gender quota for female directors and in 2008 the government announced that it had achieved full compliance. It is then followed by Spain that introduced a law requiring the firms to increase the share of female directors to 40% by 2015 (Adams and Ferreira, 2009). In Sweden the companies are required to voluntarily reserve a minimum of 25% quota for female directors. As for Netherland, the target female quota on corporate boards is set at 30% for all public companies. If the target is not achieved, then the companies have to explain the non-compliance in the annual reports and the steps to be taken to achieve the target (Catalyst, 2013). Other countries around the world have also started to consider the issue of board gender diversity such as India, Japan, Australia, Singapore, including Malaysia.

Malaysian Code on Corporate Governance (MCCG) outlines a list of recommendations on the structures and processes of which firms in Malaysia are encouraged to comply in practicing good corporate governance. After the Asian financial crisis in 1997/98, the investors' confidence in Malaysia was severely affected. From there, the first MCCG was issued in March 2000 to strengthen the corporate governance in Malaysia. Good corporate governance could lead to better corporate performance since it prevents expropriation of controlling shareholders and contributes to a better decision making process (Ali Shah, Butt and Hasan, 2009). MCCG was then revised in 2007 and again in 2012. MCCG (2007) focuses on strengthening the roles and responsibilities of the board of directors, audit committee, and the internal audit function, whereas MCCG (2012) focuses on strengthening the board structure and composition in addition to the role of directors as an active and responsible person of a firm.

Several board characteristics that are highlighted in MCCG (2012) include board independence, board size, CEO duality and board gender diversity. Principle 2, recommendation 2.2.of MCCG (2012) states that board should establish a policy formalizing its approach to boardroom diversity. The board through its Nominating Committee should take steps to ensure that women candidates are sought as part of its requirement exercise. The board should clearly state in the annual reports its gender diversity policies and targets as well as the measures to be taken to meet those targets. In fact in 2011, the Malaysian government had announced a policy that requires public listed firms in Malaysia to have at least 30% of female directors on boards by 2016. However, to date Malaysian firms are still behind the target. Only 16% of the public listed firms have female on boards and the participation of the female directors in listed boards is still low at 10.3% (The Sun Daily, 2015). This can be inferred that there is a lack of confident with the presence of female directors in boardrooms among the public listed firms in Malaysia. To promote more female directors on boards, the NAM Institute for the Empowerment of Women (NIEW), an agency under the Ministry of Women, Family and Community Development, provides training programme for the women to become a part of the board members (Malaysia Edition of Accounting and Business Magazine, 2015), such as the Advanced Women Directors' Training Programme (AWDTP 2015) and Training Workshop on Empowering Women in Agriculture.

Board gender diversity is argued to improve the quality of board discussion and the ability of board to provide an effective oversight of firm's disclosure and reports (Gul, Srinidhi, and Ng, 2011). Having gender diversity in the boardrooms can also create a

better understanding of business environment that can improve the decision making process. The difference in the male and female behaviours and risk attitudes could enhance the creativity and innovation of product and services of firms (Campbell and Minguez-Vera, 2007). Female directors are found to be better in firms monitoring (Adams and Ferreira, 2009) because they place more concern on the market, environment and ethical issues than male counterpart (Bilimoria, 2000). Furthermore, women are more risk averse (Charness and Gneezy, 2012) and thus are likely to take less risk than men (Dwyer, Gilkeson, and List, 2002). However, board diversity may decrease the effectiveness of firm's decision-making process because the process will take longer time to come to a decision as various perspectives have to be heard and considered in the boardrooms (Rose, 2007).

1.2 Problem Statement

Firms are exposed to multiple types of risk such as the sub-prime mortgage, merger and acquisition, treasury risk, credit risk, security, marketing, capital project and many more. Any types of risk will give an impact to the firms operation. This study examines the relationship between board gender diversity and corporate risk-taking among Malaysian public listed companies. Post 2008 financial crisis, regulators and firms pay more attention to improve corporate governance to strengthen public confidence. For Malaysia, MCCG (2007) was revised to the latest code MCCG (2012) that highlights the importance of board of directors in enhancing corporate governance in Malaysia.

The issue of board gender diversity and corporate risk taking are relatively unexplored in the context of Malaysia. Mostly, studies on board gender diversity in Malaysia focus on firm performance (see for example Siti Norwahida, Shin, and Mohd Shahidan 2012; Marimuthu and Kolondaisamy, 2009; Low, Roberts and Whiting, 2015). For example, Low et al. (2015), find that increasing number of female directors on the board have a positive impact on the Asian firm performance, which include Hong Kong, South Korea, Malaysia, and Singapore. Siti Norwahida et al. (2012), on the other hand, find that board gender diversity does not affect the Malaysian public firm performance. Note that the aforementioned studies mainly just examine the direct relationship between board gender diversity and performance, instead of how board gender diversity would affect firms' decision in relation to corporate risk taking behaviour that would ultimately affect firms' performance. Therefore, there is a need to go one step in depth to examine the relationship between board gender diversity and firms risk taking behaviour.

Being a developing country, Malaysian firms are mostly dominated by male directors on board. This is shown by the low ratio of female directors in the boardrooms. The ratio of female board members of Malaysia public listed firms is still far behind the targeted 30% quota. This indicates that Malaysian firms are still doubtful as to what extent board gender diversity can be beneficial to their firms. On one hand, women are argued to be more cautious, less aggressive and easier to persuade than men (Powell and Ansic, 1997). Moreover, women tend to be associated with less risk taking. Firms run by female CEOs have lower gearing ratio, less volatile earnings, and are expected to stay longer in operation than the male CEOs (Faccio, Marchica and Mura, 2016). Studies also find

women to be risk averse and thus are likely to take less risky investment as compared to the men who tend to favour risky investment (see example Dwyer, et al. 2002; Charness and Gneezy, 2012; Eckel and Grossman, 2008; Croson and Gneezy, 2009). On the other hand, Bliss and Potter (2002) show that female fund managers hold portfolios with slightly higher risk than the male counterpart. Despite the importance of the issue on board gender diversity and corporate risk taking, the question *"How board gender diversity would affect firms' risk taking behaviour?"* has not been answered specifically in the Malaysian context, where majority of the public listed firms have less incentives to increase female participation in the boardrooms.

1.3 Research Question

This study is designed to answer the following question:

1) Does the presence of women in the boardrooms mitigate corporate risk taking?
2) Does male only board lead to higher corporate risk taking?

1.4 Research Objective

The research objectives of this study are as follows:

1) To examine if female directors participation can mitigate corporate risk taking.
2) To examine if male-only board leads to higher level of corporate risk taking.

1.5 Scope of Study

This research examines the relationship between board gender diversity and corporate risk taking among Malaysian public listed companies, excluding the financial companies. Final sample firms consist of 634 non-financial companies with 6,816 firm-year observation. The sample firms can be grouped into ten different industries based on the industry classification provided Datastream. The required financial information are collected from Datastream and firm financial report, covering from the year 2000 until 2014.

1.6 Significant of Study

Findings of this study contribute to the regulators in creating and/or revising more beneficial policies such as MCCG to improve the current policies or regulations to ensure better corporate governance in the future. For example the policies could enhance and encourage more board gender diversity among Malaysian firms in the future.

Moreover, the findings could increase the presence of women in boardrooms as the 30% quota of having female directors on boards by 2016 that was announced by the Malaysia government is still behind the target. In addition, this study could convey to the companies on how female directors can contribute to enhancing corporate governance. The result from this study also contribute to the literature on corporate governance with

evidence from the developing market, in which the study on board gender diversity and corporate risk taking is still relatively unexplored Malaysia.

1.7 Organisation of Study

Chapter one discusses the background of the study and the objective of the study. For the upcoming chapter, it discusses the literature review. Next chapter 3 discusses the methodology used in this study and also the hypotheses development. Chapter 4 examines and discusses the relationship between board gender diversity with the corporate risk taking. Chapter 5 presents the conclusion and recommendation for future studies.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the literature of this study. This chapter is divided into two sections as below:

2.1 Theoretical review

2.2 Empirical review

2.1 Theoretical Review

In recent years, the issues on board gender diversity is getting attention whether the participation and proportion of female directors on boards would affect corporate risk taking behaviour or not. There is no specific theory that is directly related to the topic of board gender diversity and corporate risk taking. Therefore, this study refers to resource dependence theory, agency theory and behavioural theory that are closely related to the research objectives of this study.

2.1.1 Behavioural Theory

Behavioural theory is more related to the board gender diversity (Cyert and March, 1963). The differences in attitudes between genders may explain the difference in risk taking behaviour that would affect firms' decision making process. According to various scholars in psychology and finance, individual risk taking preferences is likely to depend

on the differences in the behaviour between men and women. Psychologies in this area find that men are more overconfident than women, instead women are found to be emotional than men. Hence, Croson and Gneezy (2009) document that men and women have different emotional reaction to uncertainty and men are overconfident than women where it may affect the possibility outcomes. By having women in boards contribute to a better quality of decision making process (N. Smith, V.Smith and Verner, 2006). However the decision making process would take more time (Berger, Kick and Schaeck, 2012) as women tend to be more cautious in making decision (Powel and Ansic, 1997). It is expected that gender differences is related to risk preferences. Women tend to be less risk taking than men (see example Croson and Gneezy, 2009; Powel and Ansic, 1997) because women are more sensitive to losses. In other words, women tend to be risk averse.

2.1.2 Resource dependence theory

Resource dependence theory is about how organisational behaviour is affected by external resources. The theory defines that the roles of board is to bring resources to the firm and to connect the firm with the external environment (Pfeffer and Salancik, 1978). Pfeffer and Salancik (1978) develop the idea that a firm can make a link with the elements of its external environment to obtain resources. Board of directors is the main linkage mechanism that connect a firm with the sources of external dependency. A firm can obtain the resources and reduce dependency by having a board of directors with skills, influences and connection to the external dependency (Hillman Shropshire and

Cannella, 2007). Prefer and Salancik (1978) highlight four benefits that a board of directors can bring to a firm, which include advice and counsel, channel of information flow, preferential access to resources, and legitimacy. Other than that, Pfeffer and Salancik (1978) state that boards are able to manage the environmental dependencies and would reflect environmental needs.

The underlying assumption of the resource dependence theory is that the dependence on important resources would influence the actions of an organisation. In addition, the organisation actions and decisions can be explained depending on the particular dependency situation. Another assumption is that the environment is assumed to contain uncommon and valued resources crucial to an organisation existence. In brief, this theory identifies the influence of external factors on organisational behaviour. The resource dependence theory has implications about the optimal divisional structure of organisation and contract structure of external organisational links. Other implications include the production of strategies, recruitment of board of directors and employees, as well as others aspects of organisational strategies.

2.1.3 Agency Theory

Another theory that is related to this study is agency theory by Jensen and Meckling (1976). Agency theory argues that the interests between managers and owners are different due to the separation of ownership and control in business. Eisenhardt (1989) states that the problem of risk sharing could arise because of the differences in risk

preference between the agent and principle. This problem might lead to agency cost when the agents take a difference action than the principles. Based on agency theory, board of directors is an important internal governance instrument to prevent managers to act on their self-interest at the expense of profit maximisation and thus creating agency cost.

Agency cost of equity is about the conflict of interest between the shareholders and managers. These two parties have different interests, where the shareholders' objective is to maximise their wealth. On the other hand, the managers' objectives are to expand the company operation for others' benefit, to increase company's value and to make sure company achieves its objectives. Agency cost of equity may be due to overinvestment problem. Overinvestment problem may occur where the managers would invest in many projects including risky investments with negative net present value. Managers may also have personal goals, which may not be the interest to increase the share value.

2.2 Empirical Review

There are limited studies on board gender diversity and corporate risk taking. This sub-section reviews the empirical studies from two individual perspectives that are the corporate risk taking and board gender diversity.

2.2.1 Corporate Risk Taking

Faccio, et al (2016) investigates the relationship between CEO gender and corporate risk taking in European. Their study uses a large sample firms from public-held and public-traded European firms. They find that CEO gender determines the corporate decision making. Women tend to be associated with less risky firms. Firm run by female CEO are less levered, less volatile, and are expected to stay longer in operations in comparison to firms managed by male CEO (Faccio et al. 2016).

Berger et al. (2012) examine how age, gender and education affect the risk taking behaviour among banks in Germany for period starting from 1994 until 2010. The result of the difference-in-difference estimations show that the decrease in average age of board increases banks risk taking because different age has different attitudes towards risk. For the gender, the result shows that as the proportion of women in boards increases bank risk taking also increases even though this effect is not significant. Berger et al. (2012) document that female directors are less experienced than male. Education shows negative results, suggesting that more educated board results in lower risk taking. This is because better educated boards would apply better risk management techniques and adjust the business model accordingly.

Nguyen (2011) finds that risk taking is associated with corporate governance structures. The paper examines the influences of corporate governance on risk taking among Japanese firms. The results show that firms with family control and concentrated

ownership are related with higher firm specific risk. Family owned firms adopt distinctive strategies that are more risky to contribute to strengthening firms' competitive position. While, bank-controlled firms are related to lower firm specific risk because banks are unfavourable to the firm competitive position.

Other than that, Boubakri, Cosset and Saffar (2013a) investigate the impact of shareholders' identity on corporate risk taking among 190 newly privatized firms from 39 countries. The result shows that the state ownership is negatively related to corporate risk taking. While foreign ownership is positively related to the corporate risk taking. However, the foreign owners' high risk taking preferences depend on the country-level governance institution (Boubakri et al. 2013a). Furthermore, firm-level corporate risk taking depends on country-level governance institution (see example John, et al. 2008).

Boubakri, Mansi and Saffar (2013b) examine the effect of political institution on the corporate risk taking. They find that political connection is positively related to corporate risk taking. Their study utilises a large sample of non-financial firms from 77 countries starting year 1988 until 2008. Firms with political connection have higher volatile earnings because the close ties with the government leads the firms to less conservative investment choices. In addition, firms with political link more possible to be bailed out by government if the firms fall into financial distress (Faccio, Masulis and McConnell, 2006).

For developing country, Ng, Chong and Ismail (2013) examine the effect of firm size on the firm risk taking behaviour among Malaysian insurance firms during the period of 2000 until 2010. The study finds that underwriting risk is positively related to the insurance firm size because of the certainty of possible bailed out by the government. In other words, large size insurance firms are likely to take more risk.

2.2.2 Board Gender Diversity

Existing studies on boards' gender diversity mainly focus on firm performance. Studies find that gender diversity leads to a better firm performance (Carter, Simkins and Simpson, 2003; Campbell and Minguez-Vera 2008). Robinson and Dechant (1997) suggest that firms with gender diverse board have better creativities and innovations because of the differences of skills, knowledge and experiences contributed by the gender diversified board. Moreover, Tu, Loi, and Yen (2015) investigate the relationship between gender diversity of board and bank performance using a sample of ASEAN banks from Thailand, Vietnam and Indonesia. The finding shows that gender diversity and firm performance is positively related. Similarly, Campbell and Mínguez-Vera (2008) also find board diversity to be positively related to firm performance. This relationship is examined using firms listed in Spain. The diversity on board could increase creativity and innovation, as well as enhancing problem-solving given the better understanding of business environment (Campbell and Minguez-Vera 2008).

N. Smith, et al. (2006) state that the advantages of having female on board is that female directors have better understanding in particular market condition than male. It can contribute to decision making process. In addition, the presence of more women directors may generate a better public image of the firm and contribute to the improvement of firm performance. Low, et al. (2015), they find that increasing number of female directors on the board have a positive impact on the firm performance. The authors use a sample of Asian firms from Hong Kong, South Korea, Malaysia, and Singapore. However, the benefits of female directors decrease in countries with higher female economic participation and empowerment due to tokenism and cultural resistance (Low et al. 2015).

Carter, D'Souza, Simkins and Simpson (2010) using a sample of major US based corporation listed in S&P 500, find that gender and ethnic diversity do not effect firm financial performance. It is due to different laws, cultural environment, geography, and others factors that may affect board diversity on board performance. Rose (2007) also finds that the presence of female directors in the boardrooms do not affect Danish firms performances. This is because the female board members are not from the *'old boys club*' and hence have to try to adapt into the traditional way.

Though board diversity could improve the quality of public disclosure through good monitoring (Gul, et al. 2011), Adams and Ferreira, (2009) find negative relationship between gender diversity and firm performance. The presence of women in board may lead to over monitoring for firms that already have strong corporate governance. Women prefer to join monitoring committee because women are found to be more active in

monitoring activities in contrast to male directors (Adams and Ferreira, 2009). Furthermore, gender diversity would cause the top management team to take longer time in their decision making process. It is also possible that they may face complicated communication process because the board members comes from different background and experiences (Berger, et al. 2012).

Other than studies about board gender diversity and firm performance, there is study that examines the relationship between board gender diversity and firm merger and acquisition. According to Levi, Li, and Zhang (2014) female directors are less likely to participate in merger and acquisition and if they do, female directors are more likely to pay lower acquisition premium because they are less overconfident than male directors. Moreover, Huang and Kisgen (2013) identify several behaviour differences between female CFOs and male CFOs. Firms with female CFOs are less likely to engage in acquisition and are not inclined to issue debt. The acquisitions made by female CFOs tend to offer higher returns as compared to the acquisitions made by male CFOs. It is concluded that men are overconfident than women. Therefore, men have greater incentives to choose risky investment than women.

Similarly with Barber and Odean (2001), male investors are found to be overconfident than female, where men trade more excessively than women. Men also tend to hold riskier investment portfolio. Using data from a national survey of nearly 2000 mutual funds investors, women are revealed to be risk averse as compared to men in handling

their mutual fund investment (Dwyer, et al. 2002). In contrast, Bliss and Potter (2002) find that women fund manager hold portfolios with slightly more risk than men.

Díaz-García, González-Moreno, and Sáez-Martínez (2013) study about gender diversity within the R&D teams and its impact on radicalness of innovation. The result indicates that gender diversity is positively related to the radical innovation. However, the change of male CEO to female CEO may lead to decrease in several measure of risk taking like R&D expenditure and firm leverage (Elsaid and Ursel, 2011).

In addition, Croson and Gneezy (2009) list three factors related to gender differences between men and women, which are the risk preferences, social preferences and reaction to competition. Based on their study, it is argued that women tend to be more risk averse than a men. Women are also more sensitive to social cue than men, and lastly they find women to be less competitive than men. Women are emotional and less overconfident than men which resulted in the differences of risk taking behaviour. Men tend to take risky investment (Dwyer, et al. 2002). Powell and Ansic (1997) state that women are more cautious, less aggressive and easier to persuade rather than men.

CHAPTER 3

METHODOLOGY

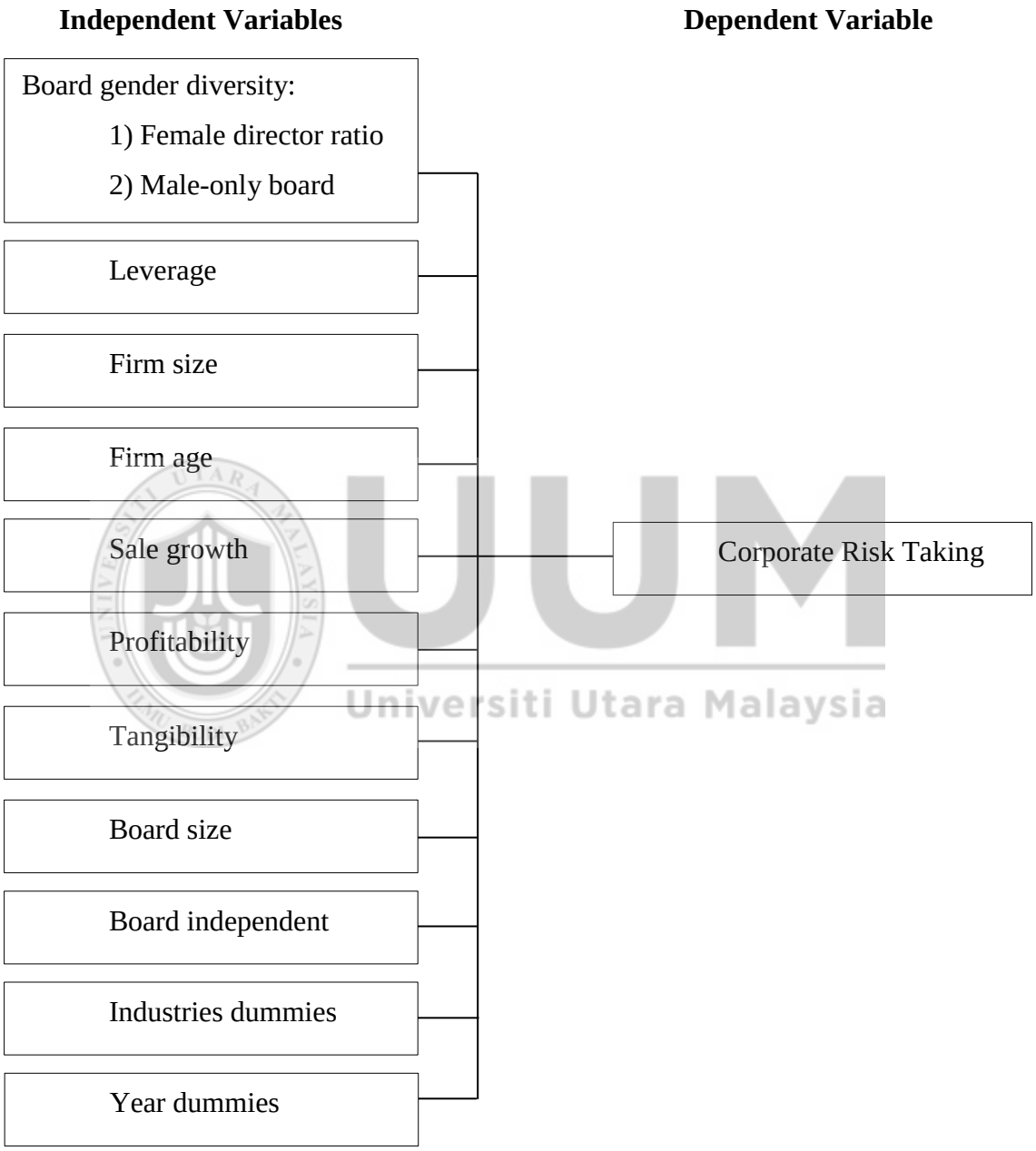
This chapter discusses on data process and methodology proses which comprise:

3.1 Research Framework

By reviewing the literature, the identified variables are shown in figure 3.1 where it presents the research framework for this study. The main independent variable is board gender diversity and the others ten variables are the control variables. Each variable is further discusses in section 3.4.

Figure 3.1

Research Framework



3.2 Hypothesis development

Behaviour would affect the level of risk taking. It would even lead to any possible outcomes (Byrness, Miller and Schaefer, 1999). Prior studies argue that women tend to be more risk averse as compared to men both in the psychology and economic literature (see examples Charness and Gneezy, 2012; Croson and Gneezy, 2009; Powell and Ansic, 1997). According to Croson and Gneezy (2009), there are three important preferences by different gender, which includes risk preferences, social preferences and reaction to competition. From their results, they find women to be more risk averse, sensitivity to social preferences based on situation and less competitive than men in general. Similarly Byrness, et al. (1999) show that women more likely to take less risk rather than men.

Another characteristic that explain gender differences in risk attitudes is related to the level of confident. Barber and Odean (2001) find men to be overconfident than women in terms of their investing skills. Men trade more often and are more likely to choose riskier investment. As a result, males not only sell their investment at the wrong time, but also experience high cost of trading in comparison to their female counterparts. Women tend to trade less and tend to use the buy and hold investment strategy. In addition, Huang and Kisgen (2013) recognise several differences in the behaviour between female and male executives. Their result shows that firms with male executives are more likely to engage in acquisition. It is implied that men are overconfident than women, thus have greater tendencies to choose risky investments. On the contrary, female directors tend to be wiser in choosing investment that can mitigate the chances of the firms facing losses in the

future. The differences in risk attitudes between genders is, therefore argued to be able to explain the variation of risk taking behaviour.

Board gender diversity is argued to improve the quality of board discussion and the ability of board to provide an effective oversight of firm's disclosure and reports (Gul, et al. 2011). Hence, having gender diversity on board could create better understanding and also improve decision making process. Women also tend to take their role seriously while in the boardrooms, which can lead to *"more civilized behaviour"* and better governance (Singh and Vinnicombe, 2004). Female directors tend to behave differently than male directors. Female directors appear to be tougher monitors and likely to join monitoring committee. Female directors also have better attendance at board meeting than male directors (Adam and Ferreira, 2009). Furthermore, Faccio, et al. (2016) suggest that firms run by female CEOs have lower leverage, less volatile and a higher chance of survival as compared to firms run by male CEOs. Based on the theories and empirical evidence the following hypotheses are formulated;

H1: Board gender diversity is negatively related to corporate risk taking

H2: Male-only board is positively related to corporate risk taking

3.3 Sample Selection

Selected sample consist of Malaysian firms that are listed on the Main board of Bursa Malaysia. The firm year observations are from year 2000 to 2014. The final samples

consists of 634 non-financial firms, with 6,816 firm-year observations. These firms are categorised into ten industries based on the industry classification collected from the Datastream database. The sample excludes financial firms because of the differences in the financial structure and regulation (Rajan and Zingalis, 1995).The final sample is obtained after excluding incomplete and/or missing information. Firms specific information is collected from Datastream, but the data related to board gender diversity, number of female directors on boards, board size and number of independent directors are hand-collected from firms annual reports.

3.4 Variable Specification

For this study, the dependent variable is corporate risk taking. In order to examine the hypotheses, the key independent variable of this study is board gender diversity. The analysis also controls for other determinants that are commonly found to be significant determinants of risk-taking. These variables are further explained as follows.

Based on Boubakri, et al. (2013b), Faccio, et al. (2011) and John, et al. (2008) this study uses two measures to proxy for corporate risk taking. *Risk 1* refers to volatility of a firm's return on asset (ROA) over three-year overlapping periods. For example, the amount of risk-taking in year 2000 is measured as the volatility of ROA from year 1998 to 2000.The ROA is defined as the ratio of operating profits to total assets. *Risk 2* refers to the difference between maximum and minimum ROA in three years interval.

To measure the effect of board gender diversity *(Gender diversity)* on corporate risk taking, this study uses two variables to proxy for board gender diversity. To examine Hypothesis 1, *Female director ratio* is used to, while the second variable *Male-only* dummy is used to test Hypothesis 2. Female director ratio measures the number of female directors over the total number of directors on a board. For *Male-only* dummy, it equals to one if all the directors on a board are male and zero otherwise. *Male-only* dummy is used as one of the main variables because Malaysian public listed are usually denominated by males.

Control variables such as leverage, firm size, profitability, sale growth, firm age, board size, board independence, tangibility and dummy market are commonly found to explain corporate risk taking behaviour. *Leverage* is a measure of the level of risk of corporate financing choices. It is measured as total debt to total assets. When firms are highly leveraged, these firms are exposed to greater risk of uncertainty that would lead to higher risk of financial distress. Thus, leverage is found to be positively related to corporate risk taking (Faccio, et al. 2011)

$$Leverage = \frac{Total\ Debt}{Total\ Asset}$$

Firm size is measured by the natural logarithm of total assets where the total assets consist of current assets and fixed assets. *Firm age* is calculated by the natural logarithm of the number of years from the establishment of the firm until to the year of observation. Firm size and firm age are expected to be negatively related to the corporate risk taking

behaviour. Smaller and/or younger firms are found to be more risk-seeking than larger and/or established firms (Faccio, et al. 2011; Boubakri, et al. 2013b; John, et al. 2008). This is because smaller and/or younger have to take more risk in order to expand their business operations.

Firm size = Ln(Total Assets)

Firm Age = Ln(Number of Year Firm Established)

Profitability is measured by firm's the return on asset (ROA). It is defined as the ratio of earnings before interest and tax (EBIT) to total assets. Higher ROA volatility indicates higher risk-taking but at the same time it could reflect poor management ability rather than firm risk-taking behaviour (Faccio, et al. 2011), thus it is necessary to control for profitability in the analysis. *Sales growth* is defined as the annual growth rate of sales. It expected to be positively related to the corporate risk taking behaviour.

$$Profitability = \frac{EBIT}{Total\ Asset}$$

Tangible assets are physical form of fixed assets that can be as collateral against borrowing. *Tangibility* is expected to be positively related to risk taking. Firms with higher tangibility have more capacity to take up more investment because the tangible assets can be used as collateral. Moreover firms with higher tangible assets have higher

liquidation value in the event of bankruptcy. Tangibility measured by ratio of fixed asset to total asset.

$$Tangibility = \frac{Net\ Fixed\ Asset}{Total\ Asset}$$

Board size is calculated by the natural logarithm of the total of board of director. *Board independent* for each firm is measured by the ratio of number of independent directors on the board to the total number of directors on the board. Some scholars claim that the presence of independent directors could increase the quality of corporate governance and also influence the firms outcomes (Jackling and Johl, 2009; Carter et al., 2010). Both board size and board independent are expected to be negatively related to risk taking while board independent expected to positively related to corporate risk taking. Industries dummies and year dummies are also included in the regression analysis.

Board size = Ln(Total of Board of Directors)

$$Board\ independent = \frac{Number\ of\ Independent\ Director}{Total\ Number\ of\ Director}$$

Table 3.1

Variables Descriptions and the Expected Sign

Variables	Description	Expected sign
Corporate Risk Taking	*Risk 1* is the volatility of firm's ROA over three-year overlapping period*;* *Risk 2* refers to the difference between maximum and minimum ROA in three year interval	Dependent variable
Board Gender Diversity	(1) Female director ratio is measured by the number of female directors over the total number of directors on the board; (2) Male-only dummy is equal to one if all directors are male and zero otherwise	- +
Leverage	Total debt to total asset ratio	+
Firm Size	Natural logarithm of total assets	-
Firm Age	Natural logarithm of the number of years from the establishment of the firm to the year of observation	-
Sale Growth	The annual growth rate of sales	+
Profitability	Return on assets (ROA)	-
Tangibility	Net fixed assets to total assets	+
Board Size	Natural logarithm of the total of board of director.	-
Board Independent	The ratio of number of independent directors on the board to the total number of directors on the board.	-
Industries dummies	One for observed industry, and zero for other industries	Not applicable
Year dummies	One for current year observations, and zero for other years	Not applicable

3.5 Research Design

This study uses two regression models to examine the relationship between board gender diversity and corporate risk taking. The first model is the Pooled Ordinary Least Square Regression (OLS) and the second is Panel Data Regression.

3.5.1 Pooled Ordinary Least Square Regression

This study employs pooled Ordinary least Square (OLS) regression with robust standard errors clustered by firm in order to estimate the relationship between board gender diversity and corporate risk taking. Pooled OLS is used because the data have both time series and cross sectional observations. However, the data is unbalanced due to some of the firm year observation are missing. In order to test the formulated hypotheses, the regression equation is written as:

$$Risk = \beta_0 + \beta_1\, Gender\ diversity_{it} + \beta_2\ Leverage_{it} + \beta_3\, Firm\ size_{it} + \beta_4\, Firm\ age_{it} + \beta_5\, Sale\ growth_{it} + \beta_6\, Profitability_{it} + \beta_7\, Tangibility_{it} + \beta_8\, Board\ independent_{it} + \beta_9\, Board\ size_{it} + \beta_{10}\, Industry\ dummies_{it} + \beta_{11}\, Year\ dummies_{it} + \varepsilon_{it} \quad \textbf{(3.1)}$$

3.5.2 Panel Data Regression

To provide robust findings, this study also repeats the analysis using panel data regression. Panel data comprises of observations on the same cross sectional units over several time periods. Both fixed effects and random effects are put to test this study. In order to test whether fixed effects or random effects better explains the sample data, this study utilises the Hausman test.

Fixed effect regression equation is written as:

$$Risk = \beta_0 + \beta_1\, Gender\ diversity_{it} + \beta_2\ Leverage_{it} + \beta_3\, Firm\ size_{it} + \beta_4\, Firm\ age_{it} + \beta_5\, Sale\ growth_{it} + \beta_6\, Profitability_{it} + \beta_7\, Tangibility_{it} + \beta_8\, Board\ independent_{it} + \beta_9\, Board\ size_{it} + \beta_{10}\, Industry\ dummies_{it} + \beta_{11}\, Year\ dummies_{it} + \gamma_i + \varepsilon_{it} \quad \textbf{(3.2)}$$

Random effect regression equation is written as:

$$Risk = \beta_0 + \beta_1\, Gender\ diversity_{it} + \beta_2\ Leverage_{it} + \beta_3\, Firm\ size_{it} + \beta_4\, Firm\ age_{it} + \beta_5\, Sale\ growth_{it} + \beta_6\, Profitability_{it} + \beta_7\, Tangibility_{it} + \beta_8\, Board\ independent_{it} + \beta_9\, Board\ size_{it} + \beta_{10}\, Industry\ dummies_{it} + \beta_{11}\, Year\ dummies_{it} + \gamma_{it} + \varepsilon_{it} \quad \textbf{(3.3)}$$

3.5.3 Descriptive Statistics

Descriptive statistics are using to provide a simple summary of the dataset and the measures. Measure of variability and central tendency are the measure used to describe the dataset. Mean, median and mode are include in the measure of central tendency, while standard deviation, maximum and minimum variables, skewness and kurtosis are include in the measure of variability. For the purpose of this study, only mean, standard deviation, maximum and minimum values are reported for the observed variables.

3.5.4 Correlation

Correlation is the most commonly use technique to examine the relationship between the variables. Correlation is used to describe the degree of relationship between the variables. It can show whether the variables are strongly related or not each other. If two independent variables are highly correlated, then one of the variables has to be excluded to control for collinearity problem.

3.5.5 Mean Different Test

Mean different test compares the mean between two samples mean, where the samples are from the same population, individual or variables. In other word mean different test is used to find the different between the samples mean. The underlying assumptions of

mean different test are, the population is normally distribution and the samples are independent.

3.5.6 Variance Inflation Factor

Variance inflation factor (VIF) is used to measure the value of multicollinearity that exists in a regression analysis. The existence of multicollinearity in the independent variables can cause a difficulty in understanding the significance of each independent variable in the regression model. By using VIF, the multicollinearity problem can be identified. If the VIF value is less than 10, it shows no multicollinearity problem.

CHAPTER 4

RESULT AND DISCUSSION

Chapter 4 discusses the results obtained from the tests on the relationship between board gender diversity and corporate risk taking. This chapter consists of:

4.1 Sample Distribution

4.2 Descriptive Statistics

4.3 Correlation Matrix

4.4 Pooled Ordinary Least Square Regression

4.5 Panel Data Regression

4.1 Sample Distribution

Table 4.1 shows the sample distribution of the sample firms by industry and year. From the table, 33.16% of the sample observations are from consumer goods industry, followed by consumer service with 25.15%, basic materials industry with 11.93% of the total observation. The lower sample observations are from the utilities with 2.07% and followed by the lowest 0.73% of the total observations are from firms in the technology industry. The firm-year observation starts from the year 2000 until 2014. Most of the sample observations are from year 2014 with 8.63%, followed by year 2012 with 8.47% and 2010 (8.41%) of the total observation. These distributions suggest the need to control for industry and year dummies in the pooled OLS regression and industry and year effects in the panel data regression.

Table 4.1
Sample Distribution by Industry and Year

Data Stream Classification	Firm year observation	%	Year	Firm year observation	%
Basic Materials	813	11.93	2000	116	1.70
Consumer Goods	2260	33.16	2001	205	3.01
Consumer Services	1714	25.15	2002	232	3.40
Healthcare	612	8.98	2003	364	5.34
Oil and Gas	671	9.84	2004	425	6.24
Real Estate	253	3.71	2005	453	6.65
Technology	50	0.73	2006	502	7.37
Telecommunications	155	2.27	2007	536	7.86
Utilities	141	2.07	2008	552	8.10
Others	147	2.16	2009	565	8.29
Total	**6816**	**100**	2010	573	8.41
			2011	569	8.35
			2012	577	8.47
			2013	559	8.20
			2014	588	8.63
			Total	**6816**	**100**

4.2 Descriptive Statistics

Table 4.2 shows that there are 8.52% female directors in the boardrooms. The mean ratio of female directors is still very far from the targeted 30% quota. The descriptive statistics also show that public listed firms in Malaysia is still prone to male dominance prove with 54.2% of the sample observations have male-only directors on boards. The average RISK1 ratio is 4.3% and average ratio for RISK2 is 8.08%, with a standard deviation of 11.8% and 21.2%, respectively.

Table 4.2
Descriptive Statistics of Pooled Sample

VARIABLES	Mean	Standard Deviation	Min	max
RISK1	0.043	0.118	0.000	4.990
RISK2	0.080	0.212	0.000	9.088
Female Director Ratio	0.085	0.110	0.000	0.600
Male-only	0.542	0.498	0.000	1.000
Leverage	0.211	0.175	0.000	1.001
Firm size	5.610	0.612	4.082	8.044
Firm age	1.329	0.295	0.000	2.033
Sales growth	0.120	0.540	-1.000	8.732
Profitability	0.044	0.096	-1.092	2.122
Tangibility	0.378	0.211	0.000	0.988
Board size	0.866	0.112	0.477	1.230
Board independent	0.433	0.121	0.000	1.000
N	6,816			

Table 4.3 reports the descriptive statistics by subsample, in which the sample is divided into subsample with mixed gender boards and subsample with male-only boards. The mean of RISK1 for mixed gender boards is 3.6% and 4.88% for firms with male directors only. Meanwhile, the mean of RISK2 is 6.81% for firms that have female directors in the boardrooms and 9.15% for firms with male-only directors. The mean difference test finds that firms with mixed gender take less risk than firms with male-only directors. The mean difference for RISK1 is -0.0128, statistically significant at the 1% level. RISK2 shows the same result as RISK1. For the firm size, firm age and sales growth insignificant mean differences are reported between the subsamples.

Based on the descriptive statistics by subsample in Table 4.3, it can be summarised that female take less risk than men, and firm with female directors have less leverage compare

with firm with all male directors. Furthermore, firms with female directors on boards may contribute to higher firm profitability and have better corporate governance as indicated by the larger board size and greater number of independent directors.

Table 4.3
Descriptive Statistic by Sample

	Mixed Gender				Male-Only				
VARIABLES	**mean**	**standard deviation**	**min**	**max**	**mean**	**standard deviation**	**min**	**max**	**mean difference test**
RISK1	0.0360	0.0574	0.0003	1.2300	0.0488	0.1510	0.0002	4.9900	-0.0128***
RISK2	0.0681	0.1050	0.0005	2.1360	0.0915	0.2710	0.0004	9.0880	-0.0234***
Leverage	0.2030	0.1730	0.0000	0.9490	0.2180	0.1780	0.0000	1.0010	-0.0145***
Firm size	5.6230	0.6230	4.3600	8.0440	5.5990	0.6030	4.0820	8.0130	0.0239
Firm age	1.3320	0.2980	0.0000	2.0290	1.3260	0.2930	0.0000	2.0330	0.0066
Sales growth	0.1220	0.4970	-0.9970	8.7040	0.1180	0.5750	-1.0000	8.7320	0.0043
Profitability	0.0503	0.0882	-0.9350	2.1220	0.0387	0.1020	-1.0920	1.8330	0.0116***
Tangibility	0.3830	0.2070	0.0000	0.9800	0.3740	0.2130	0.0000	0.9880	0.0090*
Board size	0.8840	0.1120	0.4770	1.2300	0.8520	0.1090	0.4770	1.1760	0.0319***
Board independent	0.4210	0.1180	0.0000	1.0000	0.4420	0.1240	0.1110	1.0000	0.0211***
Firm year observations (N)	3120				3696				

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

4.3 Correlation

Table 4.4 shows the correlation matrix between the variables. The univariate test suggests that *Female Director Ratio* is negatively related with RISK1 and RISK2 at the 1% significant level. Meanwhile, *Male-Only* dummy is significantly positive with RISK1 and RISK2 at the 1% level. These univariate relationships are consistent with the expectation of this study. Though the correlation table shows that most of the variables are correlated at the conventional levels, the coefficients are generally less than 0.4. Therefore, no multicollinearity problem is observed.

The variance inflation factor (VIF) of 2.91, also suggest that the predictor variables are moderately correlated. A VIF value less than 10 further confirms that that there is not serious multicollinearity problem between the variables.

Table 4.4
Correlation Matrix

	RISK1	RISK2	Female Director Ratio	Male-only	Leverage	Firm size	Firm age	Sales growth	Profitability	Tangibility	Board size	Board independent
RISK1	1.0000											
RISK2	0.9993***	1.0000										
Female Director Ratio	-0.0452***	-0.0460***	1.0000									
Male-only	0.0540***	0.0548***	-0.8435***	1.0000								
Leverage	0.0158	0.0160	-0.0506***	0.0411***	1.0000							
Firm size	-0.1229***	-0.1259***	-0.0154	-0.0195	0.2348***	1.0000						
Firm age	0.0063	0.0062	-0.0104	-0.0111	-0.0364***	0.2656***	1.0000					
Sales growth	0.0254**	0.0266**	-0.0057	-0.004	0.0197	0.0395***	-0.006	1.0000				
Profitability	-0.0204*	-0.0250**	0.0396***	-0.0599***	-0.1675***	0.1587***	0.0292**	0.1147 ***	1.0000			
Tangibility	-0.0565***	-0.0568***	0.0102	-0.0212*	0.1363***	0.0761***	0.0172	-0.0280**	-0.1049***	1.0000		
Board size	-0.0927***	-0.0954***	-0.0125	-0.1424***	0.0503***	0.3442***	0.0370***	0.0261**	0.1144***	0.0377***	1.0000	
Board independent	0.0931***	0.0937***	-0.0132	0.0864***	-0.0208*	-0.0117	0.1073***	-0.0227*	-0.0495***	-0.0487***	-0.3922***	1.0000

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

4.4 Pooled Ordinary Least Square Regression (OLS)

Table 4.5 reports the estimates of pooled OLS regression with robust standard errors clustered by firms. Models 1 until 4 in Panel A are designed to examine Hypothesis 1, where the ratio of female directors on boards is used to proxy for gender diversity. Models 1 and 2 do not control for industry and year dummies, but the industry and year dummies are controlled in Models 3 and 4. *Female Director Ratio* is negatively related to corporate risk taking. The coefficients are consistently significant at the 5% level for both measure of risk taking (*RISK1* and *RISK2*) in all the four models. Referring to Model 3,.one standard deviation increase in female directors' ratio decreases risk taking by 11.18% (from 4.30% to 3.82%).[1]When risk taking is measured by *RISK2* based on Model 4, one standard deviation increase in the female directors ratio, the risk taking decreases by 10.85% (from 8.08% to 7.2%). The reported negative relationship supports Hypothesis 1. The hypothesis argues that board gender diversity is negatively related to corporate risk taking. In other words, the presence of women in the boards can mitigate risk taking among the firms.

Models 1 to 4 are designed to test Hypothesis 2 presented in Panel B of Table 4.5. Similarly, Models 1 and 2 do not control for year and industry dummies, but Models 3 and 4 do control for the dummies. In Models 1 to 4, the *Male-only* variable is positively related to corporate risk taking. The coefficient is consistently significant at the 5% level

[1] $11.18\% = \frac{\text{Coefficient of female ratio x Standart deviation of female director ratio}}{\text{Mean RISK 1}}$

for both measures of risk taking in all the four models. The positive relationship supports Hypothesis 2. Firms with male-only directors in the boardrooms have greater incentives to take more risk. The coefficient of *Male-only* indicates that the male-only boards take 0.93% (refer Model 3) higher risk than firm run by firms with mixed gender boards. This seems to be a sizeable difference given the average of risk taking (*RISK1*) of 4.3% for the full sample. When risk taking is measured by *RISK 2* (refer Model 4), firms with male-only directors take 1.67% higher risk than mixed-gender boards, relative to the mean of *RISK 2* (8.00%).

For the control variables, some of the control variables are consistent with the expectations summarised in Table 3.1. Leverage, firm size, and sales growth are consistent with the expectations. The reported coefficients of *Leverage*, *Firm size* and *Sales growth* are in line with the study of Faccio, et al. (2011), where leverage and sales growth are positively related to corporate risk taking, whereas firm size is negatively related to risk taking, for both measures of risk taking. However, firm age is positively, but tangibility is negatively related to risk taking, suggesting that older firms and/or firms with lower tangible assets take higher risk. These findings are inconsistent with the expected signs. The reported significant relationships are consistently significant at the conventional levels. Firms' profitability, board size and number of independent directors do not have significant relationship with corporate risk taking.

Table 4.5
Pooled OLS Regression Adjusted for Robust Standard Error Cluster by Firms

Panel A: Mixed-Gender Board

	(1) RISK1	(2) RISK2	(3) RISK1	(4) RISK2
Female Director Ratio	-0.0460**	-0.0843**	-0.0437**	-0.0797**
	(-2.3583)	(-2.4049)	(-2.1908)	(-2.2279)
Leverage	0.0388***	0.0699***	0.0364***	0.0655***
	(2.8399)	(2.8670)	(2.8266)	(2.8507)
Firm size	-0.0267***	-0.0489***	-0.0309***	-0.0565***
	(-2.7300)	(-2.8027)	(-2.7964)	(-2.8684)
Firm age	0.0150***	0.0276***	0.0183***	0.0338***
	(2.6803)	(2.6630)	(3.2978)	(3.2678)
Sales growth	0.0065**	0.0123**	0.0071**	0.0135**
	(2.1210)	(2.1680)	(2.4226)	(2.4713)
Profitability	0.0117	0.0116	0.0173	0.0214
	(0.1892)	(0.1045)	(0.2770)	(0.1905)
Tangibility	-0.0267**	-0.0485**	-0.0266**	-0.0484**
	(-2.0216)	(-2.0217)	(-2.1871)	(-2.1855)
Board size	-0.0197	-0.0388	-0.0198	-0.0391
	(-0.9198)	(-1.0009)	(-0.9535)	(-1.0395)
Board independent	0.0773	0.1387	0.0871	0.1571
	(1.3452)	(1.3582)	(1.5399)	(1.5615)
Constant	0.1612***	0.3006***	0.2076***	0.3841***
	(5.4705)	(5.6474)	(5.2034)	(5.3570)
Industry dummies	No	No	Yes	Yes
Year dummies	No	No	Yes	Yes
Observations	6,816	6,816	6,816	6,816
Adjusted R-squared	0.0312	0.0324	0.0358	0.0375

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

Panel B: Male-only Board

	(1) RISK1	(2) RISK2	(3) RISK1	(4) RISK2
Male only	0.0096**	0.0174**	0.0093**	0.0167**
	(2.3569)	(2.3608)	(2.2248)	(2.2211)
Leverage	0.0391***	0.0706***	0.0367***	0.0660***
	(2.8582)	(2.8871)	(2.8405)	(2.8658)
Firm size	-0.0270***	-0.0493***	-0.0313***	-0.0571***
	(-2.7347)	(-2.8073)	(-2.7989)	(-2.8704)
Firm age	0.0155***	0.0284***	0.0188***	0.0347***
	(2.7682)	(2.7475)	(3.3838)	(3.3501)
Sales growth	0.0065**	0.0124**	0.0071**	0.0136**
	(2.1411)	(2.1881)	(2.4371)	(2.4858)
Profitability	0.0120	0.0120	0.0174	0.0216
	(0.1930)	(0.1081)	(0.2789)	(0.1922)
Tangibility	-0.0266**	-0.0484**	-0.0267**	-0.0486**
	(-2.0181)	(-2.0184)	(-2.1890)	(-2.1879)
Board size	-0.0129	-0.0265	-0.0134	-0.0274
	(-0.5692)	(-0.6458)	(-0.6061)	(-0.6887)
Board independent	0.0768	0.1378	0.0866	0.1562
	(1.3401)	(1.3531)	(1.5353)	(1.5573)
Constant	0.1470***	0.2748***	0.1948***	0.3610***
	(5.7843)	(5.9577)	(5.4139)	(5.5690)
Industry dummies	No	No	Yes	Yes
Year dummies	No	No	Yes	Yes
Observations	6,816	6,816	6,816	6,816
Adjusted R-squared	0.0310	0.0321	0.0356	0.0372

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

4.5 Panel Data Regression

To provide robust results, the regression is repeated using fixed effect panel data regression. The regression in Models 1 and 2 reports the estimates for female directors' ratio, while Models 3 and 4 report the estimates for male-only directors. The coefficient of *Female Director Ratio* shows that the presence of women in board is negatively related to firms' risk taking behaviour. The negative coefficient is statistically significant at the 1% level. For male-only boards, the result reports a positive relationship with corporate risk taking, significant at the level 1%. These findings further support Hypotheses 1 and 2. The estimates of the control variables in Table 4.6 are qualitatively similar to those reported in Table 4.5 except board independent that is shown to be positively significant at the 1% level. This suggests that firms with greater board independence take higher risk, which is inconsistent with the expectation of this study.

Though Hausman test consistently supports fixed effects over random effects, the results of random effects are also presented in Panel B of Table 4.6. The results from random effects still provide evidence, supporting Hypotheses 1 and 2. The higher the female directors' ratio, the lower the corporate risk taking would be. In other words, female directors tend to take less risk as compared to male directors. The results suggest that board gender diversity can mitigate corporate risk taking and contribute to better decision making process and corporate governance.

Table 4.6
Panel Data Regression

Panel A: Fixed effects panel data regression

	(1) RISK1	(2) RISK2	(3) RISK1	(4) RISK2
Female Director Ratio	-0.0435***	-0.0793***		
	(-3.3221)	(-3.3662)		
Male only			0.0091***	0.0164***
			(3.0909)	(3.0920)
Leverage	0.0365***	0.0657***	0.0368***	0.0662***
	(4.1692)	(4.1701)	(4.2026)	(4.2047)
Firm size	-0.0308***	-0.0562***	-0.0312***	-0.0568***
	(-10.2739)	(-10.4202)	(-10.3664)	(-10.5108)
Firm age	0.0185***	0.0342***	0.0190***	0.0351***
	(3.4965)	(3.5919)	(3.5887)	(3.6848)
Sales growth	0.0072***	0.0138***	0.0072***	0.0138***
	(2.6765)	(2.8423)	(2.6874)	(2.8535)
Profitability	0.0164	0.0195	0.0165	0.0197
	(1.0388)	(0.6886)	(1.0450)	(0.6934)
Tangibility	-0.0262***	-0.0477***	-0.0263***	-0.0478***
	(-3.7062)	(-3.7434)	(-3.7176)	(-3.7561)
Board size	-0.0186	-0.0367	-0.0123	-0.0253
	(-1.2385)	(-1.3597)	(-0.8105)	(-0.9299)
Board independent	0.0886***	0.1598***	0.0881***	0.1590***
	(6.6649)	(6.6793)	(6.6208)	(6.6370)
Constant	0.1733***	0.3219***	0.1607***	0.2989***
	(9.0364)	(9.3273)	(8.3955)	(8.6817)
Industry Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	6,816	6,816	6,816	6,816
R-squared	0.0344	0.0357	0.0342	0.0354

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

Panel B: Random Effects Panel Data Regression

	(1) RISK1	(2) RISK2	(3) RISK1	(4) RISK2
Female Director Ratio	-0.0437***	-0.0797***		
	(-3.3733)	(-3.4199)		
Male only			0.0093***	0.0167***
			(3.1780)	(3.1834)
Leverage	0.0364***	0.0655***	0.0367***	0.0660***
	(4.2162)	(4.2106)	(4.2451)	(4.2406)
Firm size	-0.0309***	-0.0565***	-0.0313***	-0.0571***
	(-10.4478)	(-10.5943)	(-10.5440)	(-10.6888)
Firm age	0.0183***	0.0338***	0.0188***	0.0347***
	(3.5077)	(3.5997)	(3.6032)	(3.6960)
Sales growth	0.0071***	0.0135***	0.0071***	0.0136***
	(2.6887)	(2.8514)	(2.7035)	(2.8665)
Profitability	0.0173	0.0214	0.0174	0.0216
	(1.1151)	(0.7659)	(1.1239)	(0.7734)
Tangibility	-0.0266***	-0.0484***	-0.0267***	-0.0486***
	(-3.8065)	(-3.8518)	(-3.8150)	(-3.8615)
Board size	-0.0198	-0.0391	-0.0134	-0.0274
	(-1.3388)	(-1.4663)	(-0.8950)	(-1.0203)
Board independent	0.0871***	0.1571***	0.0866***	0.1562***
	(6.6231)	(6.6361)	(6.5782)	(6.5928)
Constant	0.2076***	0.3841***	0.1948***	0.3610***
	(9.2183)	(9.4796)	(8.6575)	(8.9142)
Industry effect	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
Observations	6,816	6,816	6,816	6,816

*Notes: *,**or *** indicates significance at the 10%, 5% or 1% level respectively*

CHAPTER 5

CONCLUSION AND RECOMMENDATION

Chapter 5 concludes this study. This chapter consists of:

5.1 Summary of findings

5.2 Recommendation for future study

5.1 Summary of Findings

This study provides empirical evidence on the relationship between board gender diversity and corporate risk taking among Malaysian public listed companies. In recent years, board gender diversity is getting a lot of attention in the area of corporate governance. However, studies on board gender diversity and corporate risk taking are still limited specifically in the developing markets. The main objectives of this study examine whether the participation of female directors can mitigate corporate risk taking.

Utilising pooled OLS and panel data regression, this study finds that board gender diversity is negatively related to the corporate risk taking, where the presence of women on boards can decrease the level of firm risk taking due to different risk preferences between men and women. The results show that male-only boards lead to higher level of risk taking while, having women on boards can mitigate corporate risk taking. Women are likely to take less risk than men whom are overconfident and tend to choose risky

projects. The results support the Hypothesis 1 and Hypothesis 2. These results are also consistent with existing studies (Faccio, et al. 2016).

5.2 Recommendation for Future Study

This study can be further be extended by using other alternative measures to proxy for corporate risk taking such as, industry adjusted standard deviation of return on assets and volatility of stock returns. Future study should also control for endogeneity problem. From the reported results, this study acknowledges that the adjusted R-squared are very low. So there is a room to further test this relationship with other control variables. Due to the differences in the risk taking behaviour, future study can examine the effects of independent female directors on corporate risk taking behaviour. In addition, it is recommended that future study could investigate more about board gender diversity and corporate risk taking especially using evidence from developing markets due to the weaker corporate governance.

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