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Board Diversity and Women Directors' Attributes: New Insights from Bank Risk, Stability and Stock Market Valuations with Evidence from Alternative Banking Models

Rana Hamaid Alharbi

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Abstract

This thesis investigates board diversity and its association with bank stability and market value, employing a unique sample drawn from countries operating dual banking systems (Islamic and conventional). Three studies are presented that examine comprehensive diversity indicators previously untested in the literature. Study 1 presents an assessment of measures of board diversity (gender, education, nationality) in relation to three bank measures of stability for listed and unlisted banks. Studies 2 and 3 focus on listed banks and board gender diversity, alongside unique attributes for women directors reflecting monitoring, independence, and leadership, considered together with financial expertise, nationality, and education in relation to stock market valuation (Study 2) and five measures of bank risk (Study 3). The findings from Study 1 provide strong evidence that banks with women directors and directors with doctorates exhibit high bank stability. In contrast, foreign directors are significantly negatively associated with bank stability. The effects of directors' gender, nationality, and education on bank stability differ by bank type. Study 2 provides strong evidence that having women directors on the board is positively associated with bank value for conventional banks, but not for Islamic banks, as are independent women directors, those with a high level of education, and those holding accounting/finance qualifications. Women chairpersons have no significant association, but foreign women directors and those who graduated from foreign universities are negatively associated with bank value. Study 3 shows that the presence of women directors and independent women directors is negatively associated with bank risk. However, there is significant evidence that women directors with postgraduate degrees and those with accounting and finance qualifications significantly reduce bank risk in conventional banks, although this relationship only holds for market risk within Islamic banks. The findings offer valuable new insights and important policy implications for international banking research, investors, and regulators.

Dedication

I dedicate this thesis to my parents, who have been praying and waiting for this moment. I also dedicate it to my husband (Adel) and my children (Mohammed and Julia), for their continuous support and encouragement. I also dedicate this thesis to my siblings. Finally, I dedicate this thesis to my grandmother's soul (Mama's mom) who praying for and loved me, and I wish she had lived to see this moment with me.

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List of Abbreviations

Abbreviation	Meaning
2SLS	Two-stage least squares
3SLS	Three-stage least squares
AAOIFI	Accounting and Auditing Organizations for Islamic Financial Institutions
BSBS	Basel Committee on Banking Supervision
BOD	Board of directors
CAR	Capital adequacy ratio
CB	Conventional bank
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CG	Corporate governance
CMBT	Capital Markets Board of Turkey
CRO	Chief Risk Officer
CSR	Corporate social responsibility
EU	European Union
FTSE	Financial Times Stock Exchange
GCC	Gulf Cooperation Countries
GDP	Annual gross domestic product
GMM	Two-step system generalized method of moments
HHI	Herfindahl–Hirschman index
IAH	Investment account holder
IB	Islamic bank
IFRS	International Financial Reporting Standard
IFSB	Islamic Financial Service Board
IIFM	International Islamic Financial Market
IIRA	International Islamic Rating Agency
IV	Instrumental variable
LMC	Liquidity Management Centre
LM	Breusch and Pagan Lagrange multiplier
LLR	Loan loss reserve
NPL	Non-performing loan
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary least squares

PLS	Profit-loss sharing
PSM	Propensity score matching
ROAA	Return on average assets
ROAE	Return on average equity
SD	Standard deviation
S&P	Standard & Poor's
SOX	Sarbanes–Oxley Act
SME	Small and medium-sized enterprise
SSB	Shari'ah Supervisory Board
SDG	Sustainable development goal
TA	Total assets
UAE	United Arab Emirates
USD	US dollars
VIF	Variance inflation factor

Chapter 1. Introduction

1.1 Introduction

The global financial crisis of 2007–2009 drew attention to the importance of the stability of banks, particularly given their considerable role in safeguarding the financial stability of the economy as a whole. In banking, many demands have been made by the public and legislators in support of the design of efficient governance systems and boards of directors that will align the interests of managers with those of shareholders and stakeholders (Shibani and Fuentes, 2017). Previous studies have claimed that internal approaches to corporate governance have failed to control banking risks and that this may be the main explanation for the financial disaster (Pathan, 2009; Minton et al., 2014). To improve banking governance, new regulations have been developed with a view to mitigating risk and strengthening financial stability based on the prescription of minimum levels for capital and liquidity. Consequently, new guidelines have been established to enhance value and avoid the failure of banks, along with increasing public confidence (Pathan, 2009; Aebi et al., 2012; Elnahass et al., 2020). Corporate governance is a sensitive and complicated issue in the modern business field and it must continue to improve in order to meet public demands and business environment needs (Mollah and Zaman, 2015).

Corporate governance in the banking industry is different from that in non-financial sectors due to its underlying principles. The banking sector is highly regulated and more complex than other areas of business because the external regulators of banks act on behalf of stakeholders such as depositors, investors, and creditors, ensuring that the banks are sound and work in their interests. The importance of high levels of regulation in the banking sector lies in the fact that bank instability can lead to financial disaster (Adams and Mehran, 2003). Thus, the regulators of banks conduct monitoring on behalf of the stakeholders' interests and external regulators such as the government can monitor the bank's activities (Onali et al., 2016). The complex business functions in banking lead to information asymmetry between managers and stakeholders, which reduces the ability of the latter to control and follow management decision making (De Andres and Vallelado, 2008).

According to De Vita and Luo (2017), there are two perspectives on external regulations that affect bank performance and risk: those of the banks themselves and those of the regulators. First, De Vita and Luo (2017) argue that less strict regulations may increase diversification in a bank's investments, which may lead to reduced risk. With regard to the views of regulators, they explain the different perspectives in terms of public and private benefits, as suggested by

Barth et al. (2013). The public see that the government's external regulations increase the efficiency of banks and reduce the risk of market failure and the banks are monitored for the benefit of the public. However, the private perspective may be that the regulations disrupt the bank's performance to the benefit of the few rather than being in the wider public interest (Barth et al., 2013). Regulations increase the monitoring responsibilities of the board in banking organizations more than in others as banking has different governance arrangements (Adams and Mehran, 2003). Therefore, the board of directors has an extra critical role compared to other industries because the business operations are not transparent to the broader set of stakeholders, which includes shareholders, creditors, debtors, regulators, and investors (D'Amato and Gallo, 2019). Accordingly, the board of directors' role not only includes the monitoring of managers, but also the offering of advice and counsel to managers (De Andres and Vallelado, 2008). In terms of poor banking practice, along with the various characteristics of corporate governance, scholars and specialists attribute key responsibility to the weaknesses of boards of directors in executing their duties due to their essential accountability for all of a bank's strategic decision making (Andres and Vallelado, 2008). Based on the above arguments, it is possible to summarize the responsibilities of board members based on the complexity of banking in relation to two aspects: (i) their legal responsibility for the bank's health based on approval of various decisions; (ii) their duty of monitoring (Adams and Mehran, 2003).

Several studies in the literature have underlined the critical role of good corporate governance in banking and its association with how failure in the shape of regulatory disasters could weaken the stability of the financial system (D'Amato and Gallo, 2019). Therefore, academic and regulatory pressure is exerted to alleviate banking risk, helping to prevent exposure to excessive risk for individuals, organizations, and other financial institutions and reduce the risk of financial instability in general (Srivastav and Hagendorff, 2016). The literature on banking governance shows how critical the role of the board of directors is in mitigating bank risk, and driving performance, earnings management, and stock market valuation (Pathan, 2009; Pathan and Faff, 2013; Berger et al., 2014; Dong et al., 2017; Owen and Temesvary, 2018; Birindelli et al, 2020; Elnahass et al., 2020a; Trinh et al., 2020; Elnahass et al., 2021a; Elnahass et al., 2021b). Board members work as the principal means of internal governance as they protect the interests of stakeholders by improving decision making, which may shield the firm from excessive risk and enhance its financial performance; thus, the board structure reflects how soundly the obligations of governance are being satisfied (Hsu et al., 2019). Therefore, a board of directors which is efficient in monitoring banking functions fosters market approval and public and shareholder trust (García-Meca et al., 2015).

Besides this, proponents of the resource dependence perspective claim that boards of directors are efficient sources of resources, such as legitimacy, guidance, information, and counsel, which are linked to the market and other outside organizations and may help in monitoring and the mitigation of risk (Hillman and Dalziel, 2003). The board's efficiency in terms of the provision of important resources can improve financial performance and help with the monitoring of managers (Jermias and Gani, 2014). In terms of the capability to conduct efficient monitoring to align benefits to stakeholders with those to management, the characteristics, attributes, and skills of the board of directors influence the extent to which it can be guaranteed that they are working within the organization's legal and ethical obligations (Fama and Jensen, 1983; Arfken et al., 2004; Larkin et al., 2012). In this regard, having greater diversity among members on the board is expected to have an impact on performance with respect to boardroom decision making and bank stability (risk and performance), as well as on market value.

The literature linking the banking sector with board diversity is important because of the vital role of board members in banking governance. Prior evidence to date shows limited and mixed evidence regarding the impact of board diversity in mitigating bank risk and promoting long-term resilience. A board being diverse implies differences among board members, for example in terms of gender, nationality, education, skills, and experience. The concept of board diversity refers to "board member composition and the varied combination of attributes, characteristics and expertise contributed by individual board members in relation to board processes and decision-making" (Ingley and van der Walt, 2003, p.8). Theoretically, board diversity is measured to deduce the members' diverse abilities to fulfil their board functions by employing their different skills, experience, contacts, and knowledge, all of which reflect their attitudes in financial and business situations. However, the evaluation of board diversity and its impact on the decision-making process is difficult and building arguments about the characteristics of a board and its effect on banking outcomes is problematic. What is clear is that it is crucial for banks to choose their directors carefully to mitigate information asymmetry and possible conflicts of interest. The different attributes, skills, and qualities required have been considered in corporate governance research and previous studies have verified that there is a significant positive association between the attributes of board directors and both the value of the firm and financial performance (e.g. Lu and Boateng, 2017; Faleye et al., 2018; Jouida, 2019). Board diversity is also important in an uncertain environment such as the banking field since heterogeneity among board members may enhance the quality of decision making through the expression of differing views (Forbes and Milliken, 1999). Gender, nationality, and education are general aspects of variety within a board and it is

critical to consider such different characteristics of board members and their influence on corporate governance in banking. This thesis examines this issue in Chapter 4.

A much-debated area of research concerns gender diversity and how women may behave in directorship positions. Women directors can bring new vision to the board with their contacts and resources and contrasting skills and backgrounds. In short, they do not belong to the "old boys club". Moreover, women are known to have better monitoring abilities, which may help to mitigate excessively risky activity and thus enhance bank performance and stability. Indeed, some studies have found that the presence of women directors has a positive association with bank risk (Adams and Funk, 2012; Berger et al., 2014), although other studies have found no association between the presence of women directors and market reaction/performance (Hagendorff and Keasey, 2012; Pathan and Faff, 2013), explained by the fact that they have less experience in board positions. Therefore, there is public concern about hiring women only for the purpose of gender diversity and not based on qualifications that may help to enhance the functioning of the board. For this reason, it is important to investigate the different attributes of women and their impact on corporate governance in banking. This thesis investigates these matters in Chapters 5 and 6. As far as diversity in nationality is concerned, there are two sides to the argument. On the one hand, foreign members can bring international experience and new resources and networking, linking the bank to the global market. This may enhance the board's monitoring reputation, providing the kinds of resources and skills which can lead to increased bank performance and stability. On the other hand, a criticism is that they may be unable to monitor operations efficiently due to misunderstandings arising from different business cultures, environments, and regulations, which could negatively impact bank governance (García-Meca et al., 2015; Dong et al., 2017). In terms of other attributes, more highly educated and specialist board members could confer higher skill levels and wider resources and networking that may enhance the quality of business strategizing and decision making, combined with better monitoring functions and a good board reputation. This could be associated with greater bank stability by increasing the performance at an optimal risk level.

The first major research examining the issue of board diversity was published by Carter et al. (2003), followed by studies of various aspects of the phenomenon of board diversity in non-financial sectors that reported significantly different findings (e.g. Farrell and Hersch, 2005; Adams and Ferreira, 2009; Bear et al., 2010; Carter et al., 2010; Masulis et al., 2012; Estélyi and Nisar, 2016; Bennouri et al., 2018; Salloum et al., 2019). Most studies excluded banking organizations from their samples because of the complexity of their functioning and high

information asymmetry and agency costs. Indeed, only a few studies have investigated corporate governance in banking and its relationship to fundamental aspects of stability, including risk, performance, and cost efficiency, and other financial measures such as market value. For example, Elyasiani and Zhang (2015), Mollah and Zaman (2015), Mollah et al. (2017), Trinh et al. (2020) and Elnahass et al. (2020a) examined the crucial role performed by corporate governance, considering factors such as board size, independence, multiple directorships, the compensation of managers, and composition of ownership. However, investigations linked to board diversity often use only one measure, such as gender diversity (e.g. De Cabo et al., 2012; Pathan and Faff, 2013; Farag and Mallin, 2017; Kinateder et al., 2021) or education level (D'Amato and Gallo, 2017), or two diversity variables together, such as gender and nationality (García-Meca et al., 2015; Dong et al., 2017; Arnaboldi et al., 2020), or gender and education (Berger et al., 2014). These studies have focused only on bank performance or risk in assoiation with one or two dimensions of diversity. However, no research has yet been conducted on bank stability or market valuation using comprehensive financial and board diversity indicators in an international sample (see Table 3.1 in Chapter 3).

No empirical study to date has examined the impact of board diversity on financial stability, and market valuation across different bank types. In the conventional banking literature, García-Meca et al. (2015) and Arnaboldi et al. (2020) showed that women and foreign directors have a significant effect on performance in European banks, while Dong et al. (2017) found that the women directors have a significant effect on risk in Chinese banks. Moreover, Berger et al. (2014) showed that the changing numbers of executives who are women and PhD holders over the years have had significant effects on risk in German banks. Furthermore, Elnahass et al. (2020a) showed that board busyness has a significant effect in Islamic and conventional banks. In this thesis a unique sample is constructed using data from countries operating dual banking systems (i.e. Islamic and conventional banks), and employing indicators that have not previously been tested in studies of board diversity. Therefore, the findings in this study address a gap in the corporate governance banking literature focussing on board diversity in the Middle East and Islamic countries.

1.2 Research Objectives

Due to the critical exposure of corporate governance structures in the contemporary market, the first objective of this thesis is to investigate the association of the diversity of boards of directors with bank stability, taking into account different board diversity measures and employing an international sample for banks operating dual banking systems. To the best of

my knowledge, theoretical and empirical evidence is scarce on the subject of board diversity from a global banking perspective with respect to bank stability indicators.

There is also a specific focus in this thesis (within the last two empirical chapters) on extending its scope and the incremental contribtion by examining gender diversity alongside the unique attributes of women directors on the board and their association with stock market valuations as well as bank risk. Considering the different attributes of women directors in studying bank risk and market valuation in the banking context is rare.

The differential effects of bank type (Islamic versus conventional banking) are thoroughly assessed and discussed throughout the thesis, a novel aspect that has not been examined before in prior literature. Accordingly, this thesis aims to address and cover several crucial gaps in the existing banking literature and present incremental contributions (see also section 1.3).

Three empirical studies are undertaken in this thesis, the first of which offers an overall examination of bank stability, taking into consideration board diversity in terms of gender, nationality, and education, and concentrating on both listed and non-listed banks. The second and third empirical studies specifically focus on gender diversity for listed banks, the shares of which are traded on stock markets. These studies also integrate the particular and different attributes of women directors and the extent to which they are associated with market valuation and bank risk. Hence, the specific objectives and aims of the study are as follows:

(1) To examine the association of board diversity in terms of gender, nationality, and education of directors with bank stability (see Figure 1.1).
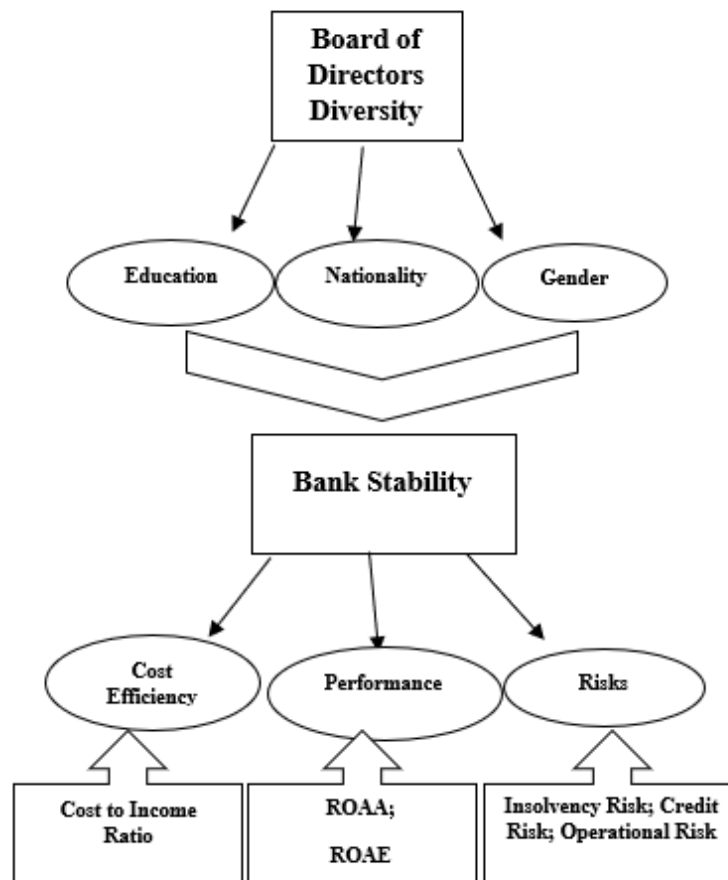
Figure 1.1. Objective 1: Examining the association of board diversity with bank stability

(2) To evaluate the effects of board gender diversity and to investigate the association of particular attributes of women directors with the market valuations for listed banks (see Figure 1.2).
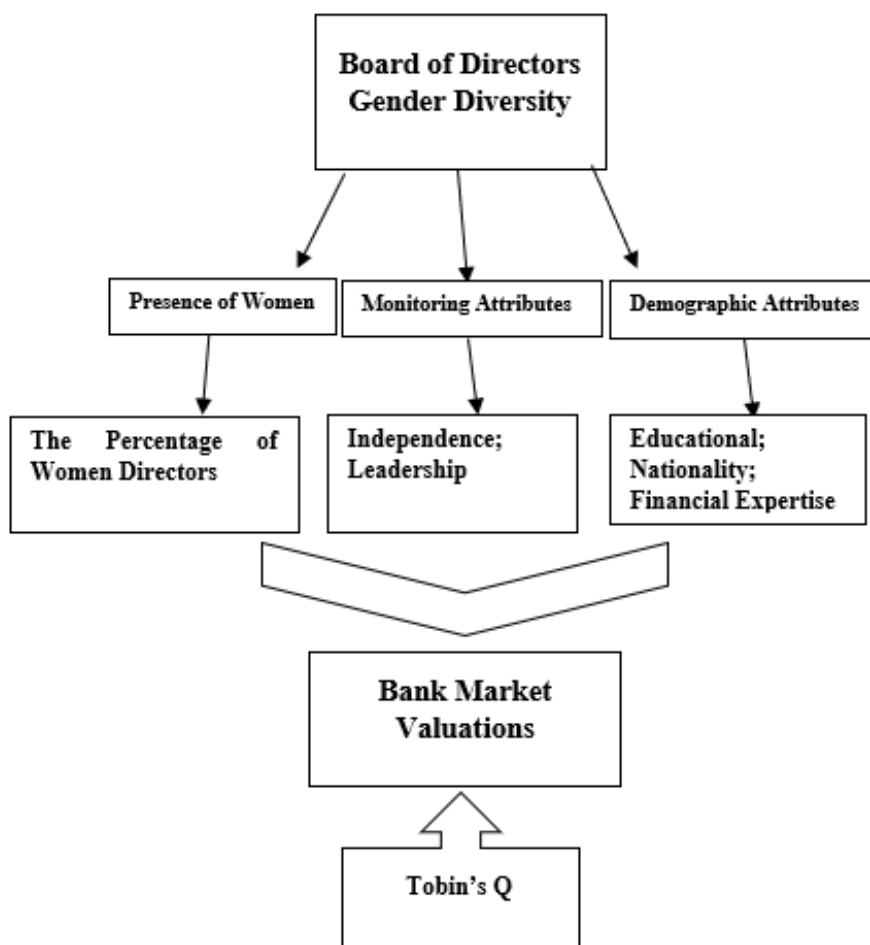
Figure 1.2. Objective 2: Examining the association of board gender diversity with bank market valuation

(3) To evaluate the association of board gender diversity and risk in listed banks, investigating the association with particular attributes of women directors on (see Figure 1.3).
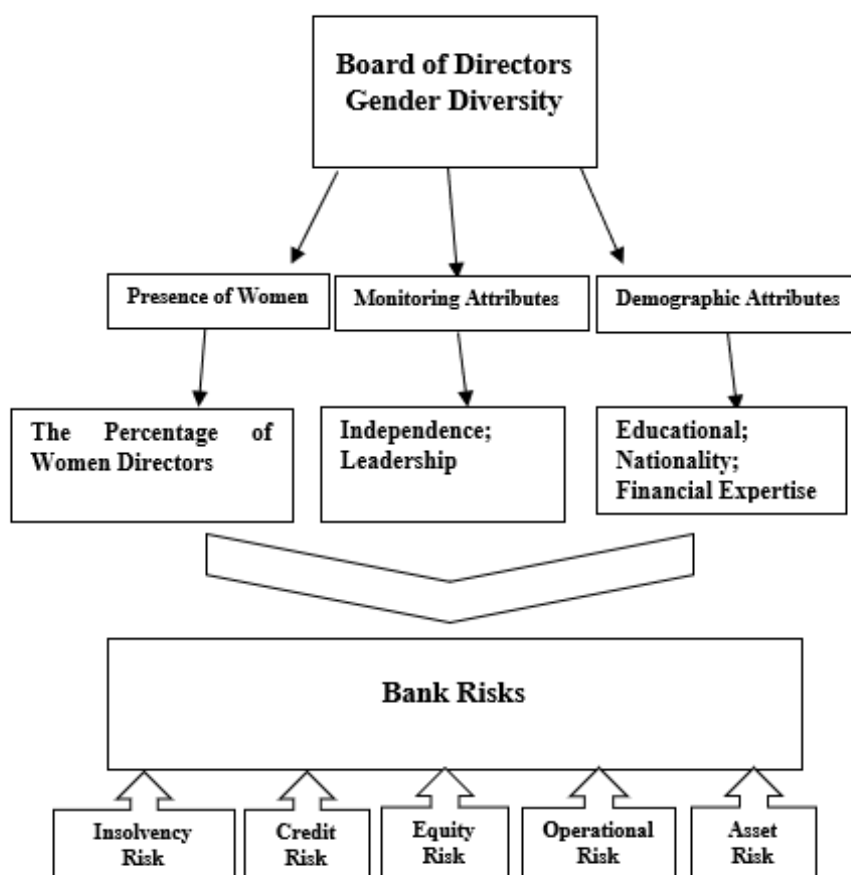
Figure 1.3. Objective 3: Examining the association of board gender diversity with bank risk

In line with these research objectives, there are three empirical chapters, as set out below.

Study 1 (Chapter 3). It is not just about gender representation: Corporate board diversity in banking

Chapter 3 considers aspects of board diversity and stability issues in the financial sector by carrying out investigations of Islamic and conventional banks. The research uses a sample of listed and unlisted Islamic and conventional banks in 14 countries, employing data for the period 2007–2017. The findings indicate that board diversity does have an association with bank stability. In comparing the effects of three different aspects of diversity on bank stability, the presence of women and PhD holders among directors is associated with greater stability, while foreign directors are linked with lower stability. Comparisons of bank type in terms of gender, nationality, and educational level within boards show differences in effects on bank stability. Women directors exhibit low risks in both bank types but are associated

with lower performance in Islamic banks and higher performance in their conventional counterparts. In conventional banks, foreign directors are linked with higher bank risk and reduced financial performance, contrary to Islamic banks. Moreover, having PhD holders among directors leads to greater stability for both bank types. The significance of these results increases with the degree of board diversity. The positive impact of board diversity on stability in the whole sample and among conventional banks tends to confirm the hypotheses and expectations proposed in this thesis, except for those relating to nationality when conventional and Islamic banks are compared.

Study 2 (Chapter 4). Women directors and market valuation: What are the "Wonder Woman" attributes in banking?

This chapter broadens the empirical investigation to consider the influence of gender diversity on the board on stock market valuation in the two bank types. The objective is to investigate whether and how investors value gender diversity on the board and the different attributes of women directors in a sample of listed Islamic and conventional banks functioning in 12 countries over the period 2007–2017. The investigation finds statistically significant indications of differential market valuations for boards with women directors. In the full sample, investors tend to recognize gender diversity as significantly increasing a bank's value, as do the presence of independent women board members, women directors with high levels of education, and those holding accounting and finance qualifications. In contrast, women's leadership as chairpersons has signficant association with market value, but attributes of foreign nationality and women members who graduated from foreign universities are associated with lower stock market values. Women on the boards of Islamic banks are associated with lower market value, but the opposite holds for conventional banks. The different attributes of women directors seem to have the opposite effects in Islamic banks to conventional banks. This suggests that investors in different bank types tend to have different valuations for the presence of women directors depending on women directors' attributes. Furthermore, based on the investigation of the effect of the financial crisis for the full sample, the findings suggest that women directors are associated with higher bank value only for the period of non-crisis years.

Study 3 (Chapter 5). Bank risk mitigation: Opening up the black box of women dierctors' attributes and demographics

The objective of this chapter is to test the effects of gender diversity on the board and different attributes of women directors on the several measures of bank risk in the two

banking types. The study again considers a multi-country sample of listed Islamic and conventional banks in 12 countries for the years 2010–2017. The findings show that having women directors on boards is substantially negatively associated with bank risk, as are other attributes, such as the independence of women directors, their postgraduate levels of education, and those with accounting and finance qualifications. In contrast, the findings concerning financial expertise, the foreign nationality of women directors, and graduation from international universities show higher bank risk. For Islamic banks, women on the board show low risk only for equity, whereas they are associated with low risk on all indicators in conventional banks. Women's different attributes show contrasting results for Islamic banks and conventional banks. These results indicate that Islamic banks are likely to face different levels of risk than their conventional counterparts, which may be attributed to the more constrained business model. Furthermore, the effectiveness of women directors in risk management is examined by analysing the relationship between bank profitability and risk. Women directors show highly effective management of bank risk.

1.3 Research Contributions

The contributions made in this thesis are investigated in more detail in Chapters 4, 5, and 6, which present the findings for the first, second, and third objectives respectively.

In general, this thesis contributes to the literature by extending the existing comparisons of Islamic and conventional banks found in the literature (e.g. Čihák and Hesse, 2010; Abedifar et al., 2013; Beck et al., 2013; Mollah and Zaman, 2015; Mollah et al., 2021; Elnahass et al., 2020; Trinh et al. 2020) in relation to corporate governance and the soundness of banks in a number of respects. It expands the literature on the effects of board diversity in corporate governance investigations (e.g. De Cabo et al., 2012; Pathan and Faff, 2013; Berger et al., 2014; García-Meca et al., 2015; D'Amato and Gallo, 2017; Dong et al., 2017; Farag and Mallin, 2017; Arnaboldi et al., 2020; Kinateder et al., 2021). First, to the best of my knowledge, the research described in Chapter 4 is the first to investigate the relationship between board diversity in terms of the gender, nationality, and educational levels of directors and bank stability in terms of risk, performance, and efficiency from an international perspective in the banking industry and comparing Islamic and conventional banks. Specifically, Chapter 4 contributes to the literature first by extending the investigation to three aspects of diversity, second by studying an international sample rather than a single country or US or European banks, and third by conducting a detailed comparison of Islamic and conventional banks.

The thesis also adds new insights to the ongoing debate about the effect of gender diversity within boards of directors by investigating how the different attributes of women directors affect market valuation and bank risk (Chapters 5 and 6). More specifically, the second and third objectives of this study contribute to the literature (e.g. Bennouri et al., 2018; Gull et al., 2018) by studying the link between particular attributes of women directors and their implications for financial industry outcomes. This is the first study to investigate the different attributes of women board members and the effects on market valuation and risk in the financial sector.

This study also expands on the literature exploring the effect of efficient governance and board attributes for periods of financial distress, as in the financial crisis of 2007. Moreover, earlier investigations, such as those of Minton et al. (2014) and recently Kinateder et al. (2021), examined only board structure and the impact of their characteristics on bank risk. However, the third empirical study in this research, described in Chapter 6, tests the effect of different attributes of women directors on bank risk in an international sample, as well as investigating the different effects for Islamic and conventional banks.

Moreover, while previous studies have taken into account limited aspects of risk, such as total and credit risk, this study independently evaluates five measures: insolvency, credit risk, equity risk, operational risk, and asset risk. Therefore, this empirical study contributes greatly to the literature on gender diversity and risk in banks (De Cabo et al., 2012; Berger et al., 2014; Dong et al., 2017; Kinateder et al., 2021) by: (i) investigating more comprehensive risk measures; (ii) examining the effect of various attributes of women directors on bank risk rather than merely considering the presence or absence of women on boards; (iii) comparing evaluations of Islamic and conventional banks; (iv) testing the efficiency of risk management in banks with women directors. In particular, this thesis presents the first comparative evaluation of stability (Study 1), and investigations of market valuation (Study 2), and risks (Study 3) in terms of the characteristics of diversity in boards of directors. The findings of this thesis also contribute to the sparse literature comparing governance in Islamic and conventional banks (Mollah and Zaman, 2015; Mollah et al., 2021; Elnahass et al., 2021a; Trinh et al., 2020), and international indicators are presented for the different effects of diversity within boards in the two bank types.

Finally, the sample of banking organizations in this thesis is selected from Middle Eastern and Asian countries, namely developing countries where levels of legal protection for investors are low. This low legal protection can result in considerable information asymmetry and thus

the quality of corporate governance structures is even more important as the legal safeguards are weak (Klapper and Love, 2004).

1.4 Thesis Structure

The remainder of this thesis is structured as follows. Chapter 2 presents the research background to the field of study by providing explanations of corporate governance in the banking sector and the different types of corporate governance models. This chapter also provides a review of Islamic finance and introduces the differences between the two banking systems (Islamic and conventional). Chapter 3 introduces diversity in boards of directors and discusses the five relevant theoretical concepts. The research conducted to achieve the three main empirical objectives of the study is then set out in Chapters 4, 5, and 6. Each of these chapters outlines the relevant theories employed in the context of the particular research question, using predictions from these theories together with empirical findings from the relevant literature to develop thy hypotheses to be tested. The methodology, data analysis, empirical findings, discussion, and conclusions are presented within each chapter. Finally, Chapter 7 presents the conclusions of the thesis, summarizing the main findings, outlining the implications of the study and its limitations, and making recommendations for further research.

Chapter 2. Background and Institutional Framework

2.1 Introduction

This chapter sets out the background to the thesis. First, it introduces corporate governance in the banking sector (section 2.2). Next, it considers the differences between Islamic and conventional banks, drawing on previous studies comparing Islamic and conventional banks (section 2.3). Finally, there is a summary of the chapter (section 2.4).

2.2 Corporate Governance in Banking

The concept of corporate governance is defined by the Organization for Economic Cooperation and Development (OECD, 1999) *Principles of Corporate Governance* as a group of connections between a firm's board, management, managers, and shareholders and other stakeholders. Similarly, Kyereboah-Coleman and Biekpe (2006) define it as the relationship between a company and its shareholders, or the relationship between the firm and the whole of society. The global financial crisis drew attention to the importance of corporate governance, particularly in the banking sector, as it is considered fundamental to the world's financial system.

According to the Basel Committee for Banking Supervision (BCBS, 2015, p. 3):

> Corporate governance determines the allocation of authority and responsibilities by which the business and affairs of a bank are carried out by its board and senior management, including how they: set the bank's strategy and objectives; select and oversee personnel; operate the bank's business on a day-to-day basis; protect the interests of depositors, meet shareholder obligations, and take into account the interests of other recognised stakeholders; align corporate culture, corporate activities and behaviour with the expectation that the bank will operate in a safe and sound manner, with integrity and in compliance with applicable laws and regulations; and establish control functions.

Corporate governance models differ around the world. The Anglo-Saxon model is applied widely in the UK and the US, as well as some European and some Asian countries. It is a market-based model (i.e. shareholders' model), with governance focused on maximizing the shareholders' value. According to Cernat (2004), this model gives shareholders access to the banks via the board of directors (agents), enabling them to engage in monitoring to guard their interests and rights. This model is related to agency theory, introduced in 2.5.1.

In contrast, the German or European corporate governance model was developed to solve the agency problem of the Anglo-Saxon model, which may arise due to conflicting incentives between the principal (shareholders) and the agent (board of directors). This model employs a governance system that applyies a two-tier approach. The management of the bank

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(management board) has the obligation to protect the rights and interests of all stakeholders (i.e. bondholders, creditors, depositors, investors, regulators), while the supervisory board is responsible for guiding and monitoring the board's activities (Schilling, 2001).

Concerning the role of boards of directors in corporate governance, O'Sullivan (2000) notes that they influence how firms allocate their resources and they shape decision making concerning investments and how the return on investments will be allocated. According to the Cadbury Report (2002), the board members' main role is to state the firm's purpose, strategize, put in place a plan to meet the firm's goals, create the policies of the firm, appoint executives (e.g. the CEO), and evaluate the activities of the management team as outcomes. To illustrate, the three key functions of boards of directors as stated by Nicholson and Kiel (2004, p. 454) are as follows:

> (1) [C]ontrolling the organisation (including monitoring management, minimising agency costs and establishing the strategic direction of the firm); (2) providing advice to management (which may include providing advice on strategy and is sometimes classified as a component of the control role) and (3) providing the firm, through personal and business contacts, access to resources (including access to finance, information and power).

Hence, the board of directors plays a vital role in making decisions that balance the requirements for profitability and financial stability in banks through optimal risk management (Kutubi et al., 2018). The board of directors' efficiency in the banking industry is different than in other sectors due to the highly regulated and complex system in the sector (Elyasiani and Zhang, 2015), which requires high monitoring and counselling (Klein, 1998). Board members work on maximizing the wealth of shareholders through decision making and monitoring the managers, especially when their activities are in conflict with the shareholders' interests. This latter point concerns a notable phenomenon called the agency issue, which arises from a conflict in interests between managers and shareholders, but which may be reduced by monitoring on the part of the board of directors (see 3.4.1). Thus, studying the effect of board members' different characteristics on bank profitability and risk decisions is an important matter in the corporate governance literature (Pathan, 2009; Pathan and Faff, 2013; Mollah et al., 2017; Trinh et al., 2020). This thesis hence concentrates on the effectiveness of directors' diversity within banks, arguing that there is a need for greater monitoring and consulting by boards of directors in banks than in non-financial firms.

2.3 Islamic versus Conventional Banking Systems

2.3.1 What is Islamic banking and finance?

The main concept on which Islamic finance, the Islamic banking model, and its capital market are founded is *Shari'ah* law (Islamic religious principles). All financial and business transactions are based on compliance with *Shari'ah.* As summarized by Greuning and Iqbal (2008, p. 7), "The basic framework for an Islamic financial system is a set of rules and laws, collectively referred to as Shariah, governing economic, social, political, and cultural aspects of Islamic societies".

The concept of *Shari'ah* refers to "the path" that shapes how individuals live their belief in God; indeed, it leads Muslims' daily activities and regulates their relationship with God and with each other in all aspects of life, including standards, morals and social norms.[1] Islam is thus concerned with more than just the relationship between the person and God, shaping the way Muslims live. This is based on rules established to help people live a just life and provide security in terms of beliefs, worship, and moral transactions. Accordingly, Islam regulates morals and behaviour in financial dealings and business transactions in society and all Muslims must follow its precepts.

Notably, Islamic finance prohibits the charging of *Riba* (interest) to generate money in its business model. Instead, it uses many other procedures to generate funding. Moreover, Islamic law forbids certain other financial activities, such as *Maysir* and *Gharar* (speculation and uncertainty, respectively). These prohibitions led to the establishment of Islamic banks, so that Muslim communities could avoid the activities of conventional banks forbidden in Islam.

The first Islamic banks date back to Egypt in the early 1970s and there has since been sharp growth over the last 30 years in different countries. The size of this sector has increased from hundreds of thousands of US dollars in 1975 to billions of dollars now. According to an Islamic Financial Services Board (IFSB, 2020) stability report, the total assets of Islamic banks increased by 12.7% from 2018 to 2019, i.e. from \$1.57 trillion to \$1.77 trillion. In the last 30 years, Islamic banking has grown quickly in both Muslim and non-Muslim countries, although most Islamic banks are concentrated in the Middle East and Asia (Khediri et al., 2015).

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[1] *Shari'ah* has two main sources, the "Quran", or holy book, and Sunnah (the prophet Mohammed's explanation of Islam). There are two other sources, the *Ijmah*/*Figh* (unanimity/consensus), comprising explanations by Islamic experts, and *Quays* (logical analogy based on similar past events).

Figure 2.1 shows the regional concentration of Islamic bank assets for the third quarter of 2019 (3Q19), with the sector being both resilient and stable. Around 96.3% of such banks are in countries led by Islamic finance and with substantial Islamic banking market share compared to conventional banking. For example, there is a significant increase in Islamic banking market share in Saudi Arabia from 52% in 2Q18 to 69.0% in 3Q19 due (inter alia) to greater penetration of Islamic windows in conventional banks as part of government efforts to support the regulatory environment and aid economic diversification (IFSB, 2020). Moreover, due to an increase in fully fledged Islamic banks in which all business undertaken is aligned with *Shari'ah* law, conventional banks have started to offer Islamic services subsumed under the Islamic window. Through the Islamic windows, these banks provide products to fulfil clients' requirements and meet the needs of the competitive banking environment, delivering such products alongside the conventional business transactions undertaken on the part of the conventional bank. The IFSB (2020, p. 129) report defines the Islamic window as "that part of a conventional financial institution (which may be a branch or a dedicated unit of that institution) that provides both fund management (investment accounts) and financing and investment that are Shari'ah-compliant, with separate funds. It could also provide takāful or retakāful services".[2] The Islamic window is part of the banking culture in certain areas and is a dominant aspect of the banking industry in Bangladesh, Indonesia, Malaysia, Oman, and Pakistan especially. Indeed, Saudi Arabia has no fully-fledged (solely conventional) banks. Therefore, this thesis includes conventional banks with Islamic windows in its sample.[3]

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[2] Takāful or retakāful services are "a part of a conventional insurer/reinsurer (which may be a branch or a dedicated unit of that institution) that provides takāful or retakāful services that are in line with Sharī'ah rules and principles" (IFSB, 2018). According to Greuning and Iqbal (2008), "The closest Islamic instrument to the contemporary system of insurance is takaful, which literally means mutual or joint guarantee. Typically, takaful is carried out in the form of solidarity mudarabah, where the participants agree to share their losses by contributing periodic premiums in the form of investments. They are then entitled to redeem the residual value of profits after fulfilling the claims and premiums" (p. 28).

[3] Note that Kuwait and Qatar do not recognize conventional banks with Islamic windows.
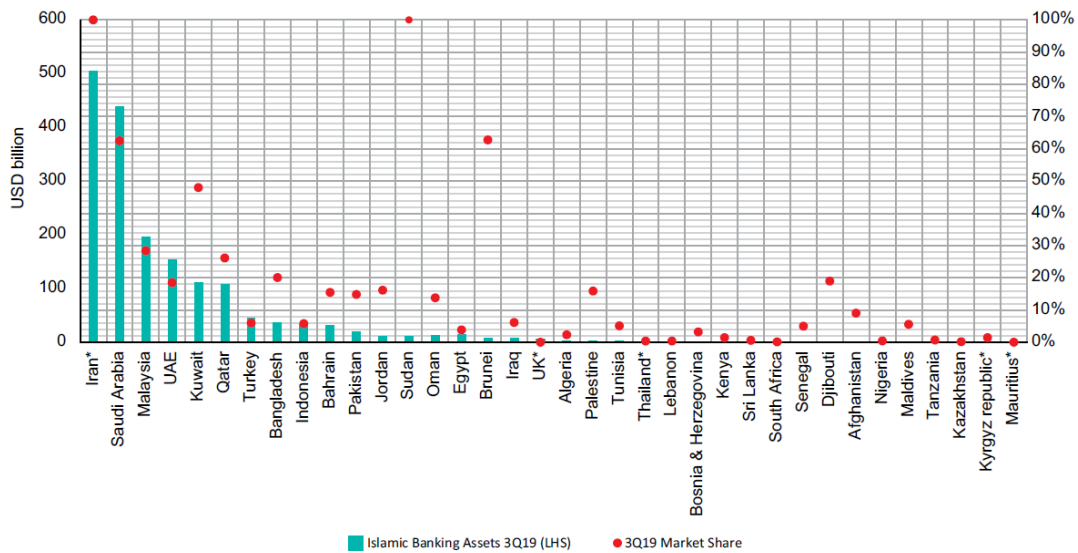
Figure 2.1. Islamic banking assets and market share (3Q19) (Source: IFSB, 2020, p. 16)

Figure 2.2 provides further illustration, displaying the countries with the most dominant shares of Islamic banking assets. As can be seen, there is a particular prevalence of Islamic banking assets in Iran (28.9%) and Saudi Arabia (24.9%), followed by Malaysia (11.1%) and the United Arab Emirates ([UAE] 8.7%), with many other countries following suit (IFSB, 2020).
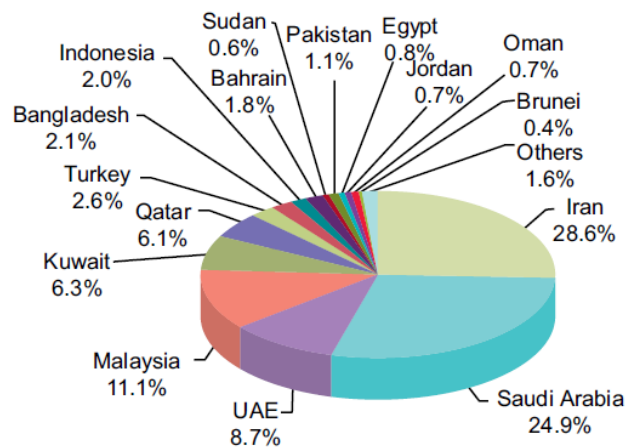
*The share is apportioned in US dollar terms.

Source: IFSB Secretariat Workings

Figure 2.2. Share of global Islamic banking (Source: IFSB, 2020, p. 15)

2.3.2 Differences between Islamic and conventional banking

The three core differences between Islamic banks and conventional banks are the business model, the regulation, and the corporate governance system. Regarding the business model, Islamic banks have five fundamental principles governing transactions which do not apply in conventional banks and it is useful to discuss these in order to understand the Islamic model. First, Islamic finance forbids the payment or receipt of interest for all business transactions and contracts, whereas the mechanisms of financial instruments in conventional banks are mainly based on interest rates. The Islamic banking system replaces the "interest-bearing contract" with "profit-bearing contracts", following a model of sharing profit and loss between the creditor and the borrower (Khediri et al., 2015) consistent with the notion of social justice in Islam, which entails sharing profit and risk (Iqbal and Mirakhor, 2013). In banking terms, the profit–loss sharing model entails equity-based contracts for the financing of ventures between lenders (Islamic banks) and borrowers (investors) (Greuning and Iqbal, 2008; Kettell, 2011). Second, according to Khediri et al. (2015, p. 76):

> Islamic banks collect funds through demand deposits (guaranteed and yield no return) and investment deposits (similar to mutual fund shares and not guaranteed a fixed return). Islamic banks have developed interest-free financing products based on profit and loss sharing (PLS) and mark-up principles.

Third, all contracts should be arranged and agreed based on transactions of real economic tangible assets (Elnahass et al., 2018). Fourth, dealing in a speculative manner and excessive risk are prohibited. The former is considered gambling (*Maysir*) and transactions carrying the latter (*Gharar*) are prohibited because there should be full disclosure and no asymmetric information in a contract (Greuning and Iqbal, 2008). Moreover, the prohibition of "*Gharar*" is linked to a form of risk management under the profit and loss sharing paradigm, which requires all parties to engage in intensive checks before making any obligation or undertaking agreements. Such checks aim to preclude the potential for informational asymmetry, high payoff contracts, or the transmission of risk from one party to another in the form of derivatives. Fifth, other forbidden financial transactions under *Shari'ah* principles are hoarding and investing or funding in illicit activities such as trading alcohol products, pornography, or pork products (Čihák and Hesse, 2010; Khediri et al., 2015).

Banking regulations are important because they set out the requirements and restrictions aimed at protecting the banks from failure and ensuring transparency between banks and other parties, including shareholders and other stakeholders (market members and investors in central bank government issues). These guidelines include capital adequacy requirements and supervisory and corporate governance guiding bank business and imposing limitations on

behaviours, ensuring the discipline of the market. The central banks in Islamic countries that are included in the thesis sample follow the guidelines and requirements of the Basel Committee on Banking Supervision (BCBS). However, most of the Basel guidelines are more appropriate for conventional banks. The central banks have thus had to issue new regulations consistent with an alternative model for Islamic banks, enabling them to work efficiently alongside conventional banks.

Because Islamic banking differs from the international banking model and must meet *Shari'ah* requirements, it has been necessary to publish new standards and guidelines to ensure that banks align with *Shari'ah* regulations (Ainley et al., 2007). Therefore, several Islamic institutions (e.g. the Accounting and Auditing Organization for Islamic Financial Institutions [AAOIFI], the Islamic Financial Services Board [IFSB], the International Islamic Financial Markets [IIFM], the International Islamic Rating Agency [IIRA], and the Liquidity Management Centre [LMC]) have been founded to regulate Islamic banking, providing frameworks that adapt the Basel requirements and standards and align them with Islamic principles. The IFSB, an international Islamic standard-setting institution based in Malaysia, has issued many standards, guidelines, and principles aimed at improving the regulation of Islamic banks. In addition, the AAOIFI,[4] based in Bahrain, has developed standards of accounting, auditing, governance, and ethics that align with *Shari'ah* for the international Islamic banking and finance industry. The core aim of these regulatory organizations is to promote growth in the international market for Islamic banking by complementing existing standards for conventional banks with *Shari'ah*-compliant measures, thus ensuring the stability of Islamic finance institutions around the world.

Finally, according to the IFSB (2006, p. 27), corporate governance from the Islamic perspective concerns:

> A set of relationships between a company's management, its Board of Directors, its shareholders and other stakeholders which provides the structure through which: (i) the objectives of the company are set; and (ii) the means of attaining those objectives and monitoring performance are determined. In the context of IIFS, good corporate governance should encompass: (i) a set of organizational arrangements whereby the actions of the management of IIFS are aligned, as far as possible, with the interests of its stakeholders; (ii) provision of proper incentives for the organs of governance such as the board of directors, SSB and management to pursue objectives that are in the interests of the stakeholders and facilitate effective monitoring, thereby encouraging

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[4] The AAOIFI is a standard-setting body for Islamic financial institutions in the areas of accounting, auditing, ethics and governance. It has nearly 200 members from 40 countries, including central banks. It has issued a total of 88 standards, comprising 26 accountability standards, 5 auditing standards, 7 governance standards, 2 ethics standards and *48 Shari'ah* standards.

IIFS to use resources more efficiently; and (iii) compliance with Islamic *Shari'ah* rules and principles.

The complexity of the Islamic banking model requires different governance mechanisms from those of conventional banks to monitor the suitability of contracts and transactions. Thus, there has been the advent of supra-authority members (*Shari'ah* supervisory committees) in Islamic banks with specialists qualified in Islamic religious education (*Usul al-Fiqh*) and the regulation of Islamic transactions (*Fiqh al-Mu'amalat*), as well as holding Islamic finance degrees. Islamic banks have multi-layered governance systems – both a board of directors and a *Shari'ah* supervisory board (SSB) – whereas conventional banks have a single governance layer (a board of directors and an audit committee) (Safieddine, 2009). The core responsibility of the SSB is to provide an internal monitoring system to verify that a bank's business is regulated and compliant with Islamic principles (Safieddine, 2009). The SSB is hence referred to as a "supra authority", which monitors the board of directors' decisions to ensure that they execute the ex-ante approved products/services (Alsaadi et al., 2017). Moreover, SSBs are responsible for checking business transactions and approving products, and they give advice, counsel, and suggestions to the board of directors (Kettell, 2011; Mollah et al., 2021). In addition, they publish independent statements verifying that all business transactions are compliant with *Shari'ah* law (Trinh et al., 2020).

The Islamic governance model also protects all stakeholders' interests but based on *Shari'ah* principles. It similarly has a two-tier governance system (a board of directors and SSB). The duties of boards of directors are similar in both bank types. These include making decisions, setting out strategies, protecting the interests of shareholders, and increasing bank value (Trinh et al., 2020). However, the decisions of boards of directors may be affected by the additional supervision of SSBs in monitoring *Shari'ah* compliance in Islamic banks (Mollah and Zaman, 2015). Such activities cause additional agency costs for Islamic banks (Trinh et al., 2020). Moreover, in conventional banks, the boards of directors have greater independence in making decisions (Mollah and Zaman, 2015; Mollah et al., 2017).

2.3.3 Literature on corporate governance and banking: Islamic vs conventional banks

With regard to literature comparing Islamic and conventional banks, studies of boards of directors and risk and performance are limited despite the growth of Islamic banking in global financial markets since the mid-1970s (Yunis, 2007). Early studies include those of Abomouamer (1989), who investigated the effect of *Shari'ah* regulation on Islamic banks, and Banaga et al. (1994), who examined the external auditing of Islamic banks in terms of corporate governance.

More recent studies have presented conflicting results. A paper that examined the relatively early differences between Islamic and conventional banks was that by Čihák and Hesse (2010), who considered a sample of 77 Islamic banks and 397 conventional banks in 19 countries from 1993 to 2004. Testing financial strength based on bank size and type, they found that the larger conventional banks were stronger financially than larger Islamic banks; however, they found the opposite for smaller banks. Moreover, they found that the Islamic banks faced issues with credit risk and high insolvency risk. In contrast, Beck et al. (2013) found that Islamic banks, while less cost-efficient than conventional banks, faced lower financial distress than conventional banks because they were healthier in terms of capital and had better asset quality. Recently, Safiullah and Shamsuddin (2019), studying differences in risk between the two bank types in a sample of 28 countries over the period 2003–2014, found that Islamic banks presented lower credit and insolvency risk, but higher liquidity risk, and similar operational risk to conventional counterparts.

The dissimilarities between the business models, corporate governance structures, and regulations have encouraged many researchers to compare the differences in terms of effectiveness in different bank types. For example, Mollah and Zaman (2015) examined board size, the independence of directors, and the role of SSBs in relation to Islamic bank performance. Mollah et al. (2017) studied the differences between the two bank types in terms of governance structure and the effect on risk and performance in 14 countries from 2005 to 2013, in 52 Islamic and 104 conventional banks. Mollah et al. (2021) examined the strength of board structure and chief executive officer (CEO) power, following the methodology of Pathan (2009), in governance structures to determine whether they were related to bank risk in Islamic and conventional banks. Trinh et al. (2020) examined the busyness of directors and the impact of stability in both bank types. In the most recent studies, Elnahass et al. (2020a) and Trinh et al. (2021) examined board busyness within Islamic and conventional banks with respect to stock market valuations and dividend pay-outs respectively while Elnahass et al. (2021b) examined earnings management and internal governance mechanisms in the two bank types.

Overall, despite the ongoing debates as well as recent research on corporate governance in Islamic versus conventional banks, no study to date has systematically and thoroughly examined the effects of board diversity among the two bank types. Moreover, global banking studies, irrespective of the bank type, have failed to incorporate the specific attributes of women directors to address the implications for bank value and various types of bank risk.

2.4 Summary

This chapter has discussed corporate governance in the banking sector. It has detailed the main differences between the bank types in the study sample (Islamic and conventional), showing that the business model, regulatory conditions, and corporate governance composition in Islamic banks are more complex than in conventional banks. It has also explored the previous literature comparing Islamic and conventional banks.

Chapter 3. Board Diversity and Relevant Theories

3.1 Introduction

This chapter provides further background to the thesis. First, it discusses diversity in boards of directors. Then, it identifies the three main characteristics of diversity in boards of directors – gender, nationality, and education – and their structure in this thesis (section 3.2), discussing each in detail. It goes on to explore the significant theories underpinning the thesis hypotheses (section 3.4). Finally, there is a summary of the chapter (section 3.5).

3.2 Diversity in Boards of Directors: Attributes and Composition

The importance of the different characteristics and the optimal composition of boards of directors have been the subject of heated debate in the literature for decades. Earlier studies (e.g. Pathan, 2009; Mollah and Zaman, 2015; Mollah et al., 2017) investigated the effects of board size and independent directors on bank outcomes. Other studies (Pathan and Faff, 2013; García-Meca et al., 2015; Cardillo et al., 2020; Arnaboldi et al., 2020) examined the effects of other board charateristics (e.g. board capital, leadership composition, gender, age, and ethnicity).

The capital of the board refers to different resources in respect of social and human capital (skills, knowledge, reputation, relations, capabilities, expertise). Members need to have different experiences and backgrounds to fulfil their duties. Diversity in directors' attributes relates to their beliefs, morals, rationales, and cognitive evaluations, which in turn determine how they act and their administrative outcomes (Hambrick and Mason, 2007). Table 3.1 details the related literature examining the effects of board diversity on performance in the banking sector. Examining the existing literature, it is apparent that to date no studies have investigated the effects of board diversity comprehensively in terms directors' role in financial stability (risk, profitability, cost efficiency), and market valuation, particularly in countries with a dual banking system (Islamic and conventional banks). Thus, this thesis helps to fill this gap.

Chapter 4 (the first empirical chapter) investigates the relation between the three general diversity variables (gender, nationality, educational level) and bank financial stability (risk, profitability, cost efficiency). According to Nekhili and Gatfaoui (2013), women directors are hired to the board based on their particular characteristics and abilities, such as education and experience. Concurring with this view, Gull et al. (2018) note that firms employ women based on their education and experience and thus obtain a new perspective on the effectiveness of gender diversity. Therefore, to gain more specific insights into how the unobservable

attributes of diverse women directors impact the banking industry, Chapters 5 and 6 examine the different characteristics of women directors interacting with bank market value and risks, respectively.

	Panel A: Previous literature			Panel B: Research gaps in the literature						
Author(s)	Dependent variables/ Research sample	Independent variables	Key findings	Women directors	Foreign directors	Highly educated directors	Women directors' different attributes	Financial stability	International context	Comparing the context of IBs-CBs
De Cabo et al. (2012)	Percentage of women directors in EU banks.	SD of the return on average assets (SDROAA), leverage	Negative association between the percentage of women directors and bank risk	Yes	No	No	No	Only risks	EU	No
Adams and Funk (2012)	Investment amount (survey in 2005) in Sweden (financial and nonfinancial listed firms)	Women directors (dummy)	Positive association between women directors and firm risk-taking	Yes	No	No	No	No	No	No
Hagendorff and Keasey (2012)	The market reaction to bank merger announcements in US commercial banks	Occupational background diversity, gender diversity, age diversity, and tenure diversity	Positive (negative) occupational background association (age and tenure) with announcement returns to mergers, while no effect with appointment of women directors	Yes	No	No	No	No	No	No
Pathan and Faff (2013)	Tobin's Q, NIM, ROAE, ROAA, and stock return in US banks	Board size, independent directors, gender diversity	Women directors enhanced performance in the pre-SOX period, while after the crisis and post-SOX, this effect declined	Yes	No	No	No	Only financial performance	No	No
García-Meca et al. (2015)	ROA and Tobin's Q. in international sample (US and European banking)	Board directors (nationality and gender)	Gender diversity associated with higher performance. National diversity exerts a negative effect on performance	Yes	Yes	No	No	Only financial performance	Yes	No

Berger et al. (2014)	Ratio of risk weighted assets (RWA) in German banks.	Women executives and PhD holders	Positive (negative) association between women executives (PhD holders) as directors and portfolio risk	Yes	No	Yes	No	Only RWA	No	No
Dong et al. (2017)	Ratio of non-performing loans (NPL), efficiency and performance in Chinese banks.	Board size, dual role, women, foreign and independent directors	Negative (positive) association between women directors on the board and NPL (profit and efficiency). Mixed findings (not consistent) for the effect of foreign directors	Yes	Yes	No	No	Only NPL risk with performance and cost efficiency	No	No
D'Amato and Gallo (2017)	Bank risk computed by the Z index, profit volatility, and ratio of NPL to total gross loans in Italian cooperative banks	Board education and turnover	Negative association between board level of education and turnover and bank risk	No	No	Yes	No	Only risk	No	No
Farag and Mallin (2017)	Ratio of impaired loans in EU and Swiss banks	Percentage of women directors	Women directors affect financial performance besides financial fragility using one indicator (non-performing assets)	Yes	No	No	No	No	EU, Switzerland	No
Owen and Temesvary (2018)	Bank performance in US bank holding companies	Gender diversity on bank boards	Women directors have a positive impact in better capitalized banks	Yes	No	No	No	Only financial performance	No	No
Cardillo et al. (2020)	Likelihood and size of public bailouts in European listed banks	Percentage of women directors	Women directors reduce the probability of bank bailouts. Also, indications that women directors have a positive impact on bank value	Yes	No	No	No	Only additional test for bank value	EU	No

| Arnaboldi et al. (2020) | Bank performance in European listed banks | Board diversity (gender, employee representation, internation-alization, and age) | No impact of overall board diversity index on bank performance, but flexibility decreases in the Eurozone crisis. Foreign directors seem to be less negative for the period of the Eurozone crisis | Yes | Yes | No | No | Only financial performance | EU | No |
| Kinateder et al. (2021) | Credit risk in listed banks across 20 countries | Women directors with or without a critical mass | Three or more women directors reduce credit risk | Yes | No | No | No | Only credit risk | Yes | No |

Note: This table reviews previous studies on board diversity in banks and study gaps. "Yes" indicates investigated in the applicable study; "No" otherwise.

Table 3.1. Previous studies of board diversity in the banking sector

3.2.1 Gender diversity

The the role of gender diversity has been the topic of considerable debate in prior literature, particularly in terms of whether and how women enhance corporate performance (Song et al., 2017), because it considers an important attribute that matters in board structure from business and ethical perspectives (De Cabo et al., 2012). Many countries have established a gender quota prescribing the minimum representation of women within boards of directors, the first such being Norway, which required an allocation of at least 40% of women on the board by 2008 (Hoel 2008). Other European countries then followed Norway in attempting to close the gap from 2015 to 2017, including France Spain, Italy, the Netherlands, and Belgium (De Cabo et al., 2012).

Nonetheless, despite women's high educational background and qualifications, the gender gap in board positions still exists. For example, the Egon Zehnder (2020) report indicates that internationally only 23.3% of board seats are occupied by women, while only 6.7% of executive board positions are taken by women, up from 20.4% in 2018. McKinsey and Company's (2014) survey of Gulf countries examining the proportions of women in the labour force observed a percentage of 32% of women in the labour force overall in comparison with 51% in Europe and other OECD countries, with the lowest levels in Saudi Arabia (18%), and the highest in Qatar, the UAE, and Kuwait (51%, 47%, and 43% respectively).[5] Moreover, despite women graduates outnumbering men graduates in these countries, they only hold 1% of board and executive committee positions in these regions (McKinsey and Company, 2014).

Many studies have shown that the presence of women on the board can have many positive impacts on corporate governance. For example, increasing gender diversity among board members enhances governance methods, improves decision-making quality, and aids transparency (Sila et al., 2016). Women board members not only promote the quality of decision making but also increase perceptions of ethical behaviour (Lewellyn and Muller-Kahle, 2020) and indeed promote a more ethical stance in decision making (Hillman, 2015). In terms of the agency problem, Adams and Ferreira (2009) find that women present higher monitoring efficiency, thus alleviating stakeholders' concerns. From the resource perspective, women directors not only provide valuable resources that help the success and survival of a company (Hillman and Dalziel, 2003; Campbell and Mínguez-Vera, 2008), but also bring different networks from those of men. According to Kang et al. (2007), women directors do

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[5] The proportion of women in the labour force in East Asia and the Pacific is 61% and women's representation on boards is 6% (McKinsey and Company, 2014).

not belong to the "old boys club" and thus they enhance the independence of boardroom decision making since they do not have the same views and opinions as the men. Therefore, gender diversity is a valuable aspect in creating a board of directors (Huse, 2018). Figure 3.1 illustrates the benefits of women's directorship style, particularly in reducing firm risk (Jizi and Nehme, 2017).
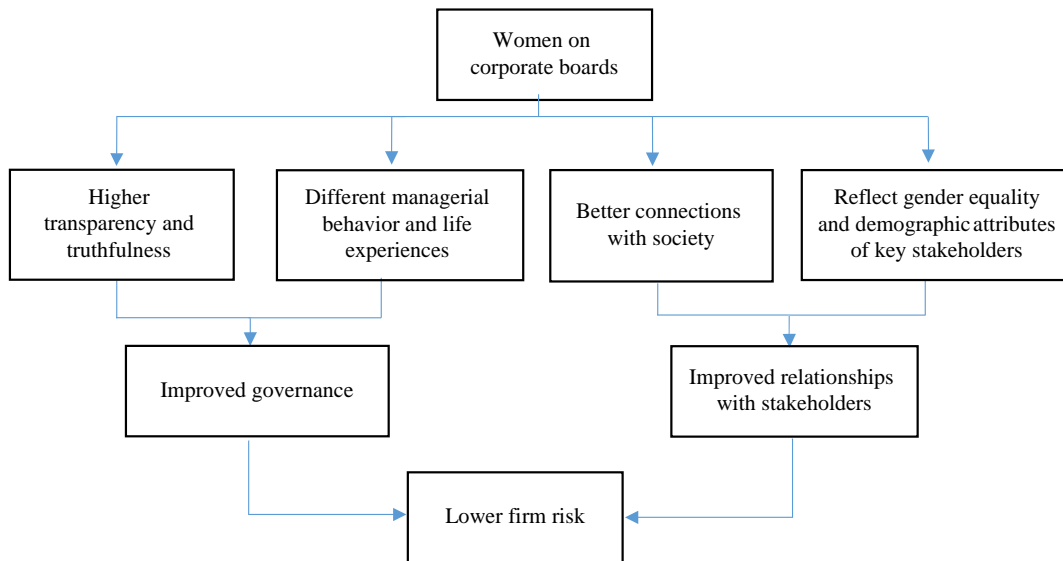
Figure 3.1. Conceptual model of women on the board and firm risk (Source: Jizi and Nehme, 2017, p. 595)

Dobija et al. (2021) discuss gender diversity in relation to two different aspects: business and justice (social and individual). From the business perspective, women on the board promote alternative resources and considerations that help to increase decision-making quality and creativity (Hillman, 2015; Dobija et al., 2021). In terms of social and individual justice, including women as board members may increase the equality of minority group representation in participating in decision making (De Cabo et al., 2012; Dobija et al., 2021).

3.2.2 Board members' nationality

International experience may enhance the function of the boardroom in various ways. Prior literature has found that national diversity on the board globally is advantageous for the firm due to the different experiences and capabilities of international directors (Oxelheim and Randoy, 2003; Choi et al., 2007). First, having directors of different nationalities[6] in the

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[6] In this thesis, national diversity is measured by the presence of directors with foreign nationality. Directors' nationality sometimes shows in their profile. If it did not show in the bank's report, I searched reliable sources, such as Bloomberg, Zawiya, Forbes, business magazines, and news articles. Failing that, I considered it a missing value.

boardroom produces alternative solutions to various problems and enhances discussion (Nielsen and Nielsen, 2013). Foreign directors, who are not associated with the local directors or executives, may also increase independence in decision making (Ingley and van der Walt, 2003). Moreover, the firm's networking may be extended by hiring foreign directors, thus helping to create shareholder variety and internationalization (Estélyi and Nisar, 2016). Moreover, directors of different nationalities, with their diverse capabilities and cultures, bring new investment concepts and connections to firms with international markets (Masulis et al., 2012).

In the literature, several benefits of appointing more foreign directors to the board have been proposed. First, according to Salloum et al. (2019), for Middle Eastern firms, hiring Western directors is associated with the advantages conferred by those directors' reputations in relation to international regulation, contact with outside corporate governance work, and personal agenda benefits. Hence, the presence of foreign members on the board of directors may enhance the quality of decision making through their different skills, experience in international markets, and understanding of legislation and regulations in different countries (Estélyi and Nisar, 2016). Second, employing foreign board members provides legitimacy to the organization both internally and externally, which is necessary in countries with increasingly diverse populations (Carter et al., 2010). Companies that recruit foreign directors can improve their governance and thus gain a sound reputation with stakeholders, such as customers, suppliers, and others in the community (Singh, 2007). For example, Hillman et al. (2002) showed that African-American directors are significantly more likely to be supported by specialists and be influential in their communities. Hiring foreign directors promotes a better institutional image in terms of how a firm is seen by different societies, thus enhancing the firm's reputation in the market (Carter et al., 2010).

3.2.3 Educational level and background

According to Erhart et al. (2003), diversity studies distinguish between observed characteristics (gender, ethnicity, nationality, age, education, functional experiences) and unobserved characteristics (skills, personality, understanding). Therefore, an important part of this thesis lies in exploring the effects of educational level (i.e. MSc and/or PhD) and background (i.e. accounting and finance qualification and studying in international universities; see Chapers 5 and 6). Educational attributes can enhance the functioning of the boardroom and have many advantages. More highly educated directors will likely have better skills related to critical analysis and diversified backgrounds. For example, the knowledge brought by highly qualified and educated directors in managing the resources/assets of the

firm can result in better quality strategic decisions (Audretsch and Lehmann, 2006). Those boards of directors can provide new ideas and innovative views (Audretsch and Lehmann, 2006; Francis et al., 2015). Similarly, Berger et al. (2014) argue that as the number of highly educated board members increases, there will be a positive effect on decision-making processes. Moreover, directors may have associated networking contacts, such as their alumni, constituting academic links that provide various resources (Chahine and Goergen, 2013). Their qualifications also enhance the independence of decision making. For illustration, Chen et al. (2019b) found that directors with PhDs presented better monitoring behaviour than those without.

3.3 Thesis Sample and Country Setting

3.3.1 Unique insights from selected sample countries and bank types

The sample countries selected for the thesis have a common aspect related to their dominant religious and social norms, socio-cultural attributes, norms, and practices, and politics. The Middle Eastern countries in this sample (Bahrain, Egypt, Kuwait, Jordon, Oman, Saudi Arabia, Qatar, and the UAE) share having Arabic as their official language and English as a second language, with the exception of Turkey, where the first language is Turkish and the second language is English. The Asian countries have different languages, but share common social norms that are based on Islamic and conservative principles. The shared social practices (i.e. daily activities, personal lives and relationships, and business activities) in the sampled countries are dependent on Islamic codes and values. While there is religious diversity in these countries (Christianity, Judaism, and others) they are Muslim-majority nations. The countries with the largest Muslim-majority populations in relation to the world percentage (i.e. over 1.8 billion) as estimated in 2017 are, in order, Indonesia, Pakistan, Bangladesh, Iran, Turkey, and Egypt (Abbasi-Shavazi and Jones, 2018). Thus, the socioeconomics of this region are shaped by a conservative cultural orientation based on Islamic values. However, the sample countries belong to different economic groups. The Middle Eastern and North African countries are oil-rich and are high-income countries within the Gulf Cooperation Council, with less economic diversification and the availability sufficient financial funds for social service requirements. The other countries in this region range between lower-middle and upper-middle income (GDP) (Elnahass et al., 2022a). Likewise, the Asian countries range between low, lower-middle, and upper-middle income.

In addition, Abbasi-Shavazi and Jones (2018) found significant improvement in educational and human capital in Islamic countries in the twenty-first century, particularly for women. However, they stated that there are differences between countries based on their culture,

political situation, and economic level. They also indicated that although there are differences in education across these countries, the gender gap is reducing among all measures of human capital because women have better access to education than past generations in all these countries. Enhancing education will increase the ability of societies to modernize and will encourage urbanization (as in the rest of the world) and people well become better educated, which may help these countries open up to the world.

In this region, many sequential reforms have been introduced by policymakers to enhance investors' protection and provide an attractive legal and institutional background for foreign investments and investors (Kamla, 2007). These improvements aim to enhance bank regulation and supervision and promote transparency by imposing disclosure requirements and requiring the introduction of corporate governance code provisions that are consistent with worldwide standards and codes (Turk-Ariss, 2009). Therefore, these countries are becoming more competitive and may be better able to attract foreign employees, specifically for senior positions (Almutairi and Quttainah, 2020).

Studying board diversity is important, particularly when considering global banking systems and countries operating dual banking systems in this region, to assess the impact of different board attributes across alternative bank types, in this case the Islamic versus conventional banking systems. This thesis aims to investigate board diversity in general and also more specifically in relation to sensitive issues such as gender diversity within the sample of Islamic countries that have dual banking systems because women in this region are expected to face greater bias than those in developed countries due to the conservative culture and dominant morals constructed on the basis of religion (Kim and Sandler, 2020).

In the Middle East, women tend to have lower participation in political, economic, and social life, as well as lower access to employment opportunities (Arab Human Development Report, 2016). In many Asian countries also, there is often an institutional and cultural resistance to hiring women directors (Low et al., 2015). Although the representation of women board members in most Asian countries is higher than in the Middle East, the numbers are still low compared to Western nations because of the institutional and socio-cultural norms (Low et al., 2015).

Prior literature highlighted the impact of social norms and culture on board gender diversity. Lewellyn and Muller-Kahle (2020) show the importance of national culture and institutional forces in explaining cross-national variation in board gender diversity. The findings from various developed countries have shown that having more women in decision-making

positions can increase women's opportunities to attain a better education and training, helping to empower them and improve the efficiency of decision making. For example, Belaounia et al. (2020) found that in countries tolerant of women's equality, women directors can enhance the firm's performance and mitigate risk. Moreover, Post and Byron (2015) found that within countries that provide access for women to receive a good education and allow economic participation, employment, and political empowerment, women directors can promote high financial performance. This thesis offers new insights into current practices in banking systems with increasing numbers of women directors on their boards.

In terms of practical insights, among the countries comprising the sample in this study, the majority have no specific and/or mandatory gender quotas. An exception is the UAE, which has a gender quota of at least one women board member for listed companies; albeit not yet mandatory, it has recently encouraged firms to hire women board members. As an example, as stated in Bloomberg, "The UAE's central bank has already signed a memorandum of understanding with Aurora50, a firm focused on gender-balanced boardrooms, to work toward raising the number of women on the boards of both public and private companies in the country" (Elbahrawy et al., 2021, np). Moreover, in Turkey, although there is no established quota as yet, the Capital Markets Board of Turkey (CMBT) recommended that the boards of directors of listed companies should have at least one women director from 2012, with a target of 25% representation by 2019 (Deloitte, 2019). Also, in Malaysia, there is currently no mandatory gender quota, but in 2017 the government sought 30% representation of women on boards by 2020 as a voluntary quota and the central bank also defined the effectiveness of boards in the financial sector based on the qualifications of board members, considering that board members must have various experiences, and different backgrounds and knowledge (Deloitte, 2019).

The demographics and socioeconomic background of regions with an Islamic and conservative cultural orientation leads to the shaping of the banking industry, which includes having conventional banks alongside Islamic banks, and conventional banks with Islamic windows (see 2.3.1 and Figure 2.1) to meet public demand. Due to the cultural norms constructed based on religion, there has been an increase in Islamic banks and conventional banks with Islamic windows. However, there are still many conventional banks because the Islamic banking is still an emerging industry. The latter bank type is retained in the sample because it is an important banking type in the sample countries, it is popular in the banking culture in this region, and it is a central part of the banking system, particularly in Bangladesh, Indonesia, Malaysia, Oman, and Pakistan. Furthermore, Saudi Arabia does not have any fully

fledged conventional banks (only Islamic banks and conventional banks with Islamic windows). Further details are provided in the following section.

3.3.2 Board diversity insights in Islamic versus conventional banks

Studies that have examined board gender diversity have mainly focused on conventional banks (De Cabo et al., 2012; Pathan and Faff, 2013; Farag and Mallin, 2017; Owen and Temesvary, 2018; Cardillo et al., 2020; Kinateder et al., 2021). Moreover, there are limited studies that have investigated more than one diversity indicator in conventional banks (Berger et al., 2014; García-Meca et al., 2015; Arnaboldi et al., 2020) (for further details see Table 3.1). However, no empirical study has investigated board diversity within the Islamic banking domain. Furthermore, no study has yet directly assessed board diversity within Islamic banks versus conventional banks and conventional banks with Islamic windows, as opposed to specifically investigating measures such as board size, independence, and multiple directorships (Mollah and Zaman, 2015; Mollah et al., 2017; Trinh et al., 2020; Elnahass et al., 2020a).

To provide further practical insights from the international sample of banks utilized in this thesis, Figure 3.2 shows the three aspects of diversity across the full sample, capturing both Islamic and conventional banks for the period 2007–2017. The sample comprises unbalanced panel data for 155 banks, both listed and unlisted, in 15 countries, covering 40 Islamic banks, 80 conventional banks, and 35 conventional banks with Islamic windows (grouped with conventional banks in Figure 3.2). In terms of percentages, the sample includes 26% Islamic banks, 52% conventional banks, and 23% conventional banks with Islamic windows, with total observations numbering 1,349.
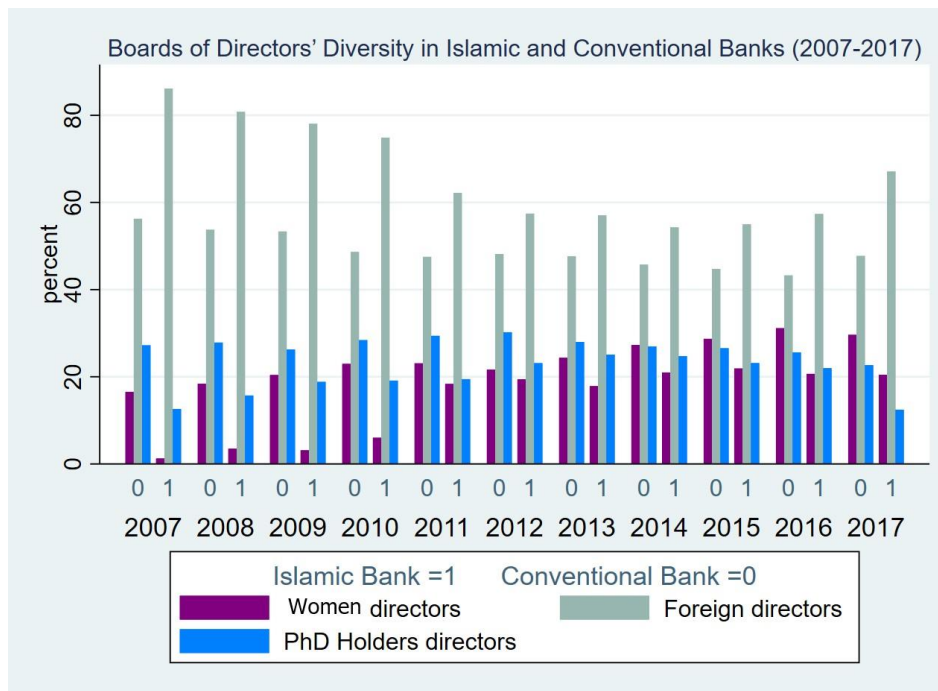
Figure 3.2. Average diversity on boards of directors among Islamic and conventional banks
(Source: own calculation based on full thesis sample)

Figure 3.2 shows that there is greater diversity in terms of foreign directors in Islamic banks than in their conventional counterparts. This is in line with Almutairi and Quttainah (2020), who stated that the business environment of Islamic banks is more welcoming and attractive for foreign directors due to the ethical monitoring and internal supervision by SSBs. They found that this environment helps foreign directors to be efficient monitors. Moreover, the reason for the increasing number of foreign directors in developing countries may be that Islamic banks are an emergent feature of the finance industry and thus these banks have more reason to attract foreign directors as experts. Therefore, although the highest diversity proxy in both bank types is nationality, the observations confirm that emerging countries are likely to be dependent on the experience of foreign directors in order to improve decision making and enhance the business environment (see section 3.2.2).

Moreover, Figure 3.2 shows that the presence of women directors has increased over the years; although there are fewer women than men directors in the sample overall, there is a higher percentage in conventional banks than in Islamic counterparts. In general, the gender gap globally is still high, with Zehnder (2020) reporting that 76.7% of board seats are filled by men and only 20.4% by women. In the Gulf region and other Islamic countries, women are more likely face higher intolerance than in developed countries, particularly Western nations such as the US or those in the EU, because of the conservative culture and norms based on religion and traditions, in which the stereotype is that women should stay in their homes as

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housewives (Othman, 2006). However, there have been increasing numbers of women directors over time in both bank types, most probably as a result of the increase in gender quotas established in a number of developed countries and the reports in academic publications showing the benefit of having women directors, which then encourage the appointment of more women to boards around the world. According to Terjesen and Singh (2008), the extent to which women are present on boards differs from culture to culture and depends on the social structures of particular countries.

Conversely, there are more directors with higher academic degrees (PhD holders) in conventional banks than in Islamic banks. Banks located in these societies tend to recruit higher proportions of foreign nationals and PhD holders as board members (Arnaboldi et al., 2020), which contributes to bank stability in the long term. These observations may imply more confidence and trust in diversity characteristics of human capital, established networks, and expertise, rather than women directors.

3.4 Theoretical Framework

This thesis employs five established theories to develop the hypotheses to be tested: agency theory (Chapters 4, 5, and 6), resource dependence theory (Chapters 4, 5, and 6), human capital theory (Chapters 4 and 5), signalling theory (Chapter 5), and upper echelons theory (Chapter 6). These theories are chosen because they enable effective testing of hypotheses relating to monitoring and control (agency theory), quality of resources linked to the external environment (resource dependence theory), board members' abilities and skills (human capital theory), directors' reputation and use as a positive signal (signalling theory), diverse characteristics and abilities in strategy formulation and decision making (upper echelons theory). Each of the theories is now discussed in turn.

3.4.1 Agency theory

Agency theory primarily concerns the organizational relationship between management/executives (the agent) and owners (the principal) (Eisenhardt, 1989; for an overview, see Table 3.2). Following Eisenhardt (1989), this thesis considers that two agency problems may occur: (i) conflicts of interest between the agent and the principal, which may incur agency costs for verifying any work undertaken by the agent to ensure that it is aligned with the principal's goals; (ii) the sharing of risk between the two parties (agent and principal) when they have different perspectives of various risks.

Key idea	Principal/agent relationships should reflect efficient organization of information and risk-bearing costs
Unit of analysis	Contract between principal and agent
Human assumptions	Self-interest Bounded rationality Risk aversion
Organizational assumptions	Partial goal conflict among participants Efficiency as the effectiveness criterion Information asymmetry between principal and agent
Information assumption	Information as a purchasable commodity
Contracting problem	Agency (moral hazard and adverse problems selection) Risk sharing
Problem domain	Relationships in which the principal and domain agent have partly differing goals and risk preferences (e.g. compensation, regulation, leadership, impression management, whistle-blowing, vertical integration, transfer pricing)

Table 3.2. Overview of agency theory (Source: Eisenhardt, 1989)

In corporate governance, agency cost is important. Management of the firm by professional managers with a separation of ownership can cause agency conflict, with managers investing in their work to maximize their own utility rather than increasing firm value, resulting in agency costs (Berger and di Patti, 2006). According to Fama and Jensen (1983), the board of directors has obligations as an agent, with the authorization and ethical responsibility to monitor other agents (management/executives), ensuring that business functions are optimally aligned with the benefits of the principals (shareholders/owners). Therefore, the monitoring function of the board is essential because of the costs that might be incurred as a result of managers following their own interests at the expense of shareholders' interests (Hillman and Dalziel, 2003), since the board of directors can reduce agency costs (Fama, 1980; Fama and Jensen, 1983) and potentially enhance corporate performance.

Consequently, board members' characteristics/attributes are related to the extent of agency costs (Adams et al., 2010). Board diversity is believed to be crucial for the effectiveness of monitoring as it is expected to lead to healthier monitoring of managers through the board independence channel (Adams et al., 2015). Indeed, in Bear et al.'s (2010) study, having more women on the board enhanced the critical monitoring process, providing a demographic that differed from that of the managers and contributed to better decision making. Estélyi and Nisar (2016) also claim that foreign directors will be appointed to boards due to their good reputation for monitoring. In terms of directors with higher academic qualifications, their critical thinking skills enable them to play a monitoring and advisory role independently and provide new ideas and points of view (Audretsch and Lehmann, 2006; Francis et al., 2015). Moreover, agency theory constructs relations between protecting investors and corporate risk in terms of trying to enhance project value through efficient monitoring and mitigating self-interest (John et al., 2008). A highly regulated banking sector with high information

asymmetry in an environment with low transparency requires high monitoring abilities from board members.

3.4.2 Resource dependence theory

The firm needs to recognize the external influences that can affect its achievement and performance in the specific environment as each firm is associated with different factors under the resource dependence perspective, including social and legal matters, competition, and customer and supplier relations (Pfeffer, 1972). The firm is conceived as working in an open system. This theory explains how to apply five mechanisms to manage external affiliations (Hillman et al., 2009). Pfeffer and Salancik (1978) identify the five mechanisms as follows: (i) external resources are providers of information and expertise; (ii) they create channels of communication between important external constituents and the firm; (iii) they provide access to communication to get support from important outside elements and organizations for the firm; (iv) they create legitimacy in external units for the firm. These mechanisms can differ in various respects, such as the framing of cooperative projects, the sequence of executive decisions, political engagement, the board of directors, and vertical incorporation or mergers. However, this thesis focuses solely on boards of directors and the benefits of board linkage with external resource units (Carter et al., 2010) within the banking industry. In a strongly regulated environment such as the banking sector, information is considered corporate capital which promotes financial performance based on the range of perspectives and experience attained through board diversity (Khatib et al., 2021).

The benefits of having diverse directors in from this theoretical perspective lies in the provision of advice, counsel, and vital information, as well as specifically relating to the ability to link to information channels between the firms and the external environment, supplying privileged contacts to community resources, and generating legitimacy (Pfeffer and Salancik, 1978). These benefits imply that board diversity has advantages in terms of the range of resources available to the firm (Hillman et al., 2000). Therefore, boards with different characteristics and attributes can be considered to provide enhanced human capital according to this theoretical perspective (Pfeffer and Salancik, 1978; Hillman et al., 2000).

Indeed, diverse directors bring many benefits to the organization in terms of different business functions based on the directors' social capital, including their role as society influencers, and providing assistance in the form of professional and functional (finance/business) expertise. For illustration, community influencers, as noted by Hillman et al. (2000) and Singh (2007), include directors working as political leaders, the faculty of universities, religious leaders, and leaders of societal organizations. Directors providing professional support include those with

experience as bankers, advisors in finance and insurance, lawyers, and others with expertise in a particular field. Directors with functional and business expertise are those with present or past experience as executives/directors in other firms, making them proficient in business decision making and creating better strategies and solutions. There are benefits from all these directors who provide diverse resources, such as financial and legal, to the firm through their experience in business decision making, dealing with competition, and participating in problem solving, especially those with proficiency in finance, law, and the banking field (Singh, 2007). Finally, they promote the quality of the firm's resources and its legitimization with the community, which may increase opportunities to succeed in terms of corporate performance (Pfeffer, 1972).

Moreover, avoiding external uncertainty is one aspect of success in decision making and can be achieved by increasing the networking channels between the firm and external businesses to address environmental dependencies. The board of directors can reduce external uncertainty and reliance through its governing and advisory capacity, managing the need for external resources to monitor the firm's business through the members' professional experience (Pfeffer and Salancik, 1978). Moreover, avoiding uncertainty by providing important information at the appropriate time is a board function that can increase the efficiency and effectiveness of decision making and promote firm performance (Zahra and Pearce, 1989). Hillman and Dalziel (2003) articulate the enhancement of performance from this theoretical perspective in terms of the board's relational capital benefits, including providing advice and counselling, conferring legitimacy and reputation, and affording resources acquired from important individuals or external groups, such as government or important community influencers and stakeholders. In addition, they note that because of the resulting channels of communication, the board's capital resources provide information that is valuable and timely, which diminishes uncertainty and thus reduces transaction costs.

According to prior studies (Pfeffer and Salancik, 1978; Hillman and Dalziel, 2003; Singh, 2007; Carter et al., 2010; Ntim, 2015), board diversity increases the pool of information and expertise available to the firm, which leads to strong monitoring and better advisory capability, contributing to improving the firm's performance and value. Figure 3.3 shows the two theoretical perspectives together in relation to the board of directors' functions. According to Nicholson and Kiel (2004), highly regulated and complex firms (as in the banking sector) may require higher and stronger monitoring and control by board members with good resources and contacts.
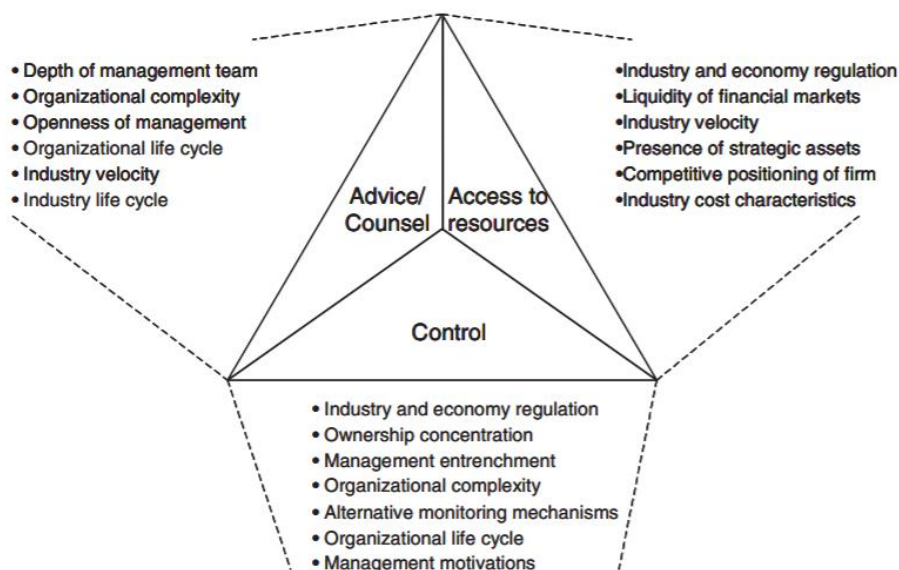
Figure 3.3. Linking the agency and resource perspectives with board functions (Source: Nicholson and Kiel, 2004, p. 454)

3.4.3 Human capital theory

Human capital theory is driven by Becker's work (1964, as cited in Terjesen et al., 2009) which examines the benefits derived by a firm from individual stocks in education, experience, and skills. The theory essentially argues that an increase in members' capabilities, experience, and skills can be expected to convert into enhanced firm performance. Carter et al. (2010) points out that the concepts associated with board diversity in resource dependence theory are complemented by human capital theory. Moreover, in their study, half of the human capital resources came to the firm through minority groups and gender diversity. For minority groups, it is important to have higher education, such as graduate degrees, doctorates, and professional degrees, in order to be recognized individually and selected to board positions, thus avoiding the bias in selection that has long excluded them from being chosen as directors (Hillman et al., 2002). Based on human capital theory, members of minority groups, identified for example in terms of gender or nationality, who serve in high executive positions, are likely to be highly qualified and high performing (e.g. holding a professional qualification or a high academic qualification [PhD] and/or have experience in a specialized field), such that they are recognized individually and selected to board positions (Singh, 2007). In Hillman et al.'s (2002) study, white female and African American directors were found to have higher educational degrees compared to white male directors, which may suggest evidence of prejudice.

Having a variety of educational levels among board members is important for firm value. The quality of degrees and the awarding institution's prestige affects directors' knowledge and decision-making capability, as found by Johnson et al. (2013). For instance, it was found that British directors' background and education affects those with whom they are affiliated and pressure groups may enhance relationships with European politicians (Bond et al., 2010). Educational level and diversity in the top team of the firm has also been found to lead to an increase in creativity and innovation (Bantel and Jackson, 1989). In terms of educational level among board members, directors with higher academic qualifications tend to have higher ethical, professional, and educational standards than those without (Audretsch and Lehmann, 2006; Francis et al., 2015). Therefore, they may be appointed to serve on boards to ensure effective monitoring, given their high expertise and reputation. According to Cho et al. (2017), 38.5% of Standard & Poors (S&P) 1500 firms include at least one professor on the board. Cho et al. (2017) argue that academic directors show greater responsibility towards society and firm performance than other professionals who work in different fields. Moreover, due to their critical thinking skills, they can play an independent monitoring and advisory role and provide new ideas and points of view (Audretsch and Lehmann, 2006; Francis et al., 2015). However, White et al. (2014) argue that academic directors will tend to work less independently in local firms, although they also point to their role in enhancing firm performance.

Several studies have examined educational level among boards of directors and have produced contradictory results. Wincent et al. (2010) found that there was a positive impact on innovative performance associated with board members' educational level in strategic (small and medium-sized enterprise [SME]) networks. In terms of financial expertise and the effectiveness of the board, directors with a higher educational level may improve banks' communications, which improves access to the sort of information that helps reduce uncertainty and improves firm stability. They have a high level of knowledge in finance, law, accounting, and risk management, which increases the probability of attaining a better decision-making process and problem-solving ability.

An early study by Powell and Johnson (1994) concluded that managers can be compared based on education, access to information, experience, and personality, rather than gender. However, several studies have indicated that the different characteristics of women generally correspond to personal attributes, such as age, education, and confidence level (Ghosh, 2018). In addition, women directors may have more financial qualifications, as found by Sealy and Doherty (2012). In their study, women directors appointed to boards in FTSE 100 companies

were 57% more likely to have a financial qualification and background. They claimed that qualifications in finance were a "springboard" for women to board positions, in particular because they may be appointed to moderate extremely risky behaviour by men. They also pointed out that such financial qualifications give women directors the sense that they are no different from their men peers as they have the appropriate language and apparent authority, thus breaking the enduring stereotypes of women in the workplace.

3.4.4 Signalling theory

Signalling theory (Spence, 1979, cited in Certo, 2003) addresses how the decision-making process occurs under conditions of asymmetric information. Certo (2003) employs the example Spence used to shape this theory, applying it to the labour market to explain the possible problem of asymmetric information facing employers when they seek to recognize different candidates' qualities. Certo et al. (2001) state that the main principle of this theory is that the signal before any transaction offer must be observed and known for the participants to use this signal effectively. In addition, they investigated two criteria for the use of signalling devices by the board of directors: (i) signals are observed and known in advance and (ii) they are costly to imitate. For example, having a section in the firm prospectus that identifies and provides the background for each director and states their decision-making expertise provides a clear signal (Fama and Jensen, 1983).

Signalling can be applicable in any market with information asymmetry (Morris, 1987). Certo (2003, citing Spence, 1973) gives an example of reductions in information asymmetry based on education as a signal in the labour market. Candidates with higher education will be selected by employers because the signal is observed and costly to imitate. A degree can be verified and candidates of lower quality will not be able to imitate this, therefore making it costly; thus the two criteria of signalling are fulfilled. In the banking sector, Hughes and Mester (1998) modified the model of cost in the bank's financial capital role as a cushion for risk-averse managers to save them from insolvency and found that the financial capital level can be used as a signal for the risk level by risk-averse bank managers.

Signalling theory is close to agency theory in describing how the agent and principal work differently and how pressures from the public and market push the agent to work in a transparent manner. Information asymmetry is an important problem discussed in the corporate governance literature in relation to agency theory and signalling theory, particularly in the banking field. Much of the previous literature has tested board composition as a signal of a good reputation in the business community and public society (Bear et al., 2010; Certo et al., 2001; Miller and Triana, 2009; Musteen et al., 2010, Elnahass et al., 2020a). The latest

financial crisis focused attention on corporate transparency, with transparent corporate governance being a signal of good quality governance mechanisms and high information quality in banks. Bear et al. (2010) investigated the relationship between gender diversity on the board and the reputation of the organization and found a positive relationship between a firm's corporate social responsibility (CSR) rating and firm reputation, mediated by women members on the board and corporate reputation.

Greater diversity in board members increases a firm's reputation because the board's characteristics can be seen by the business community, thus providing an important signal concerning the firm's reputation and indicating that valuable information is available for making decisions effectively (Musteen et al., 2010). Board diversity represented by the nationality of board members tends to bring a variety of backgrounds and expertise, good monitoring reputation, and access to different international markets in banks (Estélyi and Nisar, 2016).

3.4.5 Upper echelons theory

Upper echelons theory (Hambrick and Mason, 1984) considers how the attributes of the top management team (i.e. managers and directors) structure and impact organizational strategies (e.g. risk decisions) and outcomes (performance), and to what extent. Directors' characteristics, experience, and cognitive attributes can affect their decision making, ultimately influencing the corporation's outcomes (John et al., 2020). Figure 3.4 illustrates the effects of this theory on firm performance, but it can apply to any firm outcome, such as risk. This theory focuses on executive groups, rather than individuals, to show better justifications for any firm outcomes (Hambrick, 2007). Hambrick states:

> Given the great difficulty obtaining conventional psychometric data on top executives (especially those who head major firms), researchers can reliably use information on executives' functional backgrounds, industry and firm tenures, educational credentials, and affiliations to develop predictions of strategic actions. Granted, the use of demographic indicators leaves us at a loss as to the real psychological and social processes that are driving executive behavior, which is the well-known "black box problem" (Hambrick, 2007, p. 335).
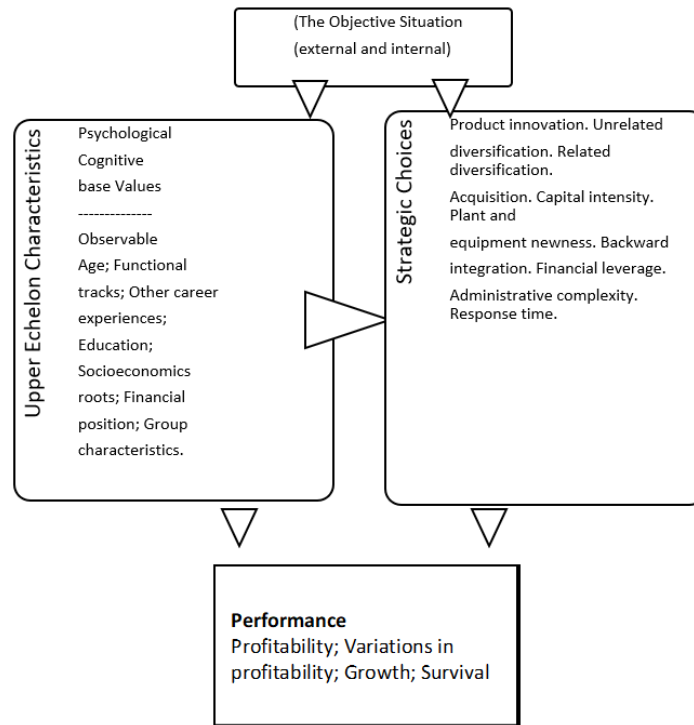
Figure 3.4. Influence of upper echelons characteristics on firm strategy and performance (Source: Hambrick and Mason, 1984, p. 198)

Board structure is influenced by the diversity of members in terms of capability and skills, knowledge and experience (Hambrick, 2007; Muller-Kahle and Lewellyn, 2011). This theoretical perspective highlights the importance of board members' responsibilities as a team for the decision-making process and strategic choices, and the role of their various characteristics in determining the functional efficiency of the board.

3.5 Summary

The chapter has discussed board diversity, specifically addressing the main attributes of diversity (gender, nationality, education). Then, the theories that comprise the theoretical framework and underpin the research hypotheses have been outlined and discussed. This thesis endeavours to fill the gap left by prior studies identified in this chapter by addressing the research hypotheses in three empirical chapters (Chapters 4, 5, and 6), which study the effects of board diversity (gender, nationality, education) on financial stability, as well as the impact of gender diversity (women and their different attributes) on market valuation and different types of bank risk.

Chapter 4. Study 1 - Bank Board Diversity: It's Not Just About Gender Representation

4.1 Abstract

Diversity within boards of directors is often cited as a key issue within renewed market and regulatory calls for equality and inclusivity in banks. This study investigates how diversity in the board of directors (measured by gender, nationality, and educational level) affects bank stability (proxied by various measures of risk, financial performance, and efficiency). This study constructs a unique sample of 1,328 bank-year observations from 153 banks, including Islamic and conventional, from 14 countries for the years 2007–2017. For the full sample, this study finds strong evidence that banks with women directors on the board are positively associated with bank stability. Conversely, foreign directors on the board are significantly negatively associated with bank stability. It also finds that directors holding high educational qualifications (PhD) are associated with high bank stability. Conditional on the bank type, gender, nationality, and education level have differential effects on bank stability. The study also finds that women directors are more active in attending board meetings. The findings of this study offer new insights into board diversity and bank stability, with important policy implications for regulators governing countries with dual banking systems.

4.2 Introduction

The objective of this study is to conduct an investigation into whether diversity in the board of directors affects bank stability (measured by risk, financial performance, and efficiency), following Beck et al. (2013), Trinh et al. (2020), and Abdelsalam et al. (2020). Diversity has become an important topic within the contemporary debate regarding gender equality, inclusivity, and other demographics (Creary et al., 2019). As defined by Ingley and van der Walt (2003), "the concept of diversity relates to board composition and the varied combination of attributes, characteristics, and expertise contributed by individual board members in relation to board process and decision-making" (p. 8). Such board diversity includes gender, educational level, background, experience, race, skills, and ability (Ingley and van der Walt, 2003). It has been suggested that diversity enhances corporate governance by bringing different perspectives to the board (Singh, 2007; Adams and Funk, 2012), leading to innovative solutions to problems (Robinson and Dechant, 1997; Estélyi and Nisar, 2016). However, to date, there are no specific global regulatory guidelines for banks covering diversity within the board of directors.

Since the global financial crisis of 2007–2008, there has been an increasing emphasis on the financial stability of banks due to their significant function in protecting the financial stability of the economy. Banks play an important role in economic growth through their role as intermediaries between savers and depositors. They also provide funds for activities that support enterprise, which fosters a strong and healthy economy. According to the Basel Committee Report (2015), effective corporate governance in the banking sector enhances the efficiency of the economy as a whole. In contrast, the Committee points out that weaknesses in bank governance exert a negative effect on economic stability and it was such weaknesses that caused the global financial crisis (Basel Committee Report, 2015).

The findings from investigations after the crisis led to the development of new regulations aimed at enhancing governance, thus avoiding excessive risk and promoting bank stability. The new regulatory requirements include minimum levels of capital and liquidity. Governance may also be enhanced via business models, processes, and the nature of the products on offer (Trinh et al., 2020). However, the complexities of the business functions in the banking sector increase the problem of information asymmetry between managers and shareholders, which reduces stakeholders' abilities to manage and track managerial decision making (De Andres and Vallelado, 2008). Hence, it is important that a bank appoints highly skilled members to the board of directors to mitigate information asymmetry and potential conflicts of interest. The board of directors is viewed as a "professional referee" (Fama, 1980, p. 293), acting as a monitoring agent with a legal and moral obligation to ensure that businesses are run in the best interests of shareholders (Fama and Jensen, 1983), and providing managers with unbiased and useful advice to assist in the operation of the business (De Andres and Vallelado, 2008).

Given the link identified between bank stability and corporate governance, and the suggestion that the board of directors, in particular a diverse board of directors, can enhance governance, it is reasonable to surmise that a diverse board of directors may be associated with higher bank stability, namely that higher efficiency and profitability will mitigate risk. This is the fundamental premise investigated in this research. In the literature, while studies have examined bank stability in conventional and Islamic banks (see Beck et al., 2013; Abdelsalam et al., 2020; Trinh et al., 2020), investigations of alternative measures of board diversity in relation to global bank stability, represented by joint empirical examinations of stability measures including financial performance, cost efficiency and bank risk, are rare. Farag and Mallin (2017) provided evidence concerning gender diversity and its impact on financial performance alongside financial fragility using one indicator (non-performing assets). De

Cabo et al. (2012) studied gender diversity representation for EU banks. Arnaboldi et al. (2020) identified the impact of board gender diversity and employee representation on bank performance for European listed banks. While many of these banking studies ultimately focused on financial performance in relation to board gender diversity, no study has collectively identified the impact of different diversity measures for boards of directors (gender, education, nationality) in relation to both bank risk and bank financial performance concurrently. In addition, these prior studies offer either single country evidence (e.g. Pathan 2009; Pathan and Faff, 2013; Berger et al., 2014; Owen and Temesvary, 2018; Elsharkawy et al., 2018) or cross-country evidence in European or US contexts (García-Sánchez et al., 2015; Farag and Mallin, 2017; Arnaboldi et al., 2020).

Moreover, to the best of my knowledge, no study has investigated board diversity in different bank types, in particular Islamic and conventional banks. Unlike conventional banks, Islamic banks operate on a non-interest-based model governed by *Shari'ah* rule, with the aim of promoting profit sharing between the bank and depositors and reducing uncertainty and eliminating trading in or allocation of funds to areas prohibited in Islam. The governance structures adopted by Islamic banking are more complicated compared to their conventional counterparts (Shibani and Fuentes 2017; Elnahass et al., 2020a). In both bank types, the board of directors is responsible for the execution of strategic decisions, protection of the shareholders' interests, and maximization of bank value. However, Islamic banks operate with an extended governance structure that is more complex and incorporates special scholars who scrutinize the bank's activities against a set of criteria derived from the Islamic code (see Abdelsalam et al., 2016). This additional board is known as the *Shari'ah* supervisory board (SSB), which is made up of *Shari'ah* compliance advisors. With a complex business model and different structure of governance, diversity in the board of directors may have a differential impact within these banks compared to their conventional counterparts. Existing evidence on the differences between Islamic and conventional banks is limited to a comparison of governance structures, for example Mollah et al. (2017) on the differences between the two bank types in terms of governance structures and the effect on risks, Mollah and Zaman (2015) on board size, independence, and SSBs in relation to Islamic bank performance, and finally, Trinh et al. (2020) on the busyness of the board of directors and the impact of stability in both bank types. To date, no studies have examined differences between Islamic and conventional banks with regard to the impact of boards of directors' diversity on bank stability (i.e. risk, profitability, cost efficiency). Therefore, this research extends the scope of previous studies to examine the association between board diversity and bank stability among Islamic and conventional banking systems.

This study conceptualizes diversity in three ways (percentage of women directors, foreign board members, and educational level).[7] The objective is to assess where and how diversity has the potential to contribute to bank stability. The study utilizes institutional differences and distinct business models employed by both bank types to identify possible associations with respect to various measures of bank stability, in particular performance and bank risk. The study draws on several well-established theories – agency theory, resource dependence theory and human capital theory – to develop three testable hypotheses that predict a positive association between bank stability and the measures of diversity.

The sample represents 14 countries operating with a dual banking system over the period 2007–2017. The study employs unique corporate governance data for 1,328 bank-year observations from 153 banks. It applies a three-stage least squares estimation method to control for endogeneity. This study finds that the average proportion of women directors more than doubled from 2007 to 2016. Conversely, the average proportion of foreign directors fell over the sample period, while the average proportion of PhD holders fluctuated over the sample period. The main findings show that, on average, women directors were significantly positively associated with bank stability, demonstrated by low bank risk, and high financial performance and cost efficiency. In addition, these results show that appointing directors with a high level of education (PhD) is associated with high bank stability (i.e. associated with low bank risk, and high financial performance and cost efficiency). In contrast, this study finds strong evidence that banks with a high proportion of foreign board members are positively associated with credit risk and negatively associated with insolvency risk and financial performance.

When considering the two bank types, high women's representation on the board of directors is associated with low bank risk for both Islamic and conventional banks. However, the presence of women directors on the board of Islamic banks is significantly negatively associated with overall financial performance, in contrast to the finding for conventional banks. Moreover, the presence of foreign directors shows differential results across the two bank types. In conventional banks the presence of foreign directors is associated with a significant increase in bank risk and reduced financial performance, which is not the case for Islamic banks. The results for educational level are consistent across both bank types; PhD holders on the board are associated with low bank risk, and high financial performance and cost efficiency (i.e. higher bank stability).

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[7] The educational level is defined as directors holding a PhD.

In a separate analysis, this study finds significant evidence that women directors are active in attending board meetings, albeit with no significant association between meeting attendance and the other diversity indicators. Moreover, this study takes a step further to examine the effect of board size, and the effects of gender and educational level of boards of directors on bank stability within banks with large not small boards. This research also uses propensity score matching (PSM) to identify control banks without any board diversity characteristics. The findings for the full sample and matched sample support the main results. These findings remain robust and consistent across alternative estimations and various techniques used to control for endogeneity and reverse causality.

This study makes several contributions to the literature on board diversity and corporate governance. First, to the best of my knowledge, this is the first international study to have employed a unique dataset for countries operating dual banking systems. This study employed several bank risk, financial performance, and diversity measures based on sociological and economic indicators. The systematic and joint tests of alternative diversity indicators hence add to the banking literature, which has tended to concentrate on limited measures of diversity and/or not have captured the implications of bank risk for the global banking industry (e.g. García-Sánchez et al., 2015; Farag and Mallin, 2017; De Cabo et al., 2012; Arnaboldi et al., 2020). Furthermore, this study is the first to recognize the possible effects of institutional characteristics in alternative banking business models. The study offers new insights into the differential effects of diversity in terms of gender and nationality on the stability of Islamic and conventional banks. While women directors are associated with higher bank stability in conventional banks, foreign directors demonstrate a negative association in this banking sector compared to Islamic banks. Both bank types indicate similar responsiveness to higher educational level. Therefore, this study extends the existing comparative literature on corporate governance for the two bank types, which does not explicitly consider board diversity (e.g. Abdelsalam et al., 2016; Shibani and Fuentes, 2017; Elnahass et al., 2020a, 2020b; Trinh et al., 2020).

The findings in this study offer important insights and policy implications for various sets of stakeholders engaging with global banking systems, indicating the importance and differential impacts of board diversity in enhancing bank stability. The positive association between women directors and bank stability suggests that women may be effective in monitoring risks and promoting enhanced financial performance for their banks. Likewise, educational level is associated with greater bank stability. Potentially, women directors with a PhD have expertise

in mitigating bank risk and make sound strategic decisions which can promote better financial performance (Berger et al., 2014).

With respect to nationality, the results show varying associations with bank stability. This study attributes the negative association with performance to the possible increase in communication and social costs resulting from appointing foreign board members. García - Meca et al. (2015) argue that high communication/social costs provide less opportunity for foreign board members to express their views and this may reduce the quality of boardroom discussions. Foreign directors may hold directorships within several firms locally and internationally and may potentially be overcommitted to paying attention to strategic and funding opportunities, hence resulting in reduced cost efficiency for their banks (see Trinh et al., 2020). Furthermore, there may be a lack of understanding of domestic standards, codes, and governance in terms of legislation and country regulations (Masulis et al., 2012), increasing the financial and regulatory costs for firms. Hence, the findings suggest that some restrictions should be imposed on the number of foreign directors on boards in these countries. With respect to nationality, policymakers should also consider publishing guidelines regarding the percentage of foreign directors within the two bank types.

Moreover, policymakers and regulators can use the evidence presented in this study to shape and guide the composition of the board of directors based on alternative banking models and for countries operating dual banking systems. While the presence of women directors is positively associated with financial performance within conventional banks, there is no such positive association for Islamic banks. Accordingly, regulators should consider increasing the quota of women directors in conventional banks while carefully assessing the threshold for the representation of women directors within Islamic banks, especially given that a few male *Shari'ah* advisors seem to dominate the Islamic banking industry (see Elnahass et al., 2020a; Trinh et al., 2020). The findings also indicate that women board members with a PhD are positively associated with bank stability across both bank types. This result calls for regulators to consider assigning more quotas for highly educated directors. This study may help to change some societies' perceptions worldwide concerning the importance of empowering women in banking. Promoting bank stability in global banking cannot be achieved without revisiting socio-cultural perspectives to allow more diversity among board members.

The rest of this chapter is organized as follows. The next section presents the theoretical framework and hypothesis development. Sections 4.4 and 4.5 present the data and sample,

and the methodology, respectively. Section 4.6 reports the empirical results, while sections 4.7 and 4.8 provide additional testing and robustness checks. Finally, section 4.9 concludes.

4.3 Theoretical Framework and Hypothesis Development

No single theory is applicable for testing the effectiveness of board diversity in banks. Hence, in examining the function of the board of directors, this study draws on agency theory to address the control role, and resource dependence theory to consider the strategy and service roles (see Pfeffer and Salancik, 1978; Hillman and Dalziel, 2003).[8] The board of directors is expected to provide vigilant oversight over executives and perform its duties impartially (Elnahass et al., 2020a, 2020b).[9] This section introduces the relevant theories, provides evidence from prior studies, and presents the main hypotheses.

Agency theory states that the fundamental monitoring role of the board over managers (agents) is to protect shareholders' (principals') interests (Carter et al., 2003). According to John et al. (2008), agency theory also defines the relationship between protecting investors and reducing firm risk through efficient monitoring and mitigating self-interested behaviour (see section 3.4.1). The function of monitoring, as Hillman and Dalziel (2003) state, lies in directors' responsibility to ensure that managers work for the benefit of shareholders and on their behalf. They can extend monitoring activities, evaluating, scrutinizing, and regulating firm activities, to ensure they fulfil their obligation to benefit the shareholders. Diversity within the board is considered important for the effectiveness of the monitoring function.

Resource dependence theory highlights the importance of the dependency between the firm and the external environment, considering the firm as working in an open system and needing to obtain/exchange certain resources for survival (Terjesen et al., 2009). The quality of resources provided by the board can enhance financial performance and assist with the monitoring of managers and the provision of resources (Jermias and Gani, 2014; see section 3.4.2). The increasing complexity and uncertainty in the business environment requires diversity in board members, particularly members with wide access to external market resources. This can provide legitimacy, financial and industrial advice, and prestige (Terjesen et al., 2009). It may also affect accounting and financial reporting, based on the unique informational sets brought to bear on the firm's operations (García-Sánchez et al., 2017).

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[8] These theories are explained in detail in section 3.4.
[9] See Hillman et al. (2002), Ingley and van der Walt (2003), Singh (2007), Terjesen et al. (2009) for further reviews of the importance of board diversity from various theoretical perspectives.

Board diversity brings different skills and educational levels to support better decision-making processes.

The arguments surrounding board diversity drawn from resource dependence theory can be further explained based on human capital theory (see section 3.4.3). In human capital theory (Becker 1964), members of boards of directors have experience in making business decisions, dealing with competition, and engaging in problem solving, particularly based on expertise in finance, law and the banking sector, as well as public relationships, and they can provide different resources such as financial and legal resources (Singh, 2007). Differences in gender and academic education between board members provide different human and social capital perspectives as well as varying backgrounds that drive and influence strategic choices within a firm (Hillman et al., 2002).

Prior studies, mainly focused on non-financial firms, have provided mixed evidence on the relationship between board diversity and firm performance (Adams and Ferreira, 2009; Carter et al., 2010; Bennouri et al., 2018). Although boards of banking institutions have the same legal responsibilities and accountabilities as those in non-financial firms, the banking industry is subject to stricter regulatory structures and has high potential for contagion (De Andres and Vallelado, 2008). Adams and Mehran (2003) state that bank directors' duties and obligations relate to two contexts: the evaluation of discrete decisions brought to the board for approval, which increases directors' legal responsibility for bank safety and soundness; their obligation to provide oversight on the boards of the firms they serve. The role of the board of directors in effectively monitoring banking operations promotes market acceptance and the confidence of shareholders, bank regulators, and other stakeholders (e.g. depositors and investors) (García-Meca et al., 2015). With the growing opaqueness surrounding the banking industry, studies investigating the association between boards of directors' diversity specifically and banking stability (i.e. bank performance and bank risk) are still scarce.

4.3.1 Gender diversity

A measure of gender diversity that is frequently employed in the literature is the percentage of women directors on the board (Pathan and Faff, 2013; Haque and Jones, 2020). Studies in the non-financial sector suggest that gender diversity is positively associated with performance (Carter et al., 2003; Farrell and Hersch, 2005; Bennouri et al. 2018; Salloum et al., 2019). In the banking sector, Pathan and Faff (2013) investigated the relationship between bank performance and the percentage of women directors in US banking holding companies and showed a positive association between gender diversity and bank performance in the period before the Sarbanes–Oxley (SOX) Act (1997–2002), but a negative association in the post-

SOX era (2004–2006). García-Meca et al. (2015) and Elsharkawy et al. (2018) found that bank performance is positively associated with gender diversity. Moreover, Owen and Temesvary (2018) reported that greater numbers of women directors are positively associated with bank performance for large US banks.

With respect to firm risk, from an agency theory perspective, a risk management problem is caused by variations in the risk behaviours between the agent and the principal, leading to different decisions and priorities regarding risk choices (Eisenhardt, 1989). For example, women directors could temper the overconfidence of male CEOs by reducing risky choices/decisions (Chen et al., 2019a). According to Grable (2000), women are naturally more risk averse than men and such risk aversion suggests a lower tendency toward risk in banks. This is also consistent with De Cabo et al. (2012), who found the proportion of women on the board to be higher for lower risk banks. Women directors promote less aggressive policies and also reduce the effect of financial distress in their firms (Chen et al., 2019a). Also, Loukil and Yousfi (2016) found that women generally tend to avoid risky decisions and challenging investments.

Moreover, in line with the agency and resource dependency theories, the relationship between investor protection and corporate risk increases the value of the firm through effective monitoring and mitigation of self-interest (Siciliano, 1996; John et al., 2008). According to Bear et al. (2010), having more women on the board of directors is associated with enhanced monitoring processes. Perhaps linked to this, Adams and Ferreira (2004) found that women present active participation on boards (e.g. frequently attending board meetings). Moreover, Farrell and Hersch (2005) reported a negative relationship between firm risk and women directors, suggesting that women are more likely to promote firm stability by reducing risk. Similarly, Adams and Ferreira (2004) showed that firms with fewer women on their boards have higher stock return variability. In Chinese banks, Dong et al. (2017) found that having a higher proportion of female directors on the board is related to higher profit and cost efficiency and lower risk. As an additional benefit, women have the power to manage and inspire teamwork and collaboration through their ability to understand others and listen to different perspectives (Salloum et al., 2019).

Accordingly, gender diversity tends to have a specific directional (i.e. positive) association with firm performance while mitigating firm risk. This leads to the following hypothesis:

H1: Gender diversity (women's representation) on the board of directors is positively associated with bank stability.

4.3.2 National diversity

Diversity on boards in terms of nationality can shape board identity and bring new perspectives in solving problems caused by the challenges generated by globalization. Moreover, they may introduce a new management strategy to their firm based on their heterogeneous perspectives. According to Estélyi and Nisar (2016), national diversity contributes positively to firm performance, as measured by Tobin's Q and return on assets (ROA). The number or percentage of foreign directors is commonly used as a measure in empirical studies, and it is generally found that appointing foreign directors to the board is positively associated with bank performance and reduced bank risk. Indeed, there are many benefits of hiring foreign directors, such as good reputation, skills, and experience (see section 3.2.2).

Within non-financial firms, some prior studies have examined the relationship between measures of nationality and firm performance. For example, Oxelheim and Randøy (2003) report that having foreign-born (Anglo-American) directors on the board led to a high value for firms in a sample of Scandinavian firms. A similar study conducted in South Korea by Choi et al. (2007) showed that multinational directors are positively associated with firm performance. Miletkov et al. (2014) also reported that directors from countries with high legal standards that protect investors can positively influence firm performance. The only study in banking, by Choi and Hassan (2005), shows a positive association between foreign directors and bank performance.

From the agency perspective, the reason for hiring foreign nationals is that they are unlikely to have a professional relationship with management. Hence, in this study a similar prediction is adopted, using the proportion of foreign nationals on the board of directors as the measure of diversity.[10] Appointing foreign board members is expected to be positively associated with bank performance and negatively associated with bank risk. This leads to the second hypothesis, stated in the alternative form:

H2: The presence of foreign nationals on the board of directors is positively associated with bank stability.

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[10] Directors' nationality sometimes shows in their profile. If it did not show in the bank's report, I searched in reliable sources, such as Bloomberg, Zawiya, Forbes, business magazines, and news articles. Failing that, I considered it a missing value.

4.3.3 Educational level

Education represents a critical form of human capital, offering professional abilities that may help to improve strategic decisions (see 3.2.3 and 3.4.3). It is also likely to improve networking with respect to social and market contacts (White et al., 2014). Educational variety in the senior team of a firm leads to an increase in creativity and innovation (Bantel and Jackson, 1989). The impact of appointing academic directors on firms' operations and business strategies has previously been explored in studies of corporate governance (e.g. Audretsch and Lehmann, 2006; Jiang and Murphy, 2007; White et al., 2014; Francis et al., 2015; Chen et al., 2019b). These studies concluded that board members who have a high level of education and special abilities and skills are more likely to have experience in directorships and higher education, an argument also supported by human capital theory. A higher educational level also enhances skills and knowledge on the board of directors and thus increases the quality of decisions (Papadakis and Barwise, 2002). A high academic education can also have a positive impact on directors' expertise in identifying and assessing firms' risk and making relevant investment/strategic decisions. Grable (2000) used a survey of Southern University's staff to report that a higher level of education and financial knowledge led to a reduction in riskier financial decisions. Likewise, Wincent et al. (2010) found that board members with a high level of education had a positive influence on a firm's innovative performance.

Appointing directors who hold the highest academic qualification, such as a PhD, can bring new points of view and advance different perspectives, linking the decision-making process to external knowledge (Audretsch and Lehmann, 2006). Such directors can also offer alumni contacts to their banks, linking to academic networks and universities, which can promote and facilitate access to additional sources for the boardroom (Chahine and Goergen, 2013). Berger et al. (2014) found that the presence of directors with PhDs reduces the bank's portfolio risk. The findings suggest that executives with doctorates act moderately as they do not need to prove their ability to climb the career ladder, whereas their counterparts engage in risky decisions to demonstrate extraordinary performance. Recently, in China, Chen et al. (2019b) reported that the monitoring behaviour of academic directors with PhDs had a positive impact on firm performance.

There is no evidence of the effect of educational level on banking stability. Hence, this study considers its influence in addition to that of gender and nationality. This study expects a positive association between educational level and bank stability. In line with resource dependency theory, a high level of education is likely to provide a breadth of resources among

board directors for communicating with the external environment through previous colleagues and social networks. Thus, having board members with the highest level of academic education (PhD) is likely to bring extended consultation and valuable resources to their banks, which can promote higher bank stability. This leads to the third hypothesis, stated in alternative form:

H₃: A high level of academic education among the board members is positively associated with bank stability.

4.4 Data and Sample

The consolidated financial data were collected from DataStream, Orbis. The country-level data were retrieved from the database of the World Bank's World Development Indicators. Corporate governance variables addressing board characteristics, such as board size, nationality, and gender, were hand collected from the annual reports provided on the official bank websites, following other banking studies (e.g. Mollah et al., 2017; Abdelsalam et al., 2020; Elnahass et al., 2020a), in filtering the sample. The inclusion criteria included: i) countries with at least one Islamic bank and one conventional bank; ii) selected banks with full annual reports on the banks' official websites, published by 31 December; iii) data for each bank available for at least three consecutive years.

The final sample comprised unbalanced panel data for 153 banks (1,328 observations), including both listed and unlisted firms, for 14 countries[11] over the period 2007–2017. The sample included 39 Islamic banks (338 bank-year observations), 80 conventional banks (693 bank-year observations), and 34 conventional banks with Islamic windows, the latter being conventional banks with financial products complying with *Shari'ah* law (297 bank-year observations).[12] The relevance for the start of the sample period is that Basel II requirements became mandatory for Islamic banks in 2007 (see IFSB, 2005; Elnahass et al., 2018). This period also allows an examination of whether board diversity could affect banking stability, particularly during periods of financial distress (i.e. the financial crisis of 2007–2009).

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[11] In total, there were more than 14 countries, but Morocco, Libya, Yemen, and Tunisia were excluded as they had banks lacking full annual reports showing the directors' information over three years. Moreover, Sudan and Iran were excluded because they do not have conventional banks and most of their banks do not have clear annual reports; also, Iran has frozen assets. The final sample included Bahrain, Bangladesh, Indonesia, Kuwait, Malaysia, Turkey, Pakistan, Qatar, Saudi Arabia, the UAE, Oman, Lebanon, Egypt, and Jordan.
[12] Following Beck et al. (2013), conventional banks with Islamic windows are included, using (WINDOW) as a dummy variable taking the value 1 for conventional banks with Islamic windows and zero otherwise (Abedifar et al., 2013). This study includes this type of bank and controls for Islamic windows because such banks are considered to comprise part of the sample countries' banking culture and therefore should not be excluded from the sample when investigating the banking sector in these countries (for details, see 2.3.1).

Table 4.1 presents the sample distribution by country and bank. In terms of the percentage of bank representation, the sample comprises 25% Islamic banks, 52% conventional banks, and 22% conventional banks with Islamic windows. In terms of the bank-year observations for Islamic banks, Bahrain has the highest number, followed by Indonesia, which also has the highest number of conventional bank-year observations. For conventional banks with Islamic windows, the highest number of observations come from banks located in Saudi Arabia.

4.5 Model and Measures for Bank Stability and Board Diversity

4.5.1 Measures of stability: Bank risk and financial performance

To examine the impact of board diversity on bank stability, the study employs several risk indicators: (i) insolvency risk; (ii) credit risk; (iii) operational risk. Most prior studies (Rumler and Waschiczek, 2016; Trinh et al., 2020) assessed bank insolvency risk by measuring the probability of default through the Z-score. The Z-score is calculated as the sum of the return on assets and the capital assets ratio, scaled by the standard deviation of return on assets.[13] Following Abedifar et al. (2013), Beck et al. (2013), and Mollah et al. (2017), the analysis used the inverse of the Z-score (*1/Z-score*), with a positive value implying high insolvency risk. The second risk measure is credit risk, examined using a proxy for backward-looking loan quality and the loan portfolio (Elnahass et al., 2018). Credit risk is measured through the ratio of loan loss reserves to gross loans (*LLR/GL*): the higher the ratio, the higher the credit risk for a bank (Abedifar et al., 2013; Beck et al., 2013). This study also includes an indicator of operational risk (*SDROAA*) to identify the volatility of assets and risk in operations, based on the increase in volatility of the bank's income. This risk measure is important in indicating the bank's operating business risk based on the three-year rolling standard deviation of (*ROAA*) (John et al., 2008; Trinh et al., 2020). A higher value of SDROAA indicates a higher operational risk for banks.

To further investigate the association with financial performance, bank performance measures were used, including return on average assets (*ROAA*) and return on average equity (*ROAE*), following previous corporate governance studies (Adams and Ferreira, 2009; Carter et al., 2010; García-Meca et al., 2015; Pathan and Faff, 2013). ROAA is the return generated from bank assets, measuring efficiency and operational performance, while ROAE measures the return on shareholders' funds. Both indicators are accounting-based measures to gauge bank profitability decisions, so high ROAA or ROAE indicate high bank profitability. To examine the operating efficiency of banks, this research uses the cost-to-income ratio

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[13] This study uses the natural logarithm of the (1/Z-score) to control for outliers.

(*COST/INCOME*), which measures overhead costs relative to gross revenues. A higher COST/INCOME ratio suggests lower levels of bank operating efficiency (Beck et al., 2013; Trinh et al., 2020).

Country	Islamic banks		Conventional banks		Conventional banks with Islamic windows		Full sample	
	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)
Bahrain	63	19	20	3	11	4	94	7
Bangladesh	11	3	70	10	31	10	112	9
Egypt	6	2	22	3	6	2	34	3
Indonesia	39	12	126	19	59	19	224	17
Jordan	26	8	98	14	0	0	124	9
Kuwait	41	12	46	7	0	0	87	7
Lebanon	11	3	49	7	10	3	70	5
Malaysia	18	5	37	5	14	5	69	5
Oman	11	3	0	0	20	6	31	2
Pakistan	11	3	43	6	36	12	90	7
Qatar	17	5	39	6	0	0	56	4
Saudi Arabia	29	9	0	0	66	21	95	7
Turkey	27	8	134	20	0	0	161	12
UAE	28	8	9	1	44	14	81	6
Bank-year observations	**338**	**100**	**693**	**100**	**297**	**100**	**1328**	**100**
Number of banks	**39**	–	**80**	–	**34**	–	**153**	–

Note: The final sample contains unbalanced panel data of 153 banks (1328 observations) with 30 Islamic commercial banks (338 observations), 80 conventional commercial banks (693 observations) and 34 conventional commercial banks with Islamic window (297 observations) in 14 countries over the period (2007–2017).

Table 4.1. Sample distribution for Study 1

4.5.2 Measures of board diversity

The board diversity indicators employed in the models are: (i) gender; (ii) nationality; (iii) educational level. The proxy for gender diversity is the ratio of the number of women on the board to the total number of board members (*WOMEN%*), as widely applied in gender-related studies (Pathan and Faff, 2013; García-Meca et al., 2015; Haque and Jones, 2020).[14]

This study measures nationality diversity among the board members using an indicator of foreign nationality (foreign board members in the country of the bank headquarters) in line with Masulis et al. (2012) and García-Meca et al. (2015). Following the prior literature, this research measures nationality using the ratio of the number of foreign members on the board to the total number of board members (*FOREIGN%*).

Finally, with respect to board members' educational level, this study follows prior studies to define board members with extended professional expertise and backgrounds as those who hold the highest level of academic qualification, a doctorate (PhD) (Berger et al., 2014). This measure is the ratio of directors holding a PhD degree to the total number of board members (*PhD%*).

4.5.3 Controls

This research also controls for other variables, including board size (*BODSIZE*), measured by the natural logarithm of the total number of board members (Trinh et al., 2020). Following García-Meca et al. (2015), this study controls for independence (*Indep%*) using the percentage of independent (non-executive) directors on the board. Moreover, this study follows prior literature (Zhou et al., 2019; Trinh et al., 2020) in controlling for some CEO characteristics, including CEO duality (*CEODUAL*) (Pathan, 2009), through a dummy variable taking the value of 1 if the CEO is the chairperson of the board and zero otherwise. Furthermore, to control for CEO power and influence, the CEO's qualifications (*CEOQUAL*) are controlled using a dummy variable taking the value of 1 if the CEO has a Master's degree or higher and zero otherwise (Fan et al., 2019). This study also follows Benuouri et al. (2018) and Fan et al. (2019) to control for CEO gender using a dummy variable (*CEO_WOMEN*) equal to 1 if the CEO is a woman and zero otherwise. For CEO nationality (*CEOFOR*), a dummy variable is used taking the value of 1 if the CEO is foreign and zero otherwise.

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[14] In line with prior literature (see Adams and Ferreira, 2009; Carter et al., 2010; Pathan and Faff, 2013; Berger et al., 2014; García-Meca et al., 2015), this measure is used to reasonably identify the ratio of the number of women on the board to the overall number of directors within each bank and for each bank observation year. That is, an increase in this ratio means an increase in the number of women on the board.

To control for bank age (*AGE*), which reflects bank experience and informational advantage, we measure the difference between the sample year and the bank establishment year (Pathan and Skully, 2010). This research also includes bank size (*LogTA*), computed by the natural logarithm of total assets of a bank measured in thousands of USD at the end of the fiscal year in the sample period (Elnahass et al., 2020a). In addition, bank leverage (*LEVERAGE*) is controlled using total liabilities divided by total equity[15] (Trinh et al., 2020). The capital adequacy ratio (*CAR*) is also controlled, following Berger et al. (2014), to address the possible reduction in moral hazard and the regulatory monitoring effect. For CAR, we use the ratio of the sum of Tier 1 and Tier 2 capital to the risk-weighted assets (Berger et al., 2014; Basher et al., 2017). To control for the bank's listing status (*LISTED*), a dummy variable is estimated taking the value of 1 if the bank is listed and zero otherwise. In all financial performance models, insolvency risk (*log 1/Z*-score) is included to control for the effect of bank risk on bank performance (Mollah and Zaman, 2015). This study also includes ROAA in all risk models.

To account for different bank types (Islamic vs conventional), a dummy variable (*IB*) is employed that takes the value of 1 if the bank-year observation is drawn from an Islamic bank and zero otherwise. An Islamic window dummy variable (*WINDOW*) is also used to distinguish between observations drawn from conventional banks and conventional banks with some Islamic functions (Abedifar et al., 2013). This is defined as a dummy variable taking the value of 1 if the observation is drawn from a conventional bank with an Islamic window and zero otherwise. This study also controls for the presence of the additional board (SSB) within Islamic banks by including SSB size. This variable represents the natural logarithm of the total number of *Shari'ah* supervisory board members (Elnahass at al., 2020a; Trinh et al., 2020).

A dummy variable is used to capture the effect of the financial crisis on the sampled banks (*CRISIS*). This takes the value of 1 for the sample years 2007–2009 and zero otherwise (Elnahass et al., 2018). Furthermore, the annual gross domestic product (*GDP*) is used to control for cross-country development (Berger et al., 2014; Mollah et al., 2017). Consistent with Abedifar et al. (2013), Mollah et al. (2017), and Trinh et al. (2020), the Herfindahl–

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[15] According to Elnahass et al. (2018), "Tier 1 capital is the sum of equity book value, qualifying non-cumulative perpetual preferred stock, and minority interests in equity accounts of subsidiaries, less goodwill and other intangible assets" (p. 24); this is considered the core capital. Tier 2 capital is the supplementary capital, which includes revaluation reserves, general provisions, subordinated term debt, and hybrid capital instruments. Both bank types – Islamic and conventional – must preserve a minimum ratio of Tier 1 and Tier 2 capital under Basel II requirements (IFSB, 2005). According to Basher et al. (2017) "Due to the prohibition of interest payments, only a small part of Tier II capital (e.g. impairment and deductible allowance) is used by Islamic banks. As a result, Islamic banks already meet the 'enhanced quality of capital' provision under Basel III" (p. 3).

Hirschman index (*HHI*) is used to capture the risk and performance of the banking sector in each country.[16] Finally, to capture the quality of national governance, the study uses the World Bank (2016) Worldwide Governance Indicators to measure the level of corruption (*CORR*) across countries. The index for governance performance ranges from approximately -2.5 (weak) to 2.5 (strong); higher values imply better control of corruption. The variable definitions and notations in the models are presented in Appendix A.

4.5.4 Econometric specification

The corporate governance literature (Wintoki et al., 2012; Sila et al., 2016; Benuouri et al., 2018; Abdelsalam et al., 2020; Elnahass et al., 2020b) shows that endogeneity bias is predominant in this field and may affect the relationship between board characteristics and firm performance/risk. This is because the board composition is chosen and constructed by firms to suit their interests and hence variables tend to be endogenous and random (Trinh et al., 2020). Such endogeneity is likely to lead to difficulty in deducing relations due to inconsistency in coefficients and various biases. Unobservable variables may influence the relationship between board characteristics and bank stability as they are variables that cannot be controlled, being unknown. As noted by Wintoki et al. (2012), difficulties can arise in determining results and proposals from parameter estimations due to the effects of underlying and unobservable factors. For example, women directors' decisions and directorships can be influenced by many unobservable variables, such as the CEO's personality and ability, which affect firms' performance (Benuouri et al., 2018). However, while the CEO's management abilities can influence directors' decisions, factors such as the representation of women directors may also affect the CEO's abilities in unobservable ways. For example, Adams and Ferreira (2009) found that women directors tend to engage in more monitoring than men, thus exerting greater control over CEOs' behaviour. Therefore, there is an issue of simultaneity, (i.e. the reverse of causality), which might cause difficulties in distinguishing whether current board characteristics affect bank stability in a particular period or whether this is actually a function of the bank's past performance.

To overcome these endogeneity issues, following prior literature (e.g. Adams and Ferreira, 2009; Carter et al., 2010; Pathan and Faff, 2013), this study tests several empirical models to assess the association of diversity within the board (gender, nationality, educational level)

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[16] The control variables adopted are well established in the literature. Nevertheless, the potential pitfalls are recognized. For example, GDP fails to take account of volunteering, individuals' income distribution, household work, and economic welfare indicators (Kubiszewski et al., 2013), HHI fails to account for the complexity of markets (Hannan, 1997), and does not sufficiently capture difference in the size distribution of firms (Mishra and Rao, 2014), and the women's labour force participation rate fails to account for underlying demographic changes, the unemployment rate, and the difference between men's and women's participation.

with bank stability.[17] This analysis applies three-stage least squares (3SLS) estimation and instrumental variables (IVs), following Crater et al. (2010), Mollah and Zaman (2015), and Trinh et al. (2020), to study the relation between board characteristics, governance mechanisms, and bank performance and stability.[18]

Furthermore, to apply further controls for endogeneity concerns, several additional tests were conducted. First, to mitigate against omitted variable bias causing endogeneity, specific bank controls were used: (i) subsample for bank type; (ii) subsample by board size because large boards are assumed to be more diversified. Then, we sought to account for reverse causality using lagged values of the independent variables. The study finally employed country fixed effects to control for unobserved different country attributes for both the full and matched samples.

Three IVs were used for board diversity. The first IV comprised the women's labour force participation rate divided by the male labour force participation rate in each country for each given year (World Bank data) (Chen et al., 2017; Cardillo et al., 2020). An increase in this ratio leads to an increased probability of having women participating in the board of directors (Chen et al., 2017). In addition, enhanced women's empowerment in the labour force is expected to be associated with a rise in well-qualified women (Shriver et al., 2009). In general, high participation of women in the workforce promotes and boosts the economy (Silverstein and Sayre, 2009). Cardillo et al. (2020) have argued that women in the local labour market do not have a direct impact on bank risk, but that the country's economic growth may influence this ratio positively. Hence, banks in these countries may have more women in the workforce and therefore GDP should be controlled for all models.

The second IV represents the country's income level (World Bank data), being a dummy variable equal to 1 if the country is classified as high to middle income and zero otherwise. According to Trinh et al. (2020), highly skilled and reputable directors with professional knowledge can easily find job opportunities through accessing open labour markets in higher income countries. Consequently, the directors of banks with headquarters in high-income countries, with strong professional skills and opportunities (especially women), are more likely to find directorship positions in other firms and this might increase the directors'

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[17] The Wu–Hausman endogeneity test was applied across all models to examine whether endogeneity exists. The test statistics suggest the presence of endogeneity bias.
[18] Prior studies on corporate governance (Wintoki et al., 2012) and board diversity (Pathan and Faff, 2013; Sila et al., 2016) used a dynamic panel data model in the estimation methods, applying the generalized method of moments (GMM) estimation. However, this methodology is subject to potential bias due to the presence of time-varying omitted variables (Wintoki et al., 2012). For this reason, the study follows Cardillo et al. (2020) and Kinateder et al. (2021) in using IVs and PSM to control for endogeneity in the analysis.

employment rate. Finally, the last IV comprised the natural logarithm of listed domestic companies within the sampled countries. This IV represents listed domestic companies, including foreign companies which are exclusively listed, with shares listed on an exchange at the end of the year (World Bank data).[19] According to the World Bank, the overall development of a country's economy is associated with the country having a stable and growing capital market. A developed capital market is based on an established functional financial system with enhanced information transparency. Such market development should help to reduce transaction costs and promote high economic growth. Therefore, the rationale for using this instrument is based on the assumption that having more listed firms in a country leads to higher economic growth and enhanced investor protections, as well as high legal enforcement. Corporate governance mechanisms tend to be less effective for monitoring risk in countries with weak investor protection and poor capital markets (La Porta et al., 1999). Boards of directors are less likely to promote high performance and mitigate risk for their firms when operating in countries with weak shareholder protection; rather, such boards will seek to avoid carrying out their responsibilities in the face of fiduciary failures (Post and Byron, 2015). Moreover, operating in countries with lower investor protection and weak enforcement of regulations will lead to a reduced impact of board diversity on bank performance (García-Meca et al., 2015). Similarly, Post and Byron (2015) found that in countries characterized by strong shareholder protection, women directors influence firm performance positively and this should promote further board diversity.

The three IVs can indirectly affect bank performance/risk because country-level indicators are less likely to endogenously influence individual banks' performance and risk. Therefore, all IVs tend to be correlated with possible endogenous variables (*WOMEN%*, *FOREIGN%*, *PhD%*) and should predict bank performance/risk only indirectly through their effects on endogenous variables (see Black et al., 2006).

To test the study hypothesis for the possible impact of boards of directors' diversity on bank risk, this study follows Elnahass et al. (2020b) and Trinh et al. (2020) and treats different diversity indicators and bank risk measures as endogenous variables by building a simultaneous equations model. The first equation, Eq. (4.1), estimates the impact of the board of directors' diversity on bank risk while the second equation, Eq. (4.2), estimates the

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[19] Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies, such as holding companies and investment companies, regardless of their legal status, are excluded. A company with several classes of shares is counted once.

influence of such bank risk on the board of directors' diversity. Accordingly, the simultaneous equations estimated for the banks are specified as:

$$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLSit + \varepsilon_{it} \qquad (4.1)$$

$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2\ CONTROLS_{it} + \varepsilon_{it} \qquad (4.2)$$

where $RISK_{it}$ represents bank risk ratios, including insolvency risk (log of *1/Z-score*), credit risk (*LLR/GL*), and operational risk (*SDROAA*). *BOD_DIVERSITY$_{it}$* reflects the three board diversity variables: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. *CONTROLS$_{it}$* is the vector of control variables (including bank-level indicators, country-level indicators, and country governance indicators) in bank *i* at year *t* and ε_{it} denotes the error term term.

Similarly, bank performance and boards of directors' diversity are expected to be mutually interdependent since board members have the responsibility to enhance bank performance. Therefore, this study also constructs a simultaneous equations model treating bank performance and the board of directors' diversity as endogenous variables (Eqs. 4.3 and 4.4). These are specified as:

$$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + \beta_2\ CONTROLS_{it} + \varepsilon_{it} \qquad (4.3)$$

$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2\ CONTROLS_{it} + \varepsilon_{it} \qquad (4.4)$$

where *PERFORMANCE$_{it}$* represents the profitability ratios (*ROAA* and *ROAE*) and the cost efficiency ratio (*COST/INCOME*). *CONTROLS$_{it}$* is the vector of control variables, including bank-level indicators, country-level indicators, and country governance indicators, in bank *i* at year *t*. ε_{it} is the error term.

4.6 Results for Bank Stability and Board Diversity

4.6.1 Descriptive statistics

Table 4.2 presents the descriptive statistics for the full sample and sub-samples of fully fledged Islamic and conventional banks, together with conventional banks with Islamic windows. For the full sample, the results show that in this study, on average, the banks are solvent, with a negative 1/Z-score (i.e. lower distance to default), but the credit risk value has a positive mean of 4.25%. With respect to operational risk, the result shows that the banks have a positive mean for *SDROA* of 0.46%, suggesting a low risk profile on average. The sample banks show positive means for *ROAA* (and *ROAE*) ratios of 1.24% (10.78%) respectively, with an average cost efficiency ratio (*COST/INCOME*) of 53%. For the board diversity indicators, the mean representation for women (*WOMEN%*) is 8.01% for the full

sample, which is slightly lower than the findings reported by García-Meca et al. (2015) and Bennouri et al. (2018) with means of 10.22% and 10.72% respectively. The sample banks show that the mean percentages for the board of directors' nationality (*FOREIGN%)* and education (*PhD%*) are 18.89% and 9.00% respectively. The percentage of foreign directors is comparable to that of García-Meca et al. (2015) at 18%.

Clustering the full sample into different bank types, the study compared Islamic banks and full-fledged conventional banks. The mean values and two-sample *t*-test indicate that Islamic banks have higher insolvency, higher credit, and higher operational risk than full-fledged conventional banks. In terms of profitability, the means of *ROAA* and *ROAE* were lower in Islamic banks (i.e. lower profitability) than in conventional banks, while the *COST/INCOME* ratio showed a higher mean value in Islamic banks than in conventional banks. This suggests that Islamic banks present lower cost efficiency than conventional banks. These results are in line with Beck et al. (2013) and Abedifar et al. (2013), who suggest that Islamic banks operate on a more complex business model and additional *Shari'ah*-based screening of trades generates additional costs.

Regarding the diversity indicators, Islamic banks report 6.9% women's representation on the board of directors, compared to 8.88% for conventional banks. Islamic banks show higher foreign diversity (*M* = 27.23%) than conventional banks (*M* = 15.26%). Concerning educational level, Islamic banks (conventional banks) report means of 8.74% (9.06%) for PhD holders. With respect to the other control variables (governance, financial, and country level), *BODSIZE*, *CEODUAL*, *CEO_WOMEN*, *CEOFOR*, and *CEOQUAL* show lower mean values for Islamic banks than conventional banks. In contrast, *Indep%* has a higher mean value for Islamic banks than conventional banks. Islamic banks tend to be smaller in size, younger in age, and less leveraged than conventional banks, which is in line with previous findings (e.g. Beck et al., 2013; Elnahass et al., 2018).

Conventional banks with Islamic windows generally report lower averages for risk indicators and higher means for profitability ratios compared to both Islamic banks and full-fledged conventional banks. They also have higher means for women's board representation (*WOMEN% M* = 7.54%) and academic qualifications (*PhD% M* = 9.42%) than Islamic banks, but lower for foreign directors (*FOREIGN% M* = 16.94%).

| Variables | N | Full Sample | | Islamic Banks | Conventional Banks | | Conventional Banks with Islamic Windows |
		Mean	Standard deviation	Sample mean	Sample mean	Two-sample *t*-test (two-tailed)	Sample mean
log(1/Z-score)	1221	-3.947	1.197	-3.725	-3.981	-2.876***	-4.048
(LLR/GL)	1306	4.248	4.508	5.481	3.990	-3.298***	3.540
(SD ROA)	992	0.462	1.071	0.781	0.381	-3.391***	0.324
ROAA	1300	1.245	1.894	0.626	1.363	0.782***	1.627
ROAE	1257	10.777	10.882	6.969	11.403	5.500***	13.466
COST/INCOME	1244	52.824	33.254	67.933	49.445	-5.409***	44.620
WOMEN%	1322	8.014	12.049	6.872	8.887	2.14 1**	7.539
FOREIGN%	1313	18.890	24.335	27.229	15.256	-6.319***	16.944
PhD%	1316	9.004	12.004	8.736	9.062	0.035	9.420
BODSIZE	1322	9.401	2.686	8.800	9.660	5.092***	9.465
Indep%	1328	34.74	16.379	39.101	31.852	-6.725***	36.553
CEODUAL	1299	0.235	0	0.424	0.277	4.466***	0.246
CEO_WOMEN	1322	0.084	0	0.543	0.075	0.401	0.131
CEOFOR	1299	0.191	0.393	0.125	0.162	1.366	0.310
CEOQUAL	1284	0.529	0.499	0.470	0.502	0.421	0.625
CAR	1317	17.219	11.137	20.086	15.975	-3.674***	16.961
AGE	1137	37.894	24.748	25.713	43.281	11.806***	36.381
LEVERAGE	1320	8.194	3.234	7.854	8.663	4.545***	7.701
LogTA	1311	13.988	3.470	13.437	13.966	2.150**	14.688
LISTED	1328	0.811	0.392	0.686	0.820	4.814***	0.919
IB	1327	0.255	0.436				
WINDOW	1306	0.236	0.425				
GDP	1328	1.606	3.632	0.748	2.028		1.785
CORR	1328	-0.142	0.601	0.050	-0.255		-0.160
HHI	1328	0.240	0.156	0.247	0.222		0.265
Rule of law	1328	-0.058	0.528	0.147	-0.150		-0.126
BOARD_DIVERSITY_Index	1307	0.120	0.097	0.143	0.111		0.112

Notes: The table presents descriptive statistics for the variables used in the models for the full sample and sub-samples for each bank type. The sample period is between 2007 and 2017. N is the number of bank-year observations. Mean is the mean value. The paired sample means test (t-test) results are also reported. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses. See Appendix A for variable definitions.

Table 4.2. Descriptive statistics for variables in the main tests – Study 1

Table 4.3 reports the average percentage values for the diversity measures in each of the years 2007–2017. The number of observations varies each year from 2007 to 2016, before dropping in the final year of the sample. The results show a marked increase in the mean proportion of women, more than doubling from 2007 to 2016, before falling back slightly in 2017. The mean proportion of foreign directors falls over the sample period, relatively sharply in the first six years, then fluctuating over the later years. The mean proportion of PhD holders also fluctuates over the years.

Table 4.4 reports the average diversity values by country over the sample period, in line with Haque and Jones (2020). This study finds that the highest proportion of women is in Indonesia (19%), followed by Bangladesh (16%). Qatar has no women on its boards of directors. However, Qatar demonstrates modest diversity in terms of the proportion of foreign directors and PhD holders. The results also show that Bahrain has almost double the proportion of foreign directors on boards of directors compared to the second highest country, Egypt, which has the highest proportion of PhD holders.

Table 4.5 presents the Pearson pair-wise correlation coefficients matrix of all variables for the full sample. The findings show that the correlation coefficients for all explanatory variables are below the 0.60 thresholds, suggesting that multicollinearity is not dominant and is mitigated in this study model.[20]

Year	N	WOMEN%	N	FOREIGN%	N	PhD%
2007	57	4.896	56	26.191	56	9.258
2008	71	5.237	70	23.410	70	9.099
2009	86	6.188	85	22.312	85	8.826
2010	104	6.603	103	20.606	103	9.400
2011	126	7.903	125	19.045	126	9.621
2012	140	7.310	139	17.719	140	9.805
2013	146	8.066	145	18.093	146	9.737
2014	149	8.957	148	17.127	149	9.290
2015	152	9.307	151	16.794	152	8.921
2016	152	9.828	152	16.705	151	8.891
2017	139	9.246	139	18.719	138	6.725

Note: This table presents the number of observations (N) and the average value for each of the diversity measures for the years 2007 to 2017.

Table 4.3. Average board diversity values by year – Study 1

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[20] The variance inflation factor (VIF) values (not reported) indicate that the VIF for each variable is lower than 10% and the mean of VIFs is lower than 6%, and thus there is no concern about multicollinearity.

Country	N	Country Rank	WOMEN%	N	Country Rank	FOREIGN%	N	Country Rank	PhD%
Bahrain	94	8	3.155	94	1	64.718	94	6	10.470
Bangladesh	112	2	16.634	112	14	2.604	112	8	7.442
Egypt	34	4	7.903	34	2	33.266	34	1	25.497
Indonesia	224	1	19.214	224	13	9.211	224	9	4.704
Jordan	123	7	5.644	123	5	23.054	123	5	13.589
Kuwait	84	9	2.577	84	11	11.527	84	10	4.376
Lebanon	68	6	6.824	68	3	30.818	68	2	15.882
Malaysia	69	3	12.034	69	10	11.532	69	7	7.980
Oman	31	12	1.369	31	12	9.869	31	14	2.558
Pakistan	90	10	2.126	90	8	13.045	90	12	3.239
Qatar	56	14	0	56	9	11.847	56	11	3.571
Saudi Arabia	95	13	0.760	95	7	13.752	95	3	14.292
Turkey	161	5	7.479	152	4	24.369	161	4	14.149
UAE	81	11	1.818	81	6	17.091	75	13	3.123

Note: This table presents the number of observations (N) and the average value for each of the diversity measures by country over the sample period.

Table 4.4. Average diversity values by country – Study 1

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Insolvency Risk	1.000												
(2) Credit Risk	0.127*	1.000											
(3) SDROA	0.534*	0.069*	1.000										
(4) ROAA	-0.197*	-0.243*	-0.386*	1.000									
(5) ROAE	-0.290*	-0.234*	-0.387*	0.630*	1.000								
(6) Cost/Income	0.166*	0.241*	0.201*	-0.436*	-0.297*	1.000							
(7) WOMEN%	0.027	-0.044	0.089*	-0.059*	-0.095*	0.137*	1.000						
(8) FOREIGN%	-0.030	0.071*	-0.018	-0.053	-0.069*	0.100*	-0.143*	1.000					
(9) PhD%	-0.056*	0.007	-0.037	0.046	0.104*	-0.061*	-0.076*	0.118*	1.000				
(10) BODSIZE	0.001	0.072*	-0.111*	0.052	0.074*	-0.168*	-0.073*	0.197*	0.242*	1.000			
(11) Indep%	-0.087*	0.002	0.029	-0.111*	-0.045	0.078*	-0.092*	0.121*	-0.025	-0.207*	1.000		
(12) CEODUAL	-0.058*	-0.175*	0.007	-0.013	0.015	0.095*	0.331*	-0.164*	-0.091*	-0.363*	-0.054*	1.000	
(13) CEO_WOMEN	-0.032	0.017	-0.015	-0.030	-0.069*	0.057*	0.309*	-0.044	-0.036	-0.110*	0.025	0.094*	1.000
(14) CEOFOR	-0.064*	-0.028	-0.044	0.040	-0.033	-0.156*	-0.129*	0.170*	-0.075*	-0.039	0.001	-0.100*	-0.052
(15) CEOQUAL	0.037	0.003	0.071*	-0.041	-0.044	-0.049	-0.043	-0.019	0.061*	0.090*	0.081*	-0.083*	-0.162*
(16) CAR	-0.101*	-0.182*	0.135*	0.027	-0.020	-0.103*	-0.086*	-0.057*	0.067*	-0.127*	0.165*	0.087*	0.075*
(17) LogTA	-0.261*	-0.055	-0.198*	-0.012	0.075*	-0.133*	0.002	-0.131*	0.036	0.099*	0.046	-0.110*	-0.044
(18) LEVERAGE	0.137*	-0.017	-0.070*	-0.022	0.049	-0.148*	0.002	-0.061*	0.090*	0.166*	-0.126*	-0.065*	-0.101*
(19) AGE	-0.166*	-0.028	-0.139*	0.046	0.110*	-0.035	0.107*	-0.124*	0.091*	-0.026	-0.098*	0.134*	0.104*
(20) CRISIS	0.136*	0.017	0.061	0.109*	0.080*	-0.059*	-0.091*	0.087*	0.001	0.002	-0.008	-0.005	-0.010
(21) IB	0.102*	0.126*	0.168*	-0.187*	-0.202*	0.262*	-0.054*	0.200*	-0.013	-0.131*	0.156*	-0.114*	0.022
(22) WINDOW	-0.061*	-0.083*	-0.075*	0.109*	0.130*	-0.135*	-0.022	-0.030	0.012	0.026	0.040	0.006	-0.115*
(23) LISTED	-0.018	0.005	-0.020	0.123*	0.088*	-0.115*	-0.159*	-0.063*	-0.022	0.199*	-0.022	-0.127*	-0.032
(24) GDP	0.079*	-0.029	0.001	-0.010	0.034	0.113*	0.293*	-0.120*	-0.017	0.001	-0.196*	0.210*	-0.009
(25) CORR	-0.080*	-0.101*	-0.014	0.051	-0.008	-0.166*	-0.297*	0.126*	-0.042	-0.050	0.200*	-0.314*	-0.014
(26) HHI	-0.018	0.059*	0.013	0.008	0.007	-0.011	-0.187*	0.068*	0.021	-0.052	0.352*	-0.102*	0.003
(27) Rule of Law	-0.110*	-0.076*	-0.022	0.021	-0.037	-0.145*	-0.301*	0.175*	-0.009	-0.016	0.236*	-0.353*	0.022
(28) BOARD_ DIVERSITY_Index	-0.040	0.046	0.005	-0.050	-0.056*	0.114*	0.265*	0.826*	0.481*	0.233*	0.052	-0.036	0.076*

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
(14) CEOFOR	1.000														
(15) CEOQUAL	0.002	1.000													
(16) CAR	0.022	0.051	1.000												
(17) LogTA	0.106*	-0.020	-0.038	1.000											
(18) LEVERAGE	-0.219*	0.030	-0.271*	0.034	1.000										
(19) AGE	0.001	-0.118*	-0.029	0.173*	-0.009	1.000									
(20) CRISIS	-0.017	0.008	0.021	-0.659*	-0.006	-0.013	1.000								
(21) IB	-0.095*	-0.068*	0.148*	-0.092*	-0.062*	-0.271*	-0.031	1.000							
(22) WINDOW	0.187*	0.120*	-0.017	0.104*	-0.093*	0.002	-0.016	-0.321*	1.000						
(23) LISTED	0.095*	-0.070*	0.002	0.084*	-0.147*	-0.037	0.071*	-0.186*	0.161*	1.000					
(24) GDP	-0.205*	0.088*	-0.141*	0.060*	0.192*	0.055	-0.165*	-0.138*	0.011	-0.133*	1.000				
(25) CORR	0.280*	-0.042	0.159*	0.113*	-0.332*	-0.050	0.049	0.186*	-0.002	0.138*	-0.306*	1.000			
(26) HHI	0.038	-0.020	0.157*	-0.309*	-0.109*	-0.110*	0.323*	0.026	0.106*	0.093*	-0.317*	0.235*	1.000		
(27) Rule of Law	0.283*	-0.011	0.177*	0.123*	-0.328*	-0.021	0.043	0.226*	-0.057*	0.152*	-0.372*	0.925*	0.228*	1.000	
(28) BOARD_ DIVERSITY_Index	0.058*	-0.009	-0.056*	-0.092*	-0.014	-0.025	0.036	0.142*	-0.032	-0.131*	0.015	-0.033	-0.015	0.020	1.000

Note: The table presents the Pearson pair-wise correlation matrix for full sample (2007–2017). The table shows no multicollinearity problem between variables. * shows significance at the 0.05 level.

Table 4.5. Full sample Pearson pair-wise correlation matrix – Study 1

4.6.2 Empirical results

This sub-section reports the results first for bank stability and board diversity, and then distinguishes between bank types (Islamic and conventional, controlling for banks with Islamic windows).

Table 4.6 presents the results of the 3SLS estimations for the effect of board diversity on bank risk (Panel A) and financial performance (Panel B) for the full sample. For the bank risk measures, having a higher proportion of women directors is associated with lower bank risk. This supported by significant and negative associations with all risk indicators, as represented by: (i) insolvency risk (log *1/Z-score*); (ii) credit risk (*LLR/GL*); (iii) operational risk (*SDROAA*). The overall results are in line with expectations and consistent with Sapienza et al. (2009) and Croson and Gneezy (2009), stating that women are more risk averse than men. With respect to the proportion of foreign directors (*FOREIGN%*), there is a significant and negative association with the proxy of insolvency, suggesting low insolvency risk. However, foreign directors are associated with higher credit risk. Regarding the proportion of PhD holders on the board of directors, there is a significant and negative association with all three risk measures, indicating low bank risk.

In Panel B, a high proportion of women directors is associated with higher bank profitability, with significantly positive coefficients for *ROAA* and *ROAE*, consistent with the findings of García-Meca et al. (2015) and Elsharkawy et al. (2018). There is a significant and negative coefficient for the *COST/INCOME* ratio, which implies higher cost efficiency when women directors are on bank boards. These results are in line with expectations and prior studies suggesting that women directors generate resources and promote efficiency for their firms (Dong et al., 2017; Haque and Jones, 2020). The proportion of foreign directors is associated with significantly lower bank performance for all three measures, in line with the findings of Elsharkawy et al. (2018) and Masulis et al. (2012) for non-financial firms. However, for the proportion of PhD holders, the research finds a significant positive association with profitability and cost efficiency. The findings regarding the association with profitability confirm prior results reported by Chen et al. (2019b) for Chinese firms.

With respect to the control variables, across the two panels shown in Table 4.6, banks with large boards (*BODSIZE*) are associated with significantly higher insolvency risk, in line with Trinh et al. (2020). With respect to the proportion of independent directors, there is a significant negative association with all three risk measures and a significantly positive relationship with performance, indicating that banks with a higher proportion of independent directors tend to have higher profitability and cost efficiency (De Andres and Vallelado,

2008). For CEO power (*CEODUAL*), the results show a negative and significant association with credit risk. Moreover, For *CEO foreign*, the results show a negative and significant association with the cost-to-income ratio, indicating that foreign CEOs are associated with higher cost efficiency. Finally, large banks (*LogTA*) are associated with lower insolvency risk and lower profitability, which is in line with Pathan (2009) and Beck et al. (2013). Conventional banks with Islamic windows (*WINDOW*) are associated with higher insolvency risk, which is in line with predictions given their small size and niche market. This study also finds a positive association between the crisis year and *ROAA* and *ROAE*, indicating that this sample of banks reported high profitability during the crisis year.

Together, these findings suggest that gender diversity, on average, is associated with greater bank stability in terms of both financial performance and risk. According to resource dependence theory, women on the board of directors may provide creative problem solving in the decision-making process (Wiersema and Bantel, 1992). Likewise, this study finds that higher education is associated with greater bank stability. Potentially, directors with a PhD have expertise in mitigating bank risk and make sound strategic decisions, which can promote better financial performance (Berger et al., 2014). For nationality, the results show varying associations with bank stability. This study attributes the negative association with performance to the possible increase in communication and social costs resulting from appointing foreign board members. García-Meca et al. (2015) argue that high communication/social costs result in fewer opportunities for foreign directors to express their views, which reduces the quality of boardroom discussions. Overall, these findings support the first (*H₁*) and third (*H₃*) hypotheses, indicating that gender and educational level are associated with greater bank stability. However, these results lead to the rejection of the second hypothesis (*H₂*) as nationality does not have a positive association with bank stability (see Figure 4.1)

VARIABLE	Panel A: Risk			Panel B: Financial Performance		
	Insolvency risk log (1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)	ROAA	ROAE	COST/INCOME
WOMEN%	-0.105***	-6.960***	-3.118***	4.493***	7.474***	-2.361**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.020)
FOREIGN%	-0.005**	4.888*	0.533	-4.311***	-6.693***	4.911***
	(0.015)	(0.062)	(0.135)	(0.000)	(0.000)	(0.000)
PhD%	-0.044***	-6.578**	-1.623***	6.666***	10.709***	-7.708***
	(0.000)	(0.012)	(0.000)	(0.000)	(0.000)	(0.000)
BODSIZE	0.056***	0.023	-0.024	-0.002	-0.019	-1.936
	(0.002)	(0.363)	(0.775)	(0.868)	(0.298)	(0.341)
Indep%	-0.955***	-1.206**	-0.088**	0.549***	1.157***	-46.222***
	(0.002)	(0.022)	(0.021)	(0.006)	(0.000)	(0.000)
CEODUAL	-0.053	-0.185*	-0.004	-0.106	-0.063	-3.802
	(0.669)	(0.100)	(0.909)	(0.134)	(0.499)	(0.729)
CEO_WOMEN	0.693***	0.230	0.180***	-0.153	-0.325*	-17.624
	(0.002)	(0.328)	(0.009)	(0.248)	(0.065)	(0.375)
CEOFOR	-0.242**	-0.857**	-0.160***	0.627***	1.006***	-106.062***
	(0.045)	(0.027)	(0.008)	(0.000)	(0.000)	(0.000)
CEOQUAL	0.013	0.189	0.033	-0.117**	-0.122*	14.824**
	(0.881)	(0.173)	(0.258)	(0.027)	(0.097)	(0.044)
ROAA	-0.167***	0.005	-0.052***			
	(0.000)	(0.978)	(0.000)			
CAR	-0.020**	0.005	-0.002	-0.015**	-0.055***	39.725**
	(0.030)	(0.502)	(0.200)	(0.011)	(0.000)	(0.050)
Insolvency Risk				-0.040*	-0.087***	-0.761
				(0.057)	(0.003)	(0.810)
LogTA	-0.071***	0.053	-0.010	-0.040***	-0.018	4.455***
	(0.000)	(0.194)	(0.215)	(0.001)	(0.346)	(0.001)
LEVERAGE	0.044**	0.013	-0.006	-0.054***	-0.005	3.472**
	(0.013)	(0.529)	(0.236)	(0.000)	(0.762)	(0.036)
AGE	-0.003	0.006**	0.002	-0.005***	-0.007***	0.819***
	(0.103)	(0.029)	(0.686)	(0.000)	(0.000)	(0.000)
IB	0.085	-0.249	-0.004	0.079	0.129	-13.613
	(0.489)	(0.121)	(0.929)	(0.281)	(0.206)	(0.209)
WINDOW	0.230**	-0.082	0.019	0.009	-0.030	15.727
	(0.030)	(0.468)	(0.586)	(0.876)	(0.709)	(0.102)
LISTED	0.132	0.426**	0.123***	-0.175**	-0.316***	27.601***
	(0.259)	(0.016)	(0.005)	(0.021)	(0.007)	(0.009)

CRISIS	0.192	-0.043	0.049	0.186*	0.754***	3.040
	(0.383)	(0.654)	(0.284)	(0.062)	(0.000)	(0.433)
GPD	0.071***	-0.007	0.019***	-0.008	-0.026**	-0.013
	(0.000)	(0.608)	(0.000)	(0.287)	(0.017)	(0.992)
CORR	-0.359***	-0.560***	-0.114***	0.370***	0.663***	-37.134***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
HHI	-0.927***	0.298	-0.192	-0.213	-0.384	12.025
	(0.007)	(0.389)	(0.104)	(0.265)	(0.139)	(0.690)
Constant	-1.688***	0.491	0.699***	1.896***	3.140***	-27.039
	(0.000)	(0.638)	(0.000)	(0.000)	(0.000)	(0.728)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	867***	919***	244***	241***	233**	750***
Observations	882	888	709	863	833	850

Note: The table presents the 3SLS results for the full sample (Islamic and conventional banks). Bank risk is represented by insolvency risk, credit risk, and operational risk (Panel A), while financial performance is represented by profitability and the cost-to-income ratio (Panel B). The estimated models are defined as follows:

$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} (4.1)$

$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} (4.2)$

$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} (4.3)$

$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} (4.4)$

where Insolvency risk = log of (1/Z-score), Credit risk = LLR/GL, and Operational risk (SDROAA) is ROAA, ROAE, and COST/INCOME. The three diversity measures ($BOD\_DIVERSITY_{it}$) are as follows: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. $CONTROLS_{it}$ is the vector of control variables in bank *I* in year *t*, including bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. This model also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and this table does not present the Hansen–Sargan test for over-identification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen Ivs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses.

Table 4.6. Test for the effect(s) of board diversity on risk and financial performance for the full sample
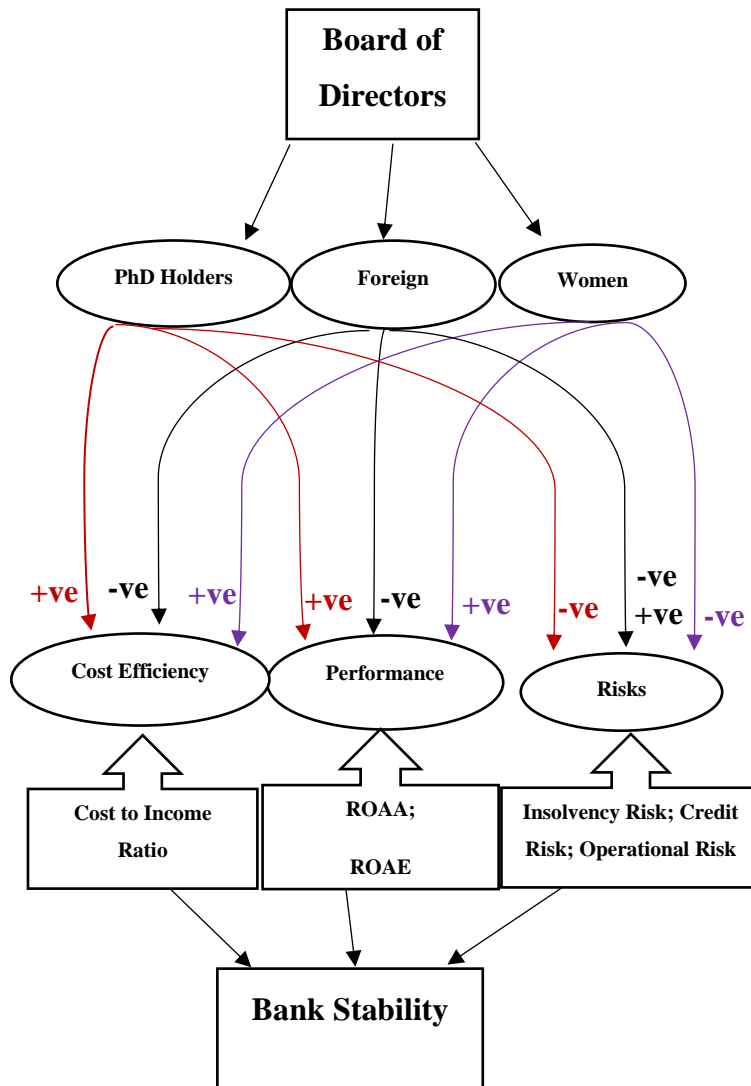
Figure 4.1. Results of the association of board diversity with bank stability

(Note: +ve indicates a positive association and -ve a negative association)

This sub-section also examines the association identified between diversity and bank stability in relation to different bank types (Islamic banks and conventional banks, controlling for Islamic windows). The results for bank risk and financial performance are presented in Tables 4.7a and 4.7b respectively, where Panel A reports the results for Islamic banks and Panel B shows the findings for conventional banks.[21]

For Islamic banks, Panel A of Table 4.7a shows that the association between the proportion of women directors is negative and significant for both insolvency and credit risk, which implies low bank risk. With respect to financial performance in Islamic banks, Table 4.7b Panel A shows that the proportion of women directors is negatively associated with the two alternative profitability measures, suggesting low profitability. For conventional banks, from Panel B in Tables 4.7a and 4.7b it is apparent that there is significantly low bank risk and high financial performance across all the indicators. Therefore, a high proportion of women directors is significantly associated with higher bank stability in conventional banks compared to Islamic banks. The negative association with financial performance for Islamic banks can be justified by the nature of the Islamic banking business model, which is characterized by extended complexity, including high monitoring and operating costs, as well as lower cost efficiency (Abdelsalam et al., 2020).[22] The Islamic banking business model is generally characterized by low efficiency and high operating costs (see Beck et al., 2013; Abdelsalam et al., 2016). Hence, the results are consistent with previous findings and suggest that even with the presence of women directors, Islamic banks still suffer in terms of financial performance. It is rare to find women directors who are expert in *Shari'ah*-compliant operations worldwide and they might well be more expensive to appoint than a male advisor (Trinh et al., 2020).

Regarding nationality, the proportion of foreign directors is positively associated with operational risk across both bank types. This study finds that the proportion of foreign directors in Islamic banks is associated with higher insolvency risk, but that foreign directors are positively associated with bank profitability. The increase in the risk exposure of Islamic banks resulting from the restrictions imposed on their liquidity and access to market sources (Abdelsalam et al., 2020) will drive these banks to maintain a higher profit margin as

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[21] The results of separate estimations of all models using the sub-samples of full-fledged conventional banks and those banks with Islamic windows remain consistent with all the main findings reported for the conventional banks in Tables 4.7a and 4.7b.

[22] The distinct nature of the bank–depositor relationship in Islamic banks is likely to bring additional complexities to the agency costs associated with this banking sector. In practice, depositors have no right to intervene in the financial and operating management of their funds, which are managed by the board of directors on their behalf (see Shibani and Fuentes, 2017). The managers of Islamic banks have opportunities to pursue their personal benefit at the expense of investment account holders (Safieddine, 2009), resulting in extensive monitoring costs that must be borne by the depositors and then have adverse impacts on the profitability and efficiency of Islamic banks (Abdelsalam et al., 2020; Trinh et al., 2020).

compensation for the increased risk. In contrast, the proportion of foreign directors is associated with lower insolvency risk for conventional banks. However, foreign directors are positively associated with both credit and operational risk. In addition, foreign directors are negatively associated with the bank's financial performance and are positively associated with the cost-to-income ratio (i.e. significantly low profitability and low cost efficiency).

Taken together, these findings suggest that having a greater percentage of foreign directors on the board may have a more detrimental impact on stability within conventional banks than in Islamic banks. One possible explanation for these results is the fact that cultural differences between board members may have a negative effect on communication, thus limiting the prospects for foreign directors to apply their skills and enhance the quality of decision making (Miletkov et al., 2014). In Islamic banks, foreign directors tend to boost profitability since board members who are *Shari'ah* scholars tend to be scarce and a few of these scholars seem to dominate the Islamic banking industry globally (see Elnahass et al., 2020a; Trinh et al., 2020). One explanation is that these directors join boards in different countries and with diverse backgrounds. Hence, based on human capital theory, they might bring different perspectives, skills, and resources to enhance bank profitability. However, the board busyness (i.e. multiple directorships) arising from the scarcity of *Shari'ah* advisors, who sit on several boards across international banks, tends to be negatively associated with stability in Islamic banks over the long term because these directors may have limited time and availibity to screen bank operations for *Shari'ah*-compliant investments (Trinh et al., 2020).

Another explanation is related to the work of García-Meca et al. (2015), who found that foreign directors are negatively associated with European bank performance. They suggest that appointing foreign board directors is associated with increased risk and reduced performance in banks, suggesting that foreign directors have limited knowledge of foreign regulations and a lack of famailiarity with the language and culture, which leads to reduced monitoring effectiveness (Dong et al., 2017). From an Islamic banking perspective, foreign directors are especially welcome and attractive because of the extra ethical monitoring and internal supervision offered by SSBs, which suggests that the Islamic banking environment supports the purposes of foreign directors to be effective monitors (Almutairi and Quttainah, 2020). Indeed, Almutairi and Quttainah (2020) found that foreign directors have a positive association with boards' effectiveness, which reduces the acting expediency of management, whereas they have an opposite association in conventional banks. They indicate that SSBs enhance the highly effective monitoring of foreign directors.

With respect to educational level, the association between the proportion of PhD holders and various indicators for bank stability is similar across the two bank types. This study finds that the proportion of PhD holders is associated with low bank risk and high financial performance, consistent with the prediction of this research and in line with resource dependence theory. The findings regarding low bank risk confirm the results of Berger et al. (2014), who found that PhD holders reduce portfolio risk (*RWA/TA*) for German banks.

For the control variables, a CEO holding a dual role (*CEODUAL*) is associated with a low risk profile in Islamic banks and conventional banks. Foreign CEOs are associated with high credit and operational risk in conventional banks, as well as being associated with high financial performance for all indicators within Islamic banks and conventional banks. Furthermore, CEOs with higher educational degrees are associated with high operational risk in both bank types, with conventional banks presenting significant low profitability and low credit. This may relate to the complicated business functions in this set of banks. Conventional banks with Islamic windows (*WINDOW*) have a positive association with insolvency risk (higher insolvency risk) and low profitability. Both bank types were affected by the crisis, such that Islamic banks presented high operational risk and conventional banks showed a high probability of default (high insolvency risk). However, both bank types also show high financial performance during the crisis.

In summary, the findings in this section provide further supporting evidence for the impact of board diversity on bank stability. Conditional on the bank type, gender and nationality diversity on the board have differential associations with bank stability in the two bank types, while educational level shows a similar effect. Comparing Islamic and conventional banks, the first hypothesis (*H₁*) is further supported for conventional banks, with a positive association between gender diversity and bank stability. This is only partially supported for Islamic banks due to the negative association between women directors and profitability. Furthermore, the influence of nationality shows varying and contrasting results in the two bank types, hence not confirming a specific direction for the predicted association under the second hypothesis (*H₂*). In addition, the results reported for the two bank types support the third hypothesis (*H₃*), suggesting that diversity in board members' education is associated

with greater financial performance for both bank types. Moreover, directors with PhDs appear to be effective in mitigating bank risk within the two bank types.[23]

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[23] Following Elnahass et al. (2018), sensitivity analyses were run across all estimated models using the IB sub-sample to control for regulatory differences in financial reporting across IB. This variable takes the value of 1 if an IB applies AAOIFI, and zero for an IB located in another country applying IFRS. The results remain unchanged and robust.

VARIABLE	Panel A: Islamic Banks			Panel B: Conventional Banks		
	Insolvency risk log (1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)	Insolvency risk log (1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)
WOMEN%	-20.809**	-7.855**	0.247	-1.897***	-7.842***	-1.980***
	(0.016)	(0.039)	(0.854)	(0.000)	(0.000)	(0.000)
FOREIGN%	4.041***	-1.155	1.703***	-0.471*	10.293***	1.047**
	(0.001)	(0.230)	(0.000)	(0.070)	(0.001)	(0.023)
PhD%	-7.196**	-3.856*	-1.067**	-1.927***	-9.896***	-1.824***
	(0.010)	(0.094)	(0.045)	(0.000)	(0.000)	(0.002)
BODSIZE	-0.023	14.795	-0.539**	0.014	-0.006	-0.106
	(0.820)	(0.113)	(0.017)	(0.434)	(0.794)	(0.191)
Indep%	-2.184*	5.942	-0.169	-1.169***	-2.118***	-0.147***
	(0.066)	(0.135)	(0.197)	(0.000)	(0.000)	(0.000)
SSB	0.090	-1.228	-0.017			
	(0.880)	(0.579)	(0.924)			
CEODUAL	-1.498**	-3.744**	-0.380***	-0.456***	-0.086	-0.014
	(0.014)	(0.037)	(0.004)	(0.000)	(0.491)	(0.691)
CEO_WOMEN				-0.186	0.070	0.099
				(0.266)	(0.708)	(0.115)
CEOFOR	-0.011	-4.181	0.064	-0.146	-1.641***	-0.188**
	(0.982)	(0.129)	(0.559)	(0.214)	(0.000)	(0.012)
CEOQUAL	-0.205	-0.506	0.114*	0.041	0.573***	0.075**
	(0.499)	(0.505)	(0.065)	(0.615)	(0.003)	(0.027)
ROAA	-0.345***	-4.911**	-0.032	-0.392	0.499**	-0.010
	(0.000)	(0.039)	(0.274)	(0.121)	(0.013)	(0.398)
CAR	0.092***	11.846*	0.007**	-0.028**	-0.026*	-0.019***
	(0.009)	(0.071)	(0.050)	(0.022)	(0.073)	(0.000)
LogTA	0.050	-0.316	-0.001	-0.043	0.085**	0.002
	(0.511)	(0.276)	(0.970)	(0.121)	(0.019)	(0.852)
LEVERAGE	0.327***	1.633**	0.005	0.023	0.010	-0.014**
	(0.000)	(0.050)	(0.567)	(0.236)	(0.670)	(0.026)
AGE	-0.029**	0.081*	-0.011***	-0.006***	0.011***	0.001
	(0.025)	(0.052)	(0.005)	(0.000)	(0.002)	(0.393)
WINDOW				0.156*	-0.052	0.034
				(0.095)	(0.621)	(0.255)
LISTED	0.807**	0.044	0.416***	0.000	0.418**	0.047
	(0.030)	(0.954)	(0.000)	(0.997)	(0.014)	(0.283)

CRISIS	0.092	3.283	0.422**	0.820***	0.094	0.091
	(0.839)	(0.209)	(0.039)	(0.007)	(0.294)	(0.263)
GDP	0.153***	0.194*	0.012	0.031**	0.002	0.015***
	(0.002)	(0.085)	(0.351)	(0.019)	(0.873)	(0.001)
CORR	-0.068	6.089	-0.068	-0.066	-0.609***	-0.101***
	(0.804)	(0.105)	(0.289)	(0.462)	(0.000)	(0.003)
HHI	1.028	-1.675	-0.136	-0.667*	-0.596	-0.208*
	(0.204)	(0.329)	(0.547)	(0.052)	(0.141)	(0.098)
Constant	-7.253***	-53.577*	0.873	-2.088***	0.105	0.789***
	(0.000)	(0.054)	(0.109)	(0.000)	(0.900)	(0.002)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	101***	30***	232***	280***	339***	141***
Observations	142	135	113	698	724	571

Notes: The table presents the 3SLS results for the sub-sample of Islamic and conventional banks. Panel A show the risk indicators for Islamic banks and Panel B shows the same results for the conventional banks, identifying the effect of BOD diversity on the risk indicators within both bank types. The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} \qquad (4.1)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.2)$$

where insolvency risk = log of (1/Z-score), credit risk = LLR/GL, and operational risk = SDROAA. $BOD\_DIVERSITY_{it}$ comprise the three indicators: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators, and country governance indicators. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1%. This table does not present the Hansen–Sargan test for overidentification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen IVs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses.

Table 4.7a. Test for the effect(s) of board diversity on bank risk for Islamic and conventional banks

VARIABLE	Panel A: Islamic Banks			Panel B: Conventional Banks		
	ROAA	ROAE	COST/INCOME	ROAA	ROAE	COST/INCOME
WOMEN%	-0.405***	-0.378***	-0.046	4.211***	9.419***	-2.546***
	(0.000)	(0.000)	(0.500)	(0.000)	(0.000)	(0.000)
FOREIGN%	0.070***	0.163***	-0.002	-5.648***	-11.033***	3.248***
	(0.003)	(0.000)	(0.600)	(0.000)	(0.000)	(0.000)
PhD%	0.086***	0.131***	-0.023	7.488***	13.835***	-4.325***
	(0.003)	(0.000)	(0.108)	(0.000)	(0.000)	(0.000)
BODSIZE	0.043	0.002	-0.013	-0.005	-0.019	-1.165
	(0.101)	(0.960)	(0.794)	(0.688)	(0.435)	(0.362)
Indep%	-1.377***	-1.429***	0.292*	0.805***	1.969***	-24.251***
	(0.000)	(0.001)	(0.059)	(0.001)	(0.000)	(0.000)
SSB	0.660***	0.925***	-0.145			
	(0.000)	(0.000)	(0.479)			
CEODUAL	-0.028	-0.291	-0.456	-0.149*	-0.144	10.635
	(0.863)	(0.138)	(0.174)	(0.059)	(0.261)	(0.134)
CEO_WOMEN				-0.114	-0.327	5.838
				(0.381)	(0.131)	(0.615)
CEOFOR	0.302**	0.351**	-0.453**	0.802***	1.695***	-71.823***
	(0.019)	(0.026)	(0.046)	(0.000)	(0.000)	(0.000)
CEOQUAL	0.016	0.093	-0.035	-0.279***	-0.522***	13.554**
	(0.863)	(0.410)	(0.728)	(0.000)	(0.000)	(0.013)
CAR	0.491**	0.140	0.319	0.011	-0.010	-26.492*
	(0.011)	(0.503)	(0.405)	(0.200)	(0.511)	(0.077)
Insolvency risk	-0.043	-0.069*	0.026	-0.014	-0.048	-0.037
	(0.188)	(0.095)	(0.554)	(0.622)	(0.288)	(0.988)
LogTA	0.044**	0.024	0.010	-0.022*	0.007	0.123
	(0.025)	(0.356)	(0.595)	(0.073)	(0.743)	(0.893)
LEVERAGE	0.051***	0.177***	0.010	-0.052***	-0.023	1.586
	(0.004)	(0.000)	(0.857)	(0.000)	(0.352)	(0.220)
AGE	-0.006	-0.010**	0.014**	-0.008***	-0.014***	0.672***
	(0.125)	(0.026)	(0.032)	(0.000)	(0.000)	(0.000)
WINDOW				-0.070	-0.226*	14.600**
				(0.336)	(0.069)	(0.024)
LISTED	-0.048	0.412***	-0.328**	-0.136	-0.442***	15.123*
	(0.681)	(0.006)	(0.049)	(0.158)	(0.007)	(0.058)
CRISIS	0.931***	0.305	-0.250*	0.122	0.586**	-1.206
	(0.002)	(0.404)	(0.061)	(0.186)	(0.015)	(0.211)

GDP	0.024*	-0.007	0.030	-0.013	-0.033**	1.118
	(0.094)	(0.698)	(0.329)	(0.159)	(0.039)	(0.191)
CORR	0.264***	0.549***	-0.340***	0.259***	0.574***	-16.827***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
HHI	-0.031	-1.132***	0.122	0.589**	1.410***	-48.950**
	(0.912)	(0.001)	(0.667)	(0.033)	(0.003)	(0.037)
Constant	-2.793***	-1.371	2.699	1.365***	2.411***	178.452***
	(0.001)	(0.160)	(0.170)	(0.000)	(0.000)	(0.002)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	234***	346***	75***	227***	212***	401***
Observations	134	129	138	700	676	683

Note: The table presents the 3SLS results for the full sample (Islamic and conventional banks). Panel A shows the financial performance indicators for Islamic banks and Panel B shows the same results for the conventional banks, identifying the effect of board of directors' diversity on the risk indicators of both bank types. The estimated models are defined as follows:

$$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} \qquad (4.3)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.4)$$

where $PERFORMANCE_{it}$ is ROAA, ROAE, and COST/INCOME. $BOD\_DIVERSITY_{it}$ comprise the three variables: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. $CONTROLS_{it}$ is the vector of control variables in bank I in year t, including bank-level indicators, country-level indicators, and country governance indicators. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1%. This table does not present the Hansen–Sargan test for overidentification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen IVs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses.

Table 4.7b. Test for the effect(s) of board diversity on bank performance for Islamic and conventional banks

4.7 Additional Analyses

4.7.1 Effect of board size

According to Carter et al. (2003), larger boards tend to be more diverse than small boards. Based on this sample, the average value of board diversity variables is higher for large boards compared to small boards, particularly in terms of the proportion of foreign directors and PhD holders (see Appendix B). Therefore, this study additionally identifies the effect of board size on the association between board diversity and bank stability. The expectation is that larger boards with greater diversity should perform better and show lower risk than smaller boards. The study sample is clustered using the median board size (9 members). Boards with a membership that is greater (equal to or below) in size than the median number of members represent large (small) boards. This study re-estimated all models and Table 4.8a reports the results for clustering the full sample into banks with large board size (Panel A) and Table 4.8b shows banks with small board size (Panel B).

For large boards, the association between the proportion of women directors and bank risk is negative and significant, but for performance is positive and significant. In contrast, for small boards, women directors are significantly and positively associated with bank risk (i.e. operational risk), and there is a significant and negative association with bank financial performance. The results indicate lower women's representation on small boards on average than on large boards (see Appendix B), implying that a lower proportion of women may lead to less influence. For large boards, the proportion of foreign directors shows a negative association with profitability and a positive association with the cost-to-income ratio (i.e. low cost efficiency). For small boards, the results are opposite – low credit risk, high profitability, and higher cost efficiency. The proportion of directors holding PhDs on large boards is positively associated with bank stability (i.e. low risk and high financial performance); this is not the case for smaller boards, which present significantly higher credit and operational risk, as well as lower financial performance. This indicates that the greater the number of board members with PhDs the higher the bank stability.

In general, the means for the board diversity variables are higher for large boards than small boards. This implies that higher diversity among board members tends to have a greater impact on bank stability. Such comparative assessments between large and small boards further explain the main results and show distinct implications for board diversity across different board sizes. The findings support the research expectations that board diversity, particularly in terms of gender and education, is associated with higher financial stability in banks with large boards, but not small boards.

	Panel A: Large Board					
	Risk			**Financial Performance**		
VARIABLE	Insolvency risk log(1/Z-score) BZ>M	Credit risk LLR/GL BZ>M	Operational risk SDROAA BZ>M	ROAA BZ>M	ROAE BZ>M	COST/INCOME BZ>M
WOMEN%	-0.199***	-3.102*	-0.030***	0.047**	-1.904	6.202
	(0.000)	(0.071)	(0.001)	(0.011)	(0.107)	(0.199)
FOREIGN%	0.010	0.254	0.003	-0.143***	-1.216**	2.886*
	(0.701)	(0.738)	(0.427)	(0.001)	(0.012)	(0.083)
PhD%	-0.337***	0.955	-0.028***	0.042**	3.593***	-4.181**
	(0.001)	(0.233)	(0.002)	(0.012)	(0.000)	(0.019)
Indep%	-0.054***	-0.777***	-0.730***	0.004**	0.008***	-0.004
	(0.000)	(0.004)	(0.000)	(0.012)	(0.001)	(0.246)
CEODUAL	2.537***	-0.061	0.308***	-0.061	0.002	-0.106
	(0.001)	(0.490)	(0.001)	(0.143)	(0.982)	(0.648)
CEO_WOMEN	-0.566	0.128	0.007	-0.063	0.133	-0.726
	(0.482)	(0.455)	(0.940)	(0.237)	(0.397)	(0.193)
CEOFOR	-0.098	-0.458***	-0.176**	0.090*	0.034	-0.174
	(0.832)	(0.000)	(0.012)	(0.078)	(0.778)	(0.259)
CEOQUAL	-1.022***	0.073	-0.161***	-0.022	-0.013	-0.023
	(0.002)	(0.160)	(0.001)	(0.440)	(0.831)	(0.827)
ROAA	-0.683***	-0.324***	-0.129***			
	(0.000)	(0.000)	(0.000)			
CAR	0.238***	-0.201	0.314**	0.158**	-0.034***	0.012
	(0.001)	(0.115)	(0.038)	(0.035)	(0.000)	(0.285)
Insolvency risk				-0.065***	-0.048*	0.027
				(0.000)	(0.087)	(0.483)
LogTA	-0.168**	-0.008	0.008	0.028***	0.014	0.013
	(0.017)	(0.422)	(0.436)	(0.004)	(0.246)	(0.353)
LEVERAGE	0.431***	-0.030***	0.014	-0.018***	-0.001	0.046*
	(0.000)	(0.006)	(0.289)	(0.004)	(0.990)	(0.075)
AGE	0.031**	0.001	0.134**	-0.003***	-0.004**	0.006***
	(0.012)	(0.442)	(0.041)	(0.000)	(0.012)	(0.004)
IB	-0.528	-0.127*	0.020	0.044	0.042	0.005
	(0.163)	(0.053)	(0.703)	(0.328)	(0.623)	(0.968)
WINDOW	1.725***	-0.038	0.253***	-0.001	0.118	-0.480
	(0.000)	(0.764)	(0.002)	(0.977)	(0.297)	(0.189)
LISTED	-1.407***	0.111	-0.105	0.027	0.041	0.523
	(0.004)	(0.390)	(0.252)	(0.594)	(0.755)	(0.235)
CRISIS	0.431	-0.142**	0.354***	0.722***	0.391***	0.028

	(0.470)	(0.034)	(0.001)	(0.000)	(0.000)	(0.852)
GDP	0.075*	-0.017*	0.022***	-0.002	0.019*	0.004
	(0.083)	(0.058)	(0.008)	(0.741)	(0.063)	(0.853)
CORR	-0.850**	-0.060	-0.114*	0.093*	0.163**	0.002
	(0.019)	(0.295)	(0.066)	(0.057)	(0.022)	(0.912)
HHI	-4.944***	0.087	-0.372**	-0.070	-0.369	-0.010
	(0.000)	(0.647)	(0.011)	(0.585)	(0.108)	(0.893)
Constant	6.054	3.001***	-0.349	-0.139	2.461***	2.184**
	(0. 861)	(0.000)	(0.577)	(0.613)	(0.000)	(0.030)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	161***	177***	94***	192***	96***	490***
Observations	469	460	367	460	447	458

Table 4.8a. Test for the effect(s) of board diversity on stability for subsamples by board size

	Panel B: Small Board					
	Risk			**Financial Performance**		
VARIABLE	Insolvency risk log(1/Z-score) BZ<=M	Credit risk LLR/GL BZ<=M	Operational risk SDROAA BZ<=M	ROAA BZ<=M	ROAE BZ<=M	COST/INCOME BZ<=M
WOMEN%	-3.197	-2.418	4.875***	-2.233	-7.934***	3.238***
	(0.461)	(0.230)	(0.000)	(0.579)	(0.002)	(0.002)
FOREIGN%	1.778	-6.365**	-1.330	11.349***	12.581***	-4.294***
	(0.945)	(0.044)	(0.199)	(0.000)	(0.000)	(0.001)
PhD%	-3.944	13.624***	2.956***	-12.103**	-18.951***	9.470***
	(0.904)	(0.006)	(0.000)	(0.017)	(0.000)	(0.000)
Indep%	3.929	-0.430	-2.212***	-2.642*	0.009	0.003
	(0.755)	(0.549)	(0.000)	(0.053)	(0.224)	(0.254)
CEODUAL	-0.619	-0.343*	-0.550***	-0.617*	-0.241	0.298***
	(0.962)	(0.058)	(0.000)	(0.077)	(0.352)	(0.008)
CEO_WOMEN	9.343	0.349	-1.259***	-1.127	0.556	-0.346
	(0.438)	(0.478)	(0.007)	(0.202)	(0.390)	(0.183)
CEOFOR	-3.780	1.347***	0.162	-2.077***	-3.206***	1.152***
	(0.931)	(0.010)	(0.368)	(0.000)	(0.000)	(0.000)
CEOQUAL	3.724	-0.812**	-0.125	1.048***	1.804***	-0.539***
	(0.905)	(0.015)	(0.337)	(0.003)	(0.000)	(0.000)
ROAA	-1.861	-0.222***	-0.249*			
	(0.885)	(0.003)	(0.083)			
CAR	4.241	-2.002***	-0.539*	0.884	0.041	-0.038*
	(0.939)	(0.004)	(0.086)	(0.247)	(0.278)	(0.051)
Insolvency risk				-0.286***	-0.198***	0.136***
				(0.005)	(0.008)	(0.000)
LogTA	2.367	-0.130	-0.059**	0.272***	0.249***	-0.153***
	(0.735)	(0.109)	(0.015)	(0.006)	(0.010)	(0.001)
LEVERAGE	0.430	-0.058	-0.018	0.024	0.173***	-0.031
	(0.890)	(0.127)	(0.530)	(0.675)	(0.003)	(0.144)
AGE	-0.011	-0.010**	-0.004*	0.005	0.021***	-0.005**
	(0.972)	(0.019)	(0.054)	(0.323)	(0.000)	(0.013)
IB	2.489	0.124	0.341*	-1.163***	-0.778**	0.379***
	(0.858)	(0.567)	(0.059)	(0.003)	(0.011)	(0.003)
WINDOW	-2.344	0.249	0.160	-0.176	-0.423	0.098
	(0.787)	(0.316)	(0.313)	(0.661)	(0.202)	(0.439)
LISTED	1.012	0.130	0.318**	0.440	1.098***	-0.290***
	(0.922)	(0.489)	(0.047)	(0.188)	(0.001)	(0.010)

CRISIS	26.861	-0.555	-0.021	3.063***	2.804**	-1.358***
	(0.654)	(0.450)	(0.872)	(0.002)	(0.011)	(0.004)
GDP	-0.243	0.060*	0.006	-0.046	-0.097**	0.051***
	(0.908)	(0.059)	(0.756)	(0.251)	(0.032)	(0.006)
CORR	-3.856	-0.139	0.027	-0.172	0.011	0.013
	(0.785)	(0.400)	(0.806)	(0.542)	(0.954)	(0.870)
HHI	-14.897	-0.520	0.209	-0.397	-1.092	0.206
	(0.696)	(0.295)	(0.655)	(0.664)	(0.127)	(0.462)
Constant	-59.715	10.634***	3.503**	-7.268*	-6.859**	7.839***
	(0.861)	(0.009)	(0.012)	(0.079)	(0.038)	(0.000)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	298***	173***	422***	56***	134***	174***
Observations	401	438	331	410	386	397

Table 4.8b. Test for the effect(s) of board diversity on stability for subsamples by board size

4.7.2 Board attendance problem

This sub-section examines the association between the attendance of directors and each of the diversity measures (Adams and Ferreira, 2009; Trinh et al., 2020). This examination is important to assess the directors' behaviour and obligations, which are identified in various rules and regulations for boards of directors (Adams and Ferreira, 2012). Guidelines for boards of directors' stress that board meetings are the primary source of information concerning the firm and directors need this information to fulfil their responsibilities and duties (Adams and Ferreira, 2012). Directors also attend these meetings to gain experience and their learning from each meeting aims to ensure greater efficiency in monitoring and providing advice in the future.

To test the effect of board diversity on attendance, the following regression model is estimated:

$$Attendance\_Problem_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \text{ (4.5)}$$

where $Attendance\_Problem_{it}$ is defined as the percentage of board members within each bank who fail to attend at least 75% of total board meetings in any one year. $BOD\_DIVERSITY_{it}$ reflects the three board diversity variables: (i) percentage of women; (ii) percentage of foreign directors; (iii) percentage of PhD holders. Hence, the main test variables are *WOMEN%, FOREIGN%*, and *PhD%*. $\beta_2 CONTROLS_{it}$ is the vector of control variables in bank *i* in year *t*, including bank-level indicators, country-level indicators, and country governance indicators. ε_{it} is the error term. Table 4.9 represents the ordinary least squares (OLS) linear probability regression estimations for the model with robust standard errors to control for heteroscedasticity. The prediction is that *Attendance Problem* is negatively associated with the diversity measures.

This study finds a significant negative association between women directors and the *Attendance Problem*. These results confirm the study prediction that women directors are more active in attending board meetings, thereby offering the potential to provide monitoring to control bank risk and promote high financial performance. Women directors tend to show a more responsible attitude in attending board meetings than men (Adams and Ferreira, 2009), which seems to explain further the underlying reasons for the enhanced bank stability in the main findings. With respect to foreign directors and directors with PhDs, the results are insignificant. For the control variables, board size is positively associated with the *Attendance Problem*, which indicates that an increase in the number of board members leads to greater failure to attend board meetings. These findings are in line with Adams and Ferreira (2009).

Moreover, the number of independent directors shows a significant and negative association with *Attendance Problem*, which means that independent directors on the board are more active in attending board meetings. This is also in line with the study prediction and further justifies the main findings.

VARIABLE	Attendance Problem
WOMEN%	-0.123**
	(0.029)
FOREIGN%	-0.061
	(0.134)
PhD%	-0.033
	(0.754)
BODSIZE	0.108***
	(0.000)
Indep%	-0.053***
	(0.000)
# Board Meetings	-0.001
	(0.638)
CAR	-0.082**
	(0.014)
LogTA	-0.002
	(0.261)
LEVERAGE	-0.011***
	(0.000)
IB	-0.009
	(0.497)
WINDOW	0.037**
	(0.020)
LISTED	-0.028
	(0.226)
CORR	-0.023
	(0.118)
GDP	-0.003
	(0.189)
Constant	0.245**
	(0.047)
R-squared	0.166
Observations	614

Notes: The table reports the OLS regression results for the association between the $Attendance\_Problem_{it}$ (percentage of board members failng to attend at least 75% of board meetings in any one year and board diversity. *Board Meetings* is the number of board meetings. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 4.9. Regression results for the relationship between attendance problems of directors and board diversity

4.8 Sensitivity Analyses and Robustness Checks

This section aims to address issues related to possible endogeneity due to omitted variable bias and/or reverse causality in the models through various sensitivity analyses and robustness checks using alternative specifications for the main models.

4.8.1 Country fixed effects and controlling for the rule of law

This section re-estimates a restricted variant of the specified model (i.e. dropping variables that might lead to possible reverse causality, such as CEO diversity). Country fixed effects

were also added as this test additionally controls for the rule of law index[24] (World Bank, 2016) in line with García-Meca et al. (2015) and Ashraf et al. (2016). According to Li et al. (2013), variables such as rule of law and culture values are stable and change very slowly at the country level over the years; hence, controlling for these variables should mitigate endogeneity from reverse causality. Indeed, this index can capture law enforcement for a country while controlling for the indirect effect of traditional culture on bank stability through mitigating institutional and economic perspectives (Ashraf et al., 2016). Moreover, such an index can offer a signal for the dominant regulatory enforcement efficiency, as well as investor protection characteristics in each country (Li and Zahra, 2012; Li et al., 2013).

Table 4.10 presents the results for the full sample and shows findings consistent with the main results. Women and PhD holder directors are positively associated with bank stability, while foreign directors are negatively associated with stability. This test also finds that low rule of law in the sample countries is associated with high credit and operational risk and with lower cost efficiency, consistent with expectations.

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[24] The index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance; higher values imply a better rule of law. The expectation of a lower coefficient for the rule of law would imply an increase in the country's risk level, in line with John et al. (2008).

VARIABLE	Panel A: Risk			Panel B: Financial Performance		
	Insolvency risk (log1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)	ROAA	ROAE	COST/INCOME
WOMEN%	-0.332**	-0.038	-1.345**	1.864**	0.061	-0.153***
	(0.034)	(0.615)	(0.016)	(0.011)	(0.157)	(0.003)
FOREIGN%	-0.286*	0.049*	0.012	-1.495***	-0.013	0.021*
	(0.094)	(0.096)	(0.967)	(0.000)	(0.348)	(0.091)
PhD%	-0.324*	-0.175*	-2.308***	1.798***	0.141***	-0.194***
	(0.091)	(0.088)	(0.000)	(0.003)	(0.003)	(0.000)
BODSIZE	1.682***	0.104	0.085	-0.001	-0.151***	0.182***
	(0.000)	(0.935)	(0.268)	(0.934)	(0.001)	(0.000)
Indep%	-0.007	-0.185	-0.268*	0.115	0.008**	-0.008***
	(0.941)	(0.569)	(0.056)	(0.347)	(0.035)	(0.009)
CEODUAL	-0.224*	-0.391	-0.015	-0.057	0.026	0.042
	(0.069)	(0.559)	(0.742)	(0.319)	(0.813)	(0.752)
ROAA	-0.172***	-0.890***	-0.038***			
	(0.000)	(0.000)	(0.000)			
Insolvency risk				-0.043***	-0.040	0.039
				(0.003)	(0.409)	(0.267)
LogTA	-0.087***	-0.004	-0.017***	-0.020***	0.007	0.006
	(0.000)	(0.952)	(0.002)	(0.000)	(0.728)	(0.716)
LEVERAGE	0.027**	-0.389***	-0.004	-0.034***	0.007	-0.057***
	(0.021)	(0.000)	(0.405)	(0.000)	(0.755)	(0.002)
AGE	-0.072	0.627**	-0.002	-0.002**	-0.134*	0.230***
	(0.364)	(0.012)	(0.917)	(0.018)	(0.061)	(0.001)
IB	0.291*	1.955***	0.058	-0.055	-0.370*	0.461***
	(0.094)	(0.001)	(0.153)	(0.259)	(0.058)	(0.002)
WINDOW	-0.004	-0.257	0.009	0.098*	-0.372*	0.521**
	(0.976)	(0.706)	(0.832)	(0.070)	(0.060)	(0.023)
LISTED	-0.128	0.512	0.081*	-0.031	0.190	0.018
	(0.293)	(0.334)	(0.058)	(0.522)	(0.332)	(0.909)
CRISIS	0.145	0.500	-0.013	0.043	0.149	-0.494***
	(0.191)	(0.365)	(0.800)	(0.295)	(0.379)	(0.003)
GDP	0.012	0.117**	0.005	-0.003	-0.004	0.002
	(0.220)	(0.014)	(0.267)	(0.623)	(0.659)	(0.812)
CORR	-0.014	-1.024	-0.160*	0.180**	0.189	-0.122
	(0.951)	(0.345)	(0.053)	(0.021)	(0.315)	(0.551)
Rule of law	0.095	4.060***	0.198*	0.158	-0.273	1.178**

	(0.729)	(0.007)	(0.060)	(0.126)	(0.597)	(0.041)
Constant	-4.983***	5.767	0.705***	1.127***	2.515***	2.093**
	(0.000)	(0.102)	(0.001)	(0.000)	(0.002)	(0.014)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	410***	493***	237***	404***	460***	227***
Observations	887	924	712	863	853	881
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents the 3SLS country fixed effect results for the full sample (Islamic and conventional banks). Bank risk is represented by insolvency risk, credit risk, and operational risk (Panel A), financial performance is represented by profitability and the cost-to-income ratio (Panel B). The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLSit + \varepsilon_{it} \qquad (4.1)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.2)$$
$$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLSit + \varepsilon_{it} \qquad (4.3)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.4)$$

where, $RISK_{it}$ is insolvency risk = log of (1/Z-score), credit risk = LLR/GL, and operational risk = SDROAA; $PERFORMANCEit$ is ROAA, ROAE, COST/INCOME. $BOD\_DIVERSITY_{it}$ comprises: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. $CONTROLSit$ is the vector of control variables for bank i in year t, including bank-level indicators, a country-level indicator (GDP), and country governance indicators (control of corruption and rule of law). IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1%. This table does not present the Hansen–Sargan test for over-identification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen IVs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses.

Table 4.10. (Sensitivity test) 3SLS regression results for board diversity on risk and financial performance for the country fixed effects full sample

4.8.2 Propensity score matching (PSM)

To control for endogeneity arising from (self-selection) bias, this sub-section uses propensity score matching to perform a matched-sample analysis for board diversity. First, the board diversity index was created in line with Arnaboldi et al. (2020).[25] The board diversity index was based on the proportion of women, foreign directors, and PhD holders within each board of directors. The three board diversity variables (*WOMEN%, FOREIGN%, PhD%*) were converted into discrete score variables ranging from 1 to 10 based on the decile of the sample distribution into which they fell (with 1 being the bottom and 10 the top decile). The board diversity index for each bank-year was then computed as:

$$\text{BOARD\_DIVERSITY\_Index}_{it} = \frac{1}{30} \sum_{j=1}^{3} D_{it}^{j}$$

where D^j is the decile for bank-year observation i in year t on the jth diversity variable ($j =$ 1,2,3). The index is equal to zero when all diversity variables are zero. Therefore, the index has a range of 0–1 by 1/30 standardizing.

Matched sample analysis was carried out using the treatment group identified through the PSM procedure (the board diversity index ≥ the sample mean of the board diversity index) and a control group (board diversity index < the sample mean of the board diversity index, or zero). The control group included the non-diverse board (index equal to zero) and the low-diversity index (possibility of having zero in one or more of the diversity indicators).

Table 4.11 compares the bank stability indicator measures (Panel A: bank risk; Panel B: financial performance) for banks with high diversity in directors to those for banks without diversity or with low diversity in directors matched using PSM for the full sample (2007–2017). The propensity score is the predicted value from a logit regression using the same controls (bank-specific controls and country-specific controls and country fixed effects) as those included in the models shown in Table 4.10. Then, the nearest-neighbour matching approach is applied, in which the unit chosen from the banks with low board diversity as a match for the banks with high board diversity is the one closest in terms of the propensity score.[26] Finally, 3SLS estimation is conducted on the matched samples, as reported in Table 4.11. The findings support the main results and are consistent with findings in Table 4.10, but the matched samples analysis shows slightly more significant results (see 4.6.2 for a

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[25] This study developed an index of diversity instead of using each diversity indicator as a treatment due to the high complexity of estimating each diversity indicator by itself for the treatment group.

[26] The logistic regressions for all models and further details of the matched samples, including the number of observations for the matched samples and other comparison tests between the treatment and control groups for all variables in the models are available upon request. For examples of models, see Appendices C and D.

justification of the findings). These results provide strong evidence that women directors and directors with PhDs are associated with greater bank stability, whereas foreign directors have a negative association with bank stability.

4.8.3 Lagged value of board diversity

As a robustness check for governance measures, this study follows Mollah et al. (2017) and Elnahass et al. (2020a) in employing a lagged approach for the full sample and re-estimating the main models. The aim is to alleviate the possibility of reverse causality and mitigate the endogeneity concern that past board members' appointments might affect current financial data. This study includes the one-year lagged value for the proportion of women directors, proportion of foreign directors, and the proportion of directors holding a PhD ($WOMEN\%_{(t-1)}$, $FOREIGN\%_{(t-1)}$, $PhD\%_{(t-1)}$). The results in Table 4.12 provide strong evidence that women directors and those holding a PhD have a positive association with bank stability for the sample banks. Furthermore, this study finds that foreign directors are negatively associated with bank risk overall, but they are also negatively associated with profitability and cost efficiency. The overall results are consistent with the main findings and suggest that the results in this study are not driven by endogeneity bias.

VARIABLE	Panel A: Risk			Panel B: Financial Performance		
	Insolvency risk log (1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)	ROAA	ROAE	COST/INCOME
WOMEN%	-4.116***	-0.098***	-6.215**	2.385***	10.111***	-0.109***
	(0.000)	(0.000)	(0.047)	(0.000)	(0.001)	(0.000)
FOREIGN%	-1.838**	0.013***	0.971**	-1.204***	-1.716	0.009**
	(0.016)	(0.000)	(0.021)	(0.000)	(0.198)	(0.045)
PhD%	-2.973***	-0.048***	-4.124*	2.104***	10.127***	-0.096***
	(0.000)	(0.002)	(0.093)	(0.000)	(0.003)	(0.000)
BODSIZE	1.079***	0.239	0.122	-3.603***	-23.754***	0.675**
	(0.000)	(0.185)	(0.575)	(0.002)	(0.007)	(0.037)
Indep%	-0.256	-0.090*	-0.298	-0.077	0.191	-0.134**
	(0.575)	(0.083)	(0.223)	(0.705)	(0.849)	(0.049)
CEODUAL	-0.146	-0.103	-0.054	0.188	2.986	-0.108
	(0.296)	(0.205)	(0.470)	(0.573)	(0.141)	(0.279)
ROAA	-0.194***	-0.081***	-0.050***			
	(0.000)	(0.000)	(0.001)			
Insolvency Risk				-0.020	-1.393***	-0.045
				(0.738)	(0.000)	(0.108)
LogTA	-0.078***	0.031**	-0.001	-0.140**	0.151	0.006
	(0.000)	(0.015)	(0.905)	(0.012)	(0.464)	(0.716)
LEVERAGE	0.049***	-0.008	-0.007	-0.221***	0.061	-0.004
	(0.003)	(0.483)	(0.647)	(0.000)	(0.757)	(0.814)
AGE	-0.093	0.225***	0.034	-1.003***	-3.352***	0.140*
	(0.257)	(0.000)	(0.442)	(0.000)	(0.000)	(0.073)
IB	0.178	-0.086	-0.081	0.254	-0.445	0.053
	(0.115)	(0.274)	(0.231)	(0.572)	(0.803)	(0.617)
WINDOW	-0.076	0.123	0.049	-0.042	-1.558	0.236
	(0.482)	(0.326)	(0.745)	(0.906)	(0.535)	(0.141)
LISTED	-0.148	0.377***	0.204*	-0.271	-0.369	0.177
	(0.216)	(0.000)	(0.060)	(0.492)	(0.809)	(0.126)
CRISIS	0.276*	-0.161	-0.044	0.513	7.964***	-0.283*
	(0.066)	(0.155)	(0.779)	(0.266)	(0.000)	(0.084)
GDP	0.023*	0.008	0.014	-0.067	-0.153	0.022*
	(0.089)	(0.383)	(0.124)	(0.108)	(0.370)	(0.081)
CORR	0.088	-0.040	-0.046	0.594	-3.120	-0.370*
	(0.744)	(0.813)	(0.724)	(0.504)	(0.401)	(0.082)
Rule of law	-0.037	0.008	0.002	1.424*	4.614	0.042
	(0.918)	(0.978)	(0.992)	(0.094)	(0.233)	(0.914)
Constant	-4.244***	0.296	0.346	14.751***	54.406***	2.783***

	(0.000)	(0.639)	(0.492)	(0.000)	(0.005)	(0.000)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	557***	669***	330***	414***	302**	355***
Observations	775	789	624	759	750	747
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents 3SLS results for the matched sample (Islamic and conventional banks). Matched sample analysis is carried out using the PSM procedure for the treatment group (if the board diversity index is higher than or equal to the sample mean of the board diversity index) and the control group (if the board diversity index is lower than the sample mean of the board diversity index or zero). Bank risk is represented by insolvency risk, credit risk, and operational risk (Panel A), financial performance is represented by profitability and the cost-to-income ratio (Panel B). The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} \qquad (4.1)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.2)$$
$$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLS_{it} + \varepsilon_{it} \qquad (4.3)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.4)$$

where $RISK_{it}$ denotes insolvency risk = log of (1/Z-score), credit risk = LLR/GL, and operational risk SDROAA; $PERFORMANCE_{it}$ is ROAA, ROAE, COST/INCOME. $BOD\_DIVERSITY_{it}$ comprises the three measures: (i) percentage of women; (ii) percentage of foreigners; (iii) percentage of PhD holders. $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. This model also controlled for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1%. This table does not present the Hansen–Sargan test for over-identification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen IVs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses.

Table 4.11. (Sensitivity test) 3SLS regression for risk and financial performance and board diversity using propensity matched samples

	Panel A: Bank Risk			Panel B: Financial Performance		
VARIABLE	Insolvency risk log (1/Z-score)	Credit risk (LLR/GL)	Operational risk (SDROAA)	ROAA	ROAE	COST/INCOME
L1 WOMEN%	-0.095***	-0.303***	-3.102***	5.342***	4.184***	-1.605
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.145)
L1 FOREIGN%	-0.082***	0.361***	0.823**	-4.956***	-4.709***	5.227***
	(0.003)	(0.000)	(0.050)	(0.000)	(0.000)	(0.000)
L1 PhD%	-0.324***	-0.296***	-1.482***	6.487***	7.224***	-6.175***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
BODSIZE	0.578***	0.037***	-0.077	0.246*	0.188	-4.804**
	(0.001)	(0.003)	(0.375)	(0.094)	(0.264)	(0.014)
Indep%	-0.243***	-0.853***	-0.117***	0.202***	0.290***	-48.810***
	(0.007)	(0.000)	(0.004)	(0.005)	(0.001)	(0.000)
CEODUAL	-0.499***	-0.423***	-0.017	-0.093	-0.009	-9.491
	(0.000)	(0.000)	(0.670)	(0.284)	(0.925)	(0.432)
CEO_WOMEN	-0.279	0.145	0.136*	-0.221	-0.254	-31.050
	(0.114)	(0.227)	(0.055)	(0.139)	(0.121)	(0.156)
CEOFOR	-0.266**	-0.560***	-0.206***	0.789***	0.728***	-115.888***
	(0.016)	(0.000)	(0.004)	(0.000)	(0.002)	(0.000)
CEOQUAL	-0.107	0.182**	0.016	-0.113*	-0.067	13.740*
	(0.177)	(0.012)	(0.591)	(0.097)	(0.389)	(0.092)
ROAA	-0.007	-0.140**	-0.053***			
	(0.838)	(0.032)	(0.000)			
CAR	-0.006	-0.002	-0.001	-0.016**	-0.051***	44.762**
	(0.488)	(0.784)	(0.577)	(0.047)	(0.000)	(0.040)
Insolvency risk				-0.029	-0.071**	-4.671
				(0.301)	(0.027)	(0.193)
LogTA	-0.065***	0.038**	-0.004	-0.055***	-0.042***	5.611***
	(0.004)	(0.011)	(0.642)	(0.000)	(0.006)	(0.000)
LEVERAGE	0.060***	-0.009	-0.010**	-0.040***	0.020	2.944
	(0.000)	(0.429)	(0.049)	(0.004)	(0.254)	(0.105)
AGE	-0.002	0.004***	0.001	-0.005***	-0.004*	0.757***
	(0.195)	(0.002)	(0.705)	(0.001)	(0.056)	(0.000)
IB	0.311***	-0.068	-0.031	0.055	-0.057	-11.923
	(0.007)	(0.426)	(0.488)	(0.562)	(0.585)	(0.315)
WINDOW	0.127	-0.132*	0.020	0.001	0.009	12.256
	(0.195)	(0.058)	(0.573)	(0.995)	(0.924)	(0.242)
LISTED	0.213*	0.259***	0.121***	-0.195*	-0.121	28.728**
	(0.051)	(0.001)	(0.005)	(0.051)	(0.295)	(0.013)
CRISIS	0.246	0.013	0.053	0.022	0.030	2.683

	(0.280)	(0.717)	(0.269)	(0.706)	(0.506)	(0.416)
GPD	0.026**	-0.007	0.017***	-0.012	-0.013	-0.096
	(0.036)	(0.458)	(0.000)	(0.212)	(0.245)	(0.946)
CORR	-0.050	-0.514***	-0.141***	0.453***	0.543***	-36.893***
	(0.565)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI	0.034	-0.072	-0.212*	0.022	-0.270	12.088
	(0.915)	(0.754)	(0.077)	(0.929)	(0.378)	(0.718)
Constant	-4.451***	0.906***	0.688***	0.982**	2.080***	-51.729
	(0.000)	(0.006)	(0.001)	(0.040)	(0.000)	(0.545)
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Wald chi^2	424***	745***	214***	340***	113***	909***
Observations	776	789	707	782	759	777

Note: The table presents the 3SLS results for the full sample (Islamic and conventional banks). Bank risk is represented by insolvency risk, credit risk, and operational risk (Panel A), Financial performance is represented by profitability and the cost-to-income ratio (Panel B), identifying the effect of the board of directors' diversity on a bank's stability. The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLSit + \varepsilon_{it} \qquad (4.1)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.2)$$
$$PERFORMANCE_{it} = \beta_0 + \beta_1 BOD\_DIVERSITY_{it} + CONTROLSit + \varepsilon_{it} \qquad (4.3)$$
$$BOD\_DIVERSITY_{it} = \beta_0 + \beta_1 PERFORMANCE_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (4.4)$$

where Insolvency risk = log of (1/Z-score), Credit risk = (LLR/GL), and Operational risk = SDROAA; $PERFORMANCE_{it}$ is ROAA, ROAE, COST/INCOME. $L1.BOD\_DIVERSITY_{it}$ comprises the lagged of one year three board $BOD\_DIVERSITY_{it}$ represents: (i) percentage of women; (ii) percentage of foreign nationals; (iii) percentage of PhD holders. $CONTROLSit$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators, and country governance indicators. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1%. This table does not present the Hansen–Sargan test for over-identification because the models are well-identified (three endogenous variables and three instrumental variables), indicating that the chosen IVs for board diversity are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 4.12. (Sensitivity test) 3SLS regression results: One year lagged WOMEN%, FOREIGN%, and PhD% for full sample, 2007–2017

4.9 Conclusion

Recent market and regulatory debates have emphasized the importance of diversity and equality in businesses and have attracted substantial interest in the areas of corporate governance, finance, and business ethics. While previous studies have provided inconclusive evidence concerning the effect of diversity on firm performance in non-financial institutions, this study is the first to examine different measures of diversity (gender, nationality, academic education) within boards of directors in banking. This study developed a unique dataset of banks located in 14 countries and operating dual banking systems. It has considered the association between diversity variables and bank stability using measures of financial performance and risk over the period 2007–2017. The study hypotheses were developed based on three theoretical perspectives: agency theory, resource dependence theory, and human capital theory. This study provides additional evidence on the impact of bank type to assess the institutional and differential associations with bank stability.

The representation of women directors on boards doubled over the sample period, with Indonesia having the highest concentration of women. With respect to other diversity measures, the percentage of foreign directors fell over the sample period, while the proportion of PhD holders fluctuated over the years. The empirical results also provide strong evidence that gender diversity is associated with high bank stability, while a higher proportion of foreign directors is associated with lower financial performance and significantly increased credit risk. The results also show that a higher proportion of directors with doctoral degrees is associated with higher bank stability. Analyses conditioned on the different bank types showed that high women's representation on the board of directors is associated with lower bank risk for both Islamic and conventional banks. The association between women directors is significantly negative for financial performance, but positive for profitability and cost efficiency in conventional banks. Having a higher proportion of foreign directors shows differential impacts on the two bank types. High nationality diversity on the board is negatively associated with financial performance in conventional banks, but the opposite holds for Islamic banks. Moreover, the results for the two alternative banking systems suggest that a high educational level is associated with high bank stability.

The additional analyses for gender diversity also indicate that women directors present significantly low problems with attendance (i.e. they are active in attending board meetings), with no significant evidence for other board of director diversity measures. This study also tested for the effect of board size and found consistent positive associations between gender

and educational measures of diversity and bank stability for banks with large rather than small boards.

Overall, these findings confirm the hypotheses and predictions, except for those relating to nationality (having a high proportion of foreign directors on the board). The results presented in this study offer new insights to the corporate governance literature and the global banking industry. This study also offers key policy implications and valuable insights for regulators, investors, and various sets of stakeholders (see 7.3). These findings provide primary indications for the optimal board composition in banks, particularly regarding gender and nationality. Women directors are associated with lower bank risk irrespective of the type of the bank. These results are in line with previous studies which conclude that women directors are more risk averse and have high monitoring skills (Levi et al., 2014; Liu et al., 2014).

This study also emphasizes the effect of institutional characteristics with respect to board diversity and systems of governance for countries operating a dual banking system. However, due to a lack of available data for the sample banks, the study is unable to extend additional analyses to capture socio-cultural differences for foreign directors. Thus, future studies are encouraged to extend this research by analysing the effect of board size and aim to establish the existence of a critical mass. Differences in the association between diversity measures and bank stability between countries could also represent a fruitful avenue for research.

Chapter 5. Study 2 – Women Directors and Market Valuation: What Are the "Wonder Women" Attributes in Banking?

5.1 Abstract

This study investigates whether the representation of women directors, women directors' monitoring attributes, and women directors' demographic attributes are associated with market value. This study constructs a unique sample of 1,019 bank-year observations for 12 countries for the years 2007–2017. For the full sample, this research finds strong evidence that a high proportion of women directors on the board is associated with high bank value. It also shows that the existence of independent women board members is significantly priced by market participants through increasing bank value, while women's leadership as chairperson has no significance association. Moreover, foreign attributes are associated with lower bank valuations. Women directors with a high level of education and those holding accounting and finance qualifications are associated with higher bank value, although there is strong evidence that banks with a high proportion of women members who graduated from foreign universities are typically associated with lower stock market valuations.

Conditional on the bank type, this study finds that a high representation of women on the board is generally associated with lower market value for Islamic banks, but the opposite holds for conventional banks. This research additionally examines the impact of the financial crisis for the full sample. The results show that women directors are valued as enhancing bank value only during non-crisis years. Furthermore, employing several sensitivity analyses, this study uses PSM to identify a matched sample of banks without women directors to control for self-selection bias and the results are consistent. Overall, this study finds the "wonder woman" attributes relate to independent directorships, higher levels of education (including the study of accounting and finance), and local knowledge through studying in the home country. The findings of this study offer new insights into board diversity and bank valuation, with important policy implications for regulators governing emerging countries with dual banking systems.

5.2 Introduction

The banking industry was greatly affected by the global financial crisis. As a result, governance was enhanced after the crisis to reduce bank risk, while new regulations were introduced with the aim of improving bank value and avoiding bank failure, as well as increasing public trust (Pathan, 2009; Aebi et al., 2012; Elnahass et al., 2020a). Enhanced governance and new regulations were particularly important as the business model of the

banking sector is complex and there is high information asymmetry between managers and shareholders, which limits the ability of stakeholders to track and control managers' decision making (De Andres and Vallelado, 2008). The ability to undertake effective monitoring in order to align shareholders' interests with those of managers, ensuring that they act in accordance with the firm's legal and ethical obligations, may be influenced by the characteristics, attributes, and skills of the board of directors (Fama and Jensen, 1983; Arfken et al., 2004; Larkin et al., 2012). These characteristics, skills, and attributes have received considerable attention in the corporate governance literature, as prior studies document that the characteristics of board members affect firm value and can enhance financial performance (e.g. Lu and Boateng, 2017; Faleye et al., 2018; Jouida, 2019). Moreover, resource dependence theorists assert that boards of directors are providers of resources, such as legitimacy, advice, and links to the market and other organizations (Hillman and Dalziel, 2003).

Gender diversity has been identified as an important board attribute in contemporary debates regarding equality, inclusivity, and other demographics. According to Ingley and van der Walt (2003), "the concept of diversity relates to board composition and the varied combination of attributes, characteristics and financial expertise contributed by individual board members in relation to board process and decision-making" (p. 8). Prior studies suggest that gender diversity enhances corporate governance by bringing different perspectives (Singh, 2007; Adams and Funk, 2012), leading to innovative solutions to problems, as well as effective governance (Robinson and Dechant, 1997; Estélyi and Nisar, 2016). Within the context of gender diversity, over the last decade an increasing number of women leaders and directors on boards (mandated or not) has caught the attention of policymakers in banking, in particular regarding the significance of their role and relationship to strong bank governance (Owen and Temesvary, 2018). Prior studies have addressed the implications of women's representation on boards for firm risk and performance. For example, women directors promote less aggressive policies and also reduce the effect of financial distress in their firms (Chen et al., 2019). Also, Loukil and Yousfi (2016) found that women generally tend to avoid risky decisions and challenging investments.

While several studies have investigated the impact of women directors on firm risk and performance within financial and non-financial firms, research examining stock market valuations within the banking sector and the relation to women leaders and their specific attributes is still limited. The majority of previous studies have focused mainly on non-financial firms, indicating that women directors are associated with higher market valuation

(e.g. Carter et al., 2003; Campbell and Mínguez-Vera, 2008; Larkin et al., 2012; Ntim, 2015; Gyapong et al., 2016). These studies did not investigate the explicit attributes and characteristics of women directors. Moreover, earlier banking studies ultimately focused on financial performance and bank risk in relation to board diversity (see Berger et al., 2014; Owen and Temesvary, 2018; Arnaboldi et al., 2020; Kinateder et al., 2021) and none have investigated the market valuation of banks and its association with various attributes of women directors (e.g. independence, leadership position, education and qualifications, experience, nationality).

A study of stock market valuations and their association with women directors within the banking sector is relevant for two key reasons. First, the uniqueness of governance in banking, together with the opacity related to several banking transactions, implies the potential for a positive association between effective monitoring by the board of directors and investors' trust and optimism (Adams and Mehran, 2012; Faleye and Krishnan, 2017). In line with agency theory, investors are likely to pay more for bank equity when their interests are aligned with those of directors and managers and when they have trust in the monitoring skills, effectiveness, and the expertise of a board member. In other words, bank market value is likely to increase as agency conflicts diminish because lower agency costs can effectively protect investors' wealth. From this perspective, the attributes of board members, for example, gender, may be associated with bank market value through their links to effective monitoring and investor trust. Second, within the banking literature, the study of stock market valuations has been restricted to the impact of corporate governance mechanisms and characteristics, for example ownership structure, shareholder protection laws, board size, and CEO duality (see Caprio et al., 2007; Belkhir, 2009; Zulkafli et al., 2010).

Relatively little is known about whether the presence of women directors on the boards of banks has a positive or negative association with bank market value and – more specifically – whether particular attributes, for example monitoring attributes (board independence, educational level, and nationality), may be relevant for bank market value. Moreover, this study extends the scope of research by addressing additional gaps in the banking literature since no prior study has considered the possible systematic differences in stock market valuations related to the presence of women directors across alternative bank types (Islamic and conventional). The two bank types differ in terms of their business models, nature, qualities, and commitments of the board of directors (Mollah et al., 2017; Elnahass et al., 2020a), which could affect investors' valuations of board gender diversity. In addition, prior

studies of gender diversity present limited evidence on market valuations during periods of financial distress, such as the financial crisis of 2007.

Accordingly, the purpose of this study is to bridge these gaps by developing a comprehensive empirical investigation of different women directors' attributes and characteristics in the banking industry, also extending the analyses to investigate the implications across alternative banking models and through the financial crisis. The premise of this chapter is that women directors' attributes may be associated with differing stock market valuations, but this association could be affected by banks' institutional characteristics and exogenous economic shocks.

This study follows the research design proposed by Bennouri et al. (2018) and Gull et al. (2018) for French firms. It considers three aspects in relation to gender diversity on the board: the representation of women directors (measured through the percentage of women directors compared to the total number of board members), women directors' monitoring attributes (independence and leadership),[27] and women directors' demographic attributes (educational level, nationality, and financial expertise).[28] The study draws on several theoretical perspectives, including agency theory, resource dependence theory, human capital theory, and signalling theory, to build three main testable hypotheses.

This study employs financial and corporate governance data for 114 listed banks from 2007 to 2017 in 12 emerging countries in the Middle East and Asia. The rationale for selecting this sample is that women in these areas tend to face greater discrimination than in developed countries due to the conservative culture and norms based on religion. According to the Arab Human Development Report (2016), among women in the Middle East there tends to be low participation in political, economic, and social life, limited access to employment opportunities and wage discrimination. However, there have been some changes recently in this area in terms of addressing discrimination and empowering women, for example through amendments to many corporate laws and the adoption of political reforms in countries such as Saudi Arabia, the United Arab Emirates (UAE), Lebanon, Jordan, and Qatar, enabling more women to attain high positions in organizations (Salloum et al., 2019). As part of ongoing

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[27] Independent women directors are measured as the number of independent non-executive women directors to the total number of women directors.

[28] This study refers to financial expertise as women directors with experience as an executive officer (e.g. Chief Executive Officer [CEO], Chief Financial Officer [CFO], or Chief Risk Officer [CRO]) in a bank or insurance company or academic institution (e.g. professor in finance, accounting, economics, or business) (Güner et al., 2008).

reforms and improvements, this study offers new insights which can support current practices in global banking systems that have an increasing number of women directors on their boards.

The study uses a three-stage least squares (3SLS) estimation method to mitigate the potential endogeneity issue. The main finding shows that – on average – the presence of women directors on boards is significantly positively associated with stock market valuations. The positive association of women directors remains unchanged after introducing different attributes. The results for effective monitoring attributes (independence and leadership) show that independent women directors are associated with high market value, while leadership, measured by the role of board chair, does not have a significant impact. However, when examining the main demographic attributes of women directors, this study finds that financial expertise and foreign nationality for the sampled banks are associated with lower bank valuations by investors. In contrast, appointing women directors with a high level of education and those with accounting and finance qualifications are both associated with higher market value. This study finds strong evidence that banks with a high proportion of women members who graduated from international universities are typically negatively associated with market value.

Employing separate analyses, this study clustered the full sample into different bank types (Islamic and conventional) and found that a high representation of women on the board is negatively associated with market value for Islamic banks, but the opposite holds for conventional banks. The presence of independent women directors on the boards of both Islamic and conventional banks is significantly positively associated with market value. In both bank types, the presence of women directors with postgraduate degrees and accounting and finance qualifications is significantly positively associated with bank market valuation. The results for educational background are consistent across both bank types; women directors who studied at foreign universities are negatively associated with bank value.

This study also examines the impact of the financial crisis and post-crisis periods. During the crisis, women directors and independent women board members show a negative association with market value. In contrast, in the post-crisis period, both have a positive association with market value. Having a woman as chairperson has no association in either period. Both the financial expertise and foreign attributes for women directors have a positive association with market value for the crisis period. Women board members with a high educational level have a consistent positive association with market value in both the crisis and post-crisis periods. However, alumni of foreign universities show an insignificant association with market valuation during the crisis. In the post-crisis period, there is a negative association between

women who graduated from foreign universities and market value, but a positive association is observed for women holding accounting and finance qualifications with bank value. Furthermore, this study uses propensity score matching (PSM) to identify a matched sample of banks without women directors to control for self-selection bias. The findings for the matched sample support the main findings. Several other sensitivy analyses are run and the overall results are robust and consistent with the main findings.

This study makes several contributions to the literature on board gender diversity and corporate governance. First, to the best of my knowledge, this is the first international study to employ a unique dataset for countries operating dual banking systems to test the impact of women directors. The study goes beyond using the percentage of women directors, employing different monitoring and demographic attributes. Through systematic analyses of comprehensive gender diversity indicators, this research enhances the results of prior banking studies that have focused on examining the ordinary measures of gender but have not studied their association with stock market valuations within the global banking industry (Pathan and Faff, 2013; García-Meca et al., 2015; Arnaboldi et al., 2020). Moreover, this study is the first to recognize the possible effects of institutional characteristics in alternative banking business models. Hence, the study presents new insights into the differing associations of women directors with market value. Consequently, this study broadens the existing literature on the corporate governance of Islamic and conventional banks, which has not clearly considered board diversity (e.g. Abdelsalam et al., 2016; Shibani and Fuentes, 2017; Elnahass et al., 2020a; Mohammad et al., 2020; Trinh et al., 2021). Finally, it extends the prior literature studying the impact of effective governance and board characteristics during episodes of financial distress, such as the financial crisis of 2007.

This study offers important insights and policy implications by showing both the significance and differential association of board gender diversity with market value for several sets of stakeholders participating in the global banking system. The positive association between women directors and market valuation implies that investors may positively price the representation of women on boards, perceiving their effective monitoring role in promoting enhanced decision making for their banks. The findings presented in this study call for policymakers to consider assigning more quotas for highly educated and independent women directors while also addressing the importance of local education for women directors. Investors tend not to price international education highly, but local education for women directors is likely to increase the bank value. Moreover, regulators need to reflect on episodes of exogenous shocks and economic stability since this study indicates that during periods of

financial distress (the financial crisis) the presence of women directors on the board seems to reduce bank market value. Regarding nationality and financial expertise, legislators should publish clearer guidelines regarding the percentage of foreign women directors and those with financial expertise within the banking sector.

Furthermore, the evidence presented in this chapter could influence policymakers/regulators and guide them to structure the board of directors differently according to the banking models, particularly in countries operating dual banking systems. Although the presence of women directors is positively associated with market value within conventional banks, investors in Islamic banking may not price such high representation of women on boards. This result can be justified by the complex agency environments and constrained business models of Islamic banking. However, highly educated and independent women board members are positively valued by investors for both bank types. Moreover, women directors and their attributes seem to promote high bank value after the financial crisis period. During these years, more women directors' quotas are identified as showing a steady increasing trend in equality and inclusive representations of board members in the sampled countries. This study also offers new and key implications for policymakers, clarifying how they might appoint women directors based on their attributes rather than a blind gender quota. The evidence presented in this study also provides support for the global movement in society towards recognizing the value of empowering women in banking.

The remainder of this chapter is structured as follows. The next section discusses the theoretical framework and then hypothesis development. The data and sample are presented in section 5.5 and the methodology in section 5.6. Section 5.7 articulates the empirical results, while sections 5.8 and 5.9 provide additional testing and robustness checks. Finally, section 5.10 concludes.

5.3 Theoretical Framework for Bank Board Diversity

Regulators and participants in capital markets have long emphasized the critical role of the board of directors as a core corporate governance mechanism in promoting a country's economic growth and financial stability. From the perspective of agency theory (see section 3.4.1), the monitoring function is the responsibility of the directors, ensuring that managers work for and on behalf of shareholders (Hillman and Dalziel, 2003). A weak system of governance tends to offer substantial managerial opportunities to engage in risk activities and fraudulent acts.

Board diversity is a key attribute to consider and evaluate as it has implications for the success of the monitoring function. Diverse boards are those constituting heterogeneous groupings in terms of gender, background, and functional diversity. The role of heterogeneity in relation to board performance and stock market valuation can be addressed through many theories and these can be linked together to identify how diversity among directors operates in the boardroom. According to Perryman et al. (2016), heterogeneity within the group enhances decision-making processes, allowing better problem solving due to the board's ability to undertake critical analysis of issues. For a board to succeed in its key functions (e.g. monitoring and controlling, advising, and counselling), it is necessary for it to include highly qualified members with different experiences and skills, linked to the external environment (Hillman and Dalziel, 2003; Ntim, 2015). These abilities can be introduced through the diversity of directors (Bear et al., 2010).

Directors with higher skills are likely to provide more resources to the organization (for resource dependence theory, see section 3.4.2). Furthermore, in terms of effectiveness, the board's role is improved by directors' high reputation, expertise, and networks (Johnson et al., 2013). Thus, the expectation in hiring members to the board is that it will be able to draw on the varied human capital they possess (Kesner, 1988). Decision making in the boardroom is a group process which requires rationalism and professional skills because of its complexity; this process is improved when wider perspectives and experiences emerge from a diversity of participants (Ingley and Van der Walt, 2003). Greater board diversity provides more valuable and better access to resources and better financial performance (Carter et al., 2010), as well as support for improved problem solving, which enhances board efficiency. Moreover, in the face of increasing globalization, it is necessary to have more diversity on the board to enhance the firm's reputation, especially as a diverse board can promote greater knowledge based on different cultures and norms (Singh, 2007).

According to agency theory, the greater the diversity of the board in terms of directors' backgrounds, the greater the efficiency of board monitoring and independence (Ingley and van der Walt, 2003). The importance of board diversity has thus been explained in relation to the effectiveness of the monitoring function. From the resource dependence perspective, there is a relationship between organizations and the external environment, requiring certain resources to be obtained/exchanged because the institution is working in an open system (Terjesen et al., 2009).

Given the high complexity and uncertainty of today's business environment, there needs to be diversity among board members, especially encompassing directors with access to external

market resources. Human capital theory can also be employed, together with resource dependence theory, to explain the arguments for board diversity in terms of obtaining certain resources based on a range of skills, experience, and backgrounds (for human capital theory see section 3.4.3).

Signalling theory, as described by Spence (1979, cited in Certo, 2003), concerns a decision-making process under asymmetric information conditions. A considerable body of literature has examined board composition as a signal to obtain a good reputation in the business community and society (Certo et al., 2001; Miller and Triana, 2009; Bear et al., 2010; Musteen et al., 2010). Wellalage and Locke (2013) have suggested that from the signalling perspective, diversity within the board can be considered a positive signal of a well-governed firm and the degree of its quality to investors. Miller and Triana (2009) find a positive relationship between board gender diversity and firm innovation. The study suggests that the reputation of a firm, mediated through signalling, is enhanced by the board's diversity in three respects. First, signalling can increase a firm's global operations and meet market driver needs by demonstrating understanding of the business environment. Thus, board members are able to advise the firm's managers in an effective manner. Second, signalling is a reflection of the obligations of cultural norms, thereby supporting the reputation of the firm. Finally, signalling indicates that the firm is meeting public representation standards.

Board diversity in terms of gender brings different perspectives, in terms of social and human capital, which have an impact on the decision-making process (Hillman et al., 2002; Hillman and Dalziel, 2003). Gender diversity is commonly measured as the proportion of total directors on the board that are women (Haque and Jones, 2020; Liao et al., 2015). Women directors can enhance the quality of the governance mechanism, the firm's financial performance, and understanding of complex business issues through their experience, abilities, and attributes (Carter et al., 2003, 2010; Adams and Ferreira, 2009). Wittenberg-Cox and Maitland (2008) state that women directors are valuable for the board because they can enhance the firm's market vision and aid in resource acquisition through their special skills, experience and background knowledge, and their business and social contacts. Furthermore, the representation of women directors in the boardroom affords new inspiration and perspectives as they have valuable experience that differs from that of the men on the board (Bennouri et al., 2018; Haque and Jones, 2020). Women directors also boost the competitive environment in the boardroom, which helps to reduce the time spent on decision making in negotiations and speeds up the process of reaching full agreement (Chen et al., 2017).

The relationship between gender diversity and firm market value has previously been investigated. However, the literature has tended to focus on non-financial firms (Carter et al., 2010; Kim and Lim, 2010; Mahadeo et al., 2012; Wellalage and Locke, 2013; Ntim, 2015) and has revealed inconsistent results. Boards of directors in the banking sector and non-financial firms have the same legal obligations and duties, but as De Andres and Vallelado (2008) point out, the banking industry is subject to a stricter regulatory structure and has high potential for contagion. This is illustrated by Adams and Mehran (2003), who outline the responsibilities of bank directors and aspects of accountability, namely that directors evaluate the decisions submitted to the board for confirmation. Thus, directors are legally accountable for the bank's health and integrity, and they are obliged to provide monitoring of their firms. Indeed, the main role of directors in terms of banking functions is monitoring as this can increase market acceptance and gain the trust of shareholders, bank regulators, and other stakeholders (García-Meca et al., 2015). The banking industry is becoming increasingly opaque and yet there is still a lack of literature investigating the association between diversity in boards of directors and the association of between gender diversity with stock market valuations.

5.4 Hypothesis Development for Women Directors and Market Valuation

Given the lack of evidence related to the possible effect of gender diversity on stock market valuations of banks, there is a clear research gap, in particular relating to women directors' attributes and their association with market value. Most prior studies on firm market valuation and women directors in non-financial firms show a positive association (Carter et al., 2003; Campbell and Mínguez-Vera, 2008; Larkin et al., 2012; Ntim, 2015; Gyapong et al., 2016). For example, for US non-financial institutions, Carter et al. (2003) investigated the relationship between board diversity and firm value using Tobin's Q and found a positive association. They proposed more research investigating the influence of women directors on firm value. Campbell and Mínguez-Vera (2008) examined Spanish listed firms using panel data and found that gender diversity is positively associated with firm value. Furthermore, a study of 2010 Fortune 500 companies found that the presence of women directors was related to higher overall returns on the common stock prices of corporations (Larkin et al., 2012). Examining a sample of South African firms, Ntim (2015) found a significant positive relationship between women directors and market valuation. Likewise, in South Africa over the period 2008–2013, Gyapong et al. (2016) found a positive association between women directors and firm market value and this value increased if the board included three or more women directors. In the banking literature, Pathan and Faff (2013) assessed the implications of gender diversity for bank performance, finding that women directors had a positive impact

on bank performance in the period before the Sarbanes–Oxley (SOX) Act (1997–2002), but this was reversed during both the post-SOX (2004–2006) and crisis (2007–2011) periods. García-Meca et al. (2015) found that bank performance is positively associated with gender diversity in some European banks.

As argued in previous studies (Hillman and Dalziel, 2003; Carter et al., 2010; Terjesen et al., 2016; Yang et al., 2019), no single theory is applicable for determing the effectiveness of gender diversity on the boards of banks and the relationship with market value; hence, this study draws on several theoretical perspectives, integrating them to provide a framework for the study.[29] A bank with sound governance mechanisms is likely to signal its good reputation to investors and stakeholders and this may increase its market value (Elnahass et al., 2020a). Accordingly, sophisticated investors are likely to perceive and price differently board members' attributes, including gender diversity, and thus it is necessary to address the impact of such attributes on promoting effective governance mechanisms and increasing firm valuation.

Gender diversity in the board is expected to enhance firm reputation and image, providing greater opportunities to improve firm value by increasing links to stakeholders (including the wider community), in line with resource dependence theory (Mahadeo et al., 2012; Wellalage and Locke, 2013; Ntim, 2015). In this context, the effectiveness and independence of boards of directors improve with the presence of more women directors and this also leads to higher firm value as measured by Tobin's Q (Ntim, 2015; Terjesen et al., 2016). Women's representation on a board provides different perspectives and experiences, which can help the board fulfil its role (Fan et al., 2019) and improve firm valuation. Gul et al. (2011) found that the more women directors there were in large firms, the more information was enhanced through increased public disclosure. Women have been found to be more likely to hold their organizations to higher ethical standards (Pan and Sparks, 2012). Agyemang-Mintah and Schadewitz (2019) show that women directors improve the decision-making process when it comes to monitoring through their fresh viewpoints and expertise, which in turn leads to an increase in the firm's financial valuation. Adams and Ferreira (2004) found that firms with fewer women on their boards have higher stock return variability – an aspect that is likely to be perceived by investors.

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[29] See Hillman et al. (2002), Hillman and Dalziel (2003), Ingley and van der Walt (2003), Singh (2007), Terjesen et al. (2009), and Nguyen et al. (2020) for further reviews of the importance of board diversity from various theoretical perspectives.

In line with the above, this study hypothesises that having high representation of women directors on the board is likely to be positively priced by investors and hence increase bank value. This leads to the following hypothesis, stated in the alternative form:

H$_1$: Gender diversity on the board of directors is significantly and positively associated with market value (Tobin's Q).

5.4.1 Women directors' monitoring and leadership attributes and market valuation

Based on agency theory, Adams et al. (2015) show that increasing board diversity may lead to an increase in the monitoring of managers due to greater board independence. The presence of women directors is used as a new indicator of independence (Ferreira, 2015) as many studies have concluded that women directors can be expected to be more independent (Dang et al., 2014; Bøhren and Staubo, 2014) and provide better monitoring (Adams and Ferreira, 2009). Although the main objective of independent directors, who do not have a relationship with managers and the company, is to ensure the firm benefits from better monitoring and thus improve firm performance (Bennouri et al., 2018), most prior studies have found that independent directors have a negative association with bank performance and a positive association with increased bank insolvency risk (Pathan and Faff, 2013; García-Sánchez et al., 2017). Duchin et al. (2010) reported that the presence of independent directors is positively associated with performance in non-financial firms with low information asymmetry between managers and shareholders, but there is a negative association in firms with high information asymmetry. Thus, banking firms with high information asymmetry should not rely on independent directors for monitoring (Adams and Ferreira, 2007). Directors may find their access to special firm information limited by managers to reduce their ability to monitor, in which case the benefits of counselling from these directors will also be diminished (Adams and Ferreira, 2007). In addition, negative results have been associated with independent directors and corporate governance due to the shortage of firm information and business strategies (Bennouri et al., 2018). However, Bennouri et al. (2018), found that independent women directors have a positive impact on firm performance (proxied by Tobin's Q) in non-financial firms. Karavitis et al. (2021) found that women independent (i.e. non-executive) directors are associated with high transparent financial reporting that adds to bank checking and monitoring.

The efficiency of the monitoring function not only depends on the presence of independent directors but also on other leadership indicators, such as whether they are a chairperson (Bennouri et al., 2018). The board chairperson's main responsibility is leading the board to function effectively, ensuring that all board members are involved in monitoring managers

and also creating a collaborative environment to obtain better communication between board members that brings the board coherency (Machold et al., 2011). Thus, board effectiveness depends on board chair leadership quality (Gabrielsson et al., 2007; Palvia et al., 2015).

According to Nekhili et al. (2018), women chairpersons promote good listening, better problem-solving, and social support, which helps to create a cooperative leadership environment that enhances the boardroom function. Comparing women versus men chairpersons, Eagly and Carli (2003) found that women are expected to be more democratic and interactive in leadership style than their male peers, who are more job-oriented and adopt a more autocratic style. Therefore, women may be more suitable in this position than men because they show more transformational leadership, which increases board efficiency (Nekhili et al., 2018). In addition, women chairpersons improve the quality of boardroom decision-making, which has a positive impact on firm performance (Peni, 2014). In contrast, Bennouri et al. (2018) reported that having a woman chairperson is negatively associated with Tobin's Q for non-financial firms

Few studies have investigated chairwomen in the banking industry (Palvia et al., 2015; Andries et al., 2020; Palvia et al., 2020). Palvia et al. (2015) tested US banks led by women chief executive officers (CEOs) and chairs in relation to bank capital ratios and default risk. They found that small banks with women CEOs and chairs were less likely to fail during the financial crisis (2007–2009). Andries et al. (2020) found women chairs and high board gender diversity to be positively associated with profitability in Central and Eastern European banks. Recently, Palvia et al. (2020) tested women's leadership in US banks and found that banks with women CEOs and chairs are associated with better lending performance. Therefore, this argument suggests that women leading banks may have a positive association with bank market value.

Drawing on the above argument and signalling and agency theories, it is expected that the presence of independent women directors on the board, as well as women chairs, will be positively priced by investors and will therefore be associated with enhanced stock market valuations for banks. Independent women directors are likely to mitigate high information asymmetry, which is dominant in the banking business environment (Pathan and Faff, 2013). Therefore, the second hypothesis is formulated into two main sub-hypotheses to address women directors' independence and leadership attributes separately, as follows:

H$_{2a}$: Independent women directors on the board are significantly and positively associated with bank value.

H~2b~: Women chairpersons are significantly and positively associated with bank value.

5.4.2 Women directors' demographic attributes and market valuation

This study follows Bennouri et al. (2018) in measuring demographic characteristics and experience, such as directors' education, foreign nationality, and business education (in finance and accounting), while extending the analyses to women directors' financial expertise.[30] The ability to solve problems and understand complex business issues increases with the level of education of directors (Johnson et al., 2013). The attributes of board members (skills, experience, qualifications) can improve the decision-making process and enhance firm performance. According to human capital theory (Becker, 1964), productive and intellectual abilities are improved by certain demographic attributes (e.g. education and experience), which confer advantages on both individuals and organizations. Linking the issue of gender and education, women directors are likely to have invested in their education to overcome the phenomenon of the "glass ceiling", so that they will be accepted for their experience in their field in the business environment (Hillman et al., 2002; Johnson et al., 2013). Another demographic attribute, nationality, can also enhance the board's perspective as directors of different nationalities bring new ideas and solutions to problems and the challenges of globalization.

Directors with high academic qualifications (e.g. MSc and/or PhD) can use their academic knowledge to assist in the management of the firm's resources/assets, enhancing the decision-making strategy (Audretsch and Lehmann, 2006). Prior studies on corporate governance have investigated the impact of selecting academic directors on firms' operation and business strategies (e.g. Jiang and Murphy, 2007; Kim and Lim, 2010; White et al., 2014). These studies, drawing on human capital theory, argue that directors with a higher educational level and particular skills are more likely to have directorship experience. Furthermore, an increase in educational level, as well as specialized qualifications (e.g. in finance) can enhance skills and experience on the board of directors and this leads to improvements in the quality of decisions (Papadakis and Barwise, 2002). Nekhili and Gatfaoui (2013) found that women directors were better educated and more had business degrees than their male counterparts. Drawing on resource dependence theory, such directors can also facilitate access to resources for the boardroom offered by alumni relations and link their banks with university academic networks (Chahine and Goergen, 2013). Recently, in a study based in China, Chen et al. (2019b) reported that the monitoring behaviour of directors with PhDs had a positive

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[30] See Chapter 3 for more discussion of demographic characteristics and experience (such as directors' education, foreign nationality), as well as theoretical explanations.

influence on firm performance. Kim and Lim (2010) found that different educational backgrounds and majors among directors had a positive association with valuation in Korea.

Financial expertise is defined as women directors with experience (past or present) as an executive officer, such as a Chief Executive Officer (CEO), Chief Financial Officer (CFO), or Chief Risk Officer (CRO), in a bank or insurance company or academic institution (e.g. professor in finance, accounting, economics, or business) (Güner et al., 2008). Regarding financial expertise and the effectiveness of the board, there are a limited number of studies that have provided important results. For example, the higher the number of financial experts on the board, the more positive the relationship with bank risk (Minton et al., 2014) because of bank shareholders' preference for "excessive risk". However, this still under the moral hazard assumption, which means the more directors there are with a financial background, the greater the understanding of complex banking investments (Fernandes and Fich, 2012). Greater financial expertise in banks may increase risk if there is certainty that this will increase the bank value (García-Sánchez et al., 2017). Moreover, Fernandes and Fich (2012) reported that increasing the number of financial experts as outsider directors leads to a reduction in the risk of banks due to their rich knowledge and abilities, which help them provide better monitoring of and advice to managers and reduce conflicts of interest between insider directors and shareholders. Therefore, they improve firm communications, which in turn enhances access to the sort of information that helps reduce uncertainty and improves bank value. They also have a high level of knowledge in the fields of finance, law, accounting, and risk management, which increases the probability of better decision-making and problem-solving abilities.

From the resource dependence perspective, national diversity is important in providing cultural knowledge and information about various markets through the presence of foreign directors that differs from knowledge only of the domestic market and enhances the firm's reputation (Ruigrok et al., 2007; Estélyi and Nisar, 2016). Estélyi and Nisar (2016) found that foreign directors are appointed to boards due to their good monitoring reputation. From the agency perspective, the reason for hiring foreigners is that they do not have a relationship with management (Estélyi and Nisar, 2016). Thus, they can play a monitoring role in the boardroom and in other committees efficiently and without bias. Accordingly, and consistent with Singh et al. (2008) and with resource dependence theory, women directors can be considered a potential source of international experience, especially if they are foreign (Gull et al., 2018). A prior study found foreign directors have a positive effect on firm performance (Choi et al., 2007). For Norwegian and Swedish firms, Oxelheim and Randøy (2003) reported

that having independent foreign directors increased the firm's valuation. Ben-Amar et al. (2013) point out, foreign directors can bring fresh points of view and ideas, different skills, wide networking contacts, and information and experience from international markets. Consistent with this evidence, Oxelheim et al., (2013) note that foreigners may understand international financial markets in advance of others and have vested knowledge of international clients, investors, and employees. The only study in banking, by Choi and Hassan (2005), found a positive relationship between foreign directors and bank financial performance.

The appointment of women directors to boards tends to depend on their demographic attributes, such as educational background and experience (Nekhili and Gatfaoui, 2013). According to Gull et al. (2018), in French firms, women are hired to the boards of directors if they have specific demographic characteristics (e.g. educational level and financial expertise) that are higher than those of their male peers. Hiring women with different demographic capital attributes is expected to offer the bank a range of resources, particularly in terms of connecting with the external environment through previous colleagues and social networks. Consequently, having board members with the highest level of education and financial expertise and of different nationalities is likely to bring extended consultative and valuable resources to the bank, which can increase market valuation. Women directors' demographic attributes are represented by their educational background (i.e. higher education such as MSc/PhD and international qualifications from global universities) in this study, as well as foreign nationality and financial expertise, are expected to be positively perceived by investors in the bank and hence increase bank value. Thus, the third hypothesis is stated as follows:

H_3: Women directors' demographic attributes (i.e. educational background and level, foreign nationality, financial expertise) are positively associated with stock market valuations.

In line with the above hypothesis, each of these attributes are tested separately to assess the individual and incremental association with bank market value.

5.5 Data Collection
The financial data for the study were collected from Thomson DataStream, Orbis (in US dollars). The country-level data were collected from the World Bank's World Development Indicators database. For corporate governance variables, data on women directors and their specific attributes and other board characteristics, such as board size, independence, and CEO

information, were hand collected from the annual reports provided on the banks' official websites.

The initial sample represented 1,328 bank-year observations from 153 banks, including Islamic and conventional. The sample period covers 2007–2017 for 14 countries from the Middle East and Asia. This study followed prior banking studies (e.g. Mollah et al., 2017; Elnahass et al., 2020a; Trinh et al., 2021) to filter the initial sample. The inclusion criteria were as follows:

1. Only listed banks, to assess stock market valuations. Hence, banks from two countries (Lebanon and Malaysia) were dropped as they do not have Islamic listed banks.

2. At least one Islamic bank and one conventional bank in each country.

3. Full annual reports posted on the banks' official websites, published by 31 December.

4. Data available for at least three consecutive years for each bank.

The final sample included unbalanced panel data for 114 listed banks (1,019 observations), for 12 countries over the period 2007–2017. The sample comprised 27 Islamic banks (232 bank-year observations), 58 conventional banks (532 bank-year observations), and 29 conventional banks with Islamic windows (i.e. conventional banks with financial products in compliance with *Shari'ah* law) (255 bank-year observations).[31] The selection of this period made it possible to examine whether women's representation on boards was associated with market valuation in banks, especially during the period of financial distress (the financial crisis in 2007–2009), by controlling for these years. Moreover, to support additional analyses for the two bank types, the Basel II requirements became mandatory for Islamic banks in 2007 (see IFSB, 2005; Elnahass et al., 2018).

Table 5.1 shows the distribution of the sample by country and bank type. The sample contains 23% Islamic banks, 52% conventional banks and 25% conventional banks with Islamic windows. Regarding the bank-year observations for Islamic banks, Bahrain has the highest number, followed by Kuwait. Turkey has the highest number of conventional bank-year observations, followed by Indonesia. For conventional banks with Islamic windows, Saudi Arabia has the greatest number.

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[31] In selecting the sample, including conventional banks with an Islamic window following Beck et al. (2013), This research added (WINDOW) as a dummy variable to control for fully conventional and Islamic banks (Abedifar et al., 2013). Also, it ran several sensitivity analyses to identify the impact of this bank type in this study sample and the market value indicators and the results remained the same.

Country	Islamic banks		Conventional banks		Conventional Banks with Islamic windows		Full Sample	
	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)
Bahrain	55	24	20	4	11	4	86	8
Bangladesh	11	5	53	10	31	12	95	9
Egypt	6	2	23	4	0	0	29	3
Indonesia	8	3	99	19	47	18	154	15
Jordan	16	6	98	18	0	0	114	11
Kuwait	41	18	46	9	0	0	87	9
Oman	11	5	0	0	20	9	31	3
Pakistan	11	5	43	8	36	14	90	9
Qatar	17	7	36	7	0	0	53	5
Saudi Arabia	29	13	0	0	66	26	95	10
Turkey	7	3	105	20	0	0	112	11
UAE	20	9	9	1	44	17	73	7
Bank-year observations	**232**	**100**	**532**	**100**	**255**	**100**	**1019**	**100**
Number of banks	**27**	–	**58**	–	**29**	–	**114**	–

Note. The final sample contains unbalanced panel data of 114 banks (1019 observations) with 27 Islamic commercial banks (232 observations), 58 conventional commercial banks (532 observations) and 29 conventional commercial banks with Islamic windows (255 observations) in 12 countries over the period (2007–2017). See Appendix A for variable definitions.

Table 5.1. Sample distributions – Study 2

5.6 Model and Measures

5.6.1 Measure of bank market value

To examine the relationship between board gender diversity and bank market value, this study employs *Tobin's Q*, which is also used as a proxy for firm valuation (Ntim, 2015; Agyemang-Mintah and Schadewitz, 2019; Elnahass et al., 2020a). This variable is calculated as the sum of a bank's year-end book value of debt and market value of equity, divided by the year-end book value of total assets, following previous studies (Terjesen et al., 2016; Yang et al., 2019; Elnahass et al., 2020a). In general, Tobin's Q identifies the measure of firm value in terms of standard variables in research from a corporate governance perspective (Black et al., 2014). It also reflects how a firm invests in human and technological capital and thus describes the intangible value of such capital, which does not show in ordinary accounting indicators (Kaczmarek et al., 2014; Elnahass et al., 2020a). According to Yang et al. (2019), *Tobin's Q* provides a more comprehensive picture of firm value than the stock return or any capital market indicators as the ratio considers a firm's assets in its calculation; therefore, it is helpful for samples with different firm systematic risk, leverage, or size (Stulz, 1994; Yang et al., 2019). Jubilee et al. (2018) found that both leverage and profitability of banks are positively related to firm value as measured by Tobin's Q.

In addition, this ratio integrates the bank equity book value and the market, reducing the distortion of tax regulations and accounting contracts (Wernerfelt and Montgomery, 1988). Moreover, Tobin's Q gives an indication of the firm's present over-/under-valuation according to stock (market)-based valuations and it also shows the expected present value of future cash flows (Devers et al., 2007). Therefore, Tobin's Q tends to be used in corporate governance studies as the standard proxy for firm value (Black et al., 2012). It reflects the corporate governance mechanism through the financial evaluation of the firm and captures the wealth of investors in the firm (Agyemang-Mintah, 2015; Agyemang-Mintah and Schadewitz, 2019). Managers can manipulate direct earnings (Gyapong et al., 2016), which will affect accounting measures (return on assets [ROA], return on equity [ROE]) (Hambrick and Finkelstein, 1995). In contrast, it is difficult for management to manipulate Tobin's Q. Finally, this study takes the natural logarithm of Tobin's Q to reduce the impact of high-Q outlier banks (Black et al., 2012; Elnahass et al., 2020a).

5.6.2 Measures of board gender diversity and women directors' attributes

This research follows Bennouri et al. (2018) in measuring women directors' representation and demographic attributes. First, the main gender diversity indicator is the ratio of the number of women on the board to the total number of board members (*WOMEN*), as widely

applied in gender-related studies (Adams and Ferreira, 2009; Berger et al., 2014; Bennouri et al., 2018; Chen et al., 2019a, Fan et al., 2019). This research predicts a positive association between the number of women directors and bank market value, consistent with prior studies (Campbell and Vera, 2010; Ntim, 2015).

To investigate women directors' attributes, this chapter splits them into two main categories: (i) monitoring and (ii) demographic. To examine the monitoring attributes, it uses the number of independent women directors to total women directors on the board (*Indep_Women*) (Bennouri et al., 2018; Gull et al., 2018). Furthermore, it uses women chairpersons as another indicator of the monitoring attribute (Bennouri et al., 2018). This study defines (*Chair_Women*) as a dummy variable which is equal to 1 if the chairperson is a woman and zero otherwise (Bennouri et al., 2018; Gull et al., 2018; Nekhili et al., 2018). Furthermore, with respect to board demographic attributes, this study follows prior studies (Bennouri et al., 2018; Gull et al., 2018), as well as resource dependence and human capital theories, to define board directors with extensive professional experience and different backgrounds, such as those members who hold postgraduate qualifications (Berger et al., 2014). To capture the demographic capital attributes of women on the board, this study controls for nationality, education level, and financial expertise. It defines financial expertise (*Expertise_Women*) as the proportion of women directors with experience (past or present) as an executive officer in a bank or insurance company (Chief Executive Officer [CEO], Chief Financial Officer [CFO], Chief Risk Officer [CRO]), or in an academic institution (e.g. professor in finance, accounting, economics, or business) (Güner et al., 2008; Aebi et al., 2012; Minton et al., 2014). Then, this study controls for nationality by using the number of foreign women directors to the total number of women members on the board (*Foreign_Women*) (Bennouri et al., 2018; Gull et al., 2018).

The other demographic characteristic is educational level, measured by the number of women directors holding a postgraduate degree, such as a PhD and/or Master's degree (MA, MSc, or MBA) (*PostGrad_Women*) to the total number of women members on the board (Bennouri et al., 2018; Gull et al., 2018). Moreover, this study captures women directors' educational background and culture by using the proportion of women directors who graduated from foreign universities (*Inter_Univ_Women*). This chapter follows Chen et al. (2019b), who found a significant positive market response to the appointment of academic alumni from foreign universities to the board, as they bring foreign academic experience to the boardroom in terms of management codes and practices. For educational specialisation, this study uses the number of women with an academic qualification in finance and/or accounting and/or

Islamic finance (*Acc&Fin_Women*) to the total number of women directors on the board. This indicator is an alternative measure of financial expertise, as women's expertise is an essential attribute of women directors (Nekhili and Gatfaoui, 2013). Moreover, women have fewer opportunities to attain executive positions than men (Nekhili and Gatfaoui, 2013; Bergrer et al., 2014).

5.6.3 Measurement of control variables

The control variables include corporate governance characteristics, the first of which is board size (*BODSIZE*). This variable is calculated as the natural logarithm of the total number of board members in line with prior studies (e.g. Mollah and Zaman, 2015; Gull et al., 2018; Elnahass et al., 2020). To capture the role of the board, this study controls for board independence (*Indep*), which is measured using the percentage of independent (non-executive) directors on the board (García-Meca et al., 2015; Chen et al., 2019a; Fan et al., 2019). It also controls for CEO gender using a dummy variable (*CEO_Women*), which is equal to 1 if the CEO is a woman and zero otherwise (Bennouri et al., 2018; Gull et al., 2018). Furthermore, it follows most of the corporate governance literature by controlling for CEO power using a dummy variable (*CEODUAL*) taking the value of 1 if the CEO is the chairperson of the board and zero otherwise (Pathan, 2009; Mollah and Zaman, 2015).

To control for bank-level variables, this study computes the bank size (*LogTA*) using the natural logarithm of total assets measured in thousands of US dollars at the end of the fiscal year (Elnahass et al., 2020a; Trinh et al., 2020). It also includes bank age (*LogAGE*), computing the difference between the sample year and the year in which the bank was established (Pathan and Skully, 2010; Wellalage and Locke, 2013; Marinova et al., 2016). This study expects a negative association between bank age and Tobin's Q (Marinova et al., 2016). Loderer and Waelchli (2009) argue that this negative association is due to the weakening competitive ability of the firm over time. Furthermore, bank leverage (*LEVERAGE*) is calculated using total liabilities divided by total equity (Agyemang-Mintah and Schadewitz, 2019; Trinh et al., 2020). High leverage can affect market valuation positively (Ntim, 2013; Agyemang-Mintah and Schadewitz, 2019). It also controls for capital expenditure (*LOG(CAPEX/TA)*) (Ntim, 2015; Terjesen et al., 2016; Elnahass et al., 2020a).

This study additionally controls for different bank types (Islamic vs conventional) in the sample using a dummy variable (*IB*), which takes the value of 1 if the bank is Islamic and zero otherwise. Moreover, it controls for the Islamic window to distinguish between fully conventional banks and those conventional banks with Islamic windows. This study uses the Islamic window dummy variable (*WINDOW*), which is defined as a dummy variable taking

the value of 1 if the conventional bank has an Islamic window and zero otherwise (Abedifar et al., 2013). A dummy variable is also used to capture the effect of the financial crisis on the sample (*CRISIS*), taking the value of 1 for the sample years 2007–2009 and zero otherwise (Elnahass et al., 2018; Fan et al., 2019). It controls for auditing of the banks by one of the four major auditing institutions (*BIG4*) using a dummy variable that is equal to 1 if a firm is audited by a Big4 firm and zero otherwise (Agyemang-Mintah and Schadewitz, 2019; Elnahass et al., 2020a).

To address environmental institutional control, this study enters country-level variables. First, the annual gross domestic product (*GDP*) is used to control for development in the cross-country data (Berger et al., 2014; Terjesen et al., 2016; Mollah et al., 2017). Furthermore, it controls for the banking sector affecting value using the Herfindahl-Hirschman Index (*HHI*) (Abedifar et al., 2013; Mollah et al., 2017). To capture the quality of national governance it uses the six Worldwide Governance Indicators (World Bank, 2016), to measure the level of governance (*Governance_Index*). This index is calculated by the average of six governance measures (regulatory quality, rule of law, control of corruption, political stability, governance effectiveness, voice, and accountability) (Čihák and Hesse, 2010; Elnahass et al., 2020). Each governance measure index ranges from -2.5 (weak) to 2.5 (strong) for performance; higher values imply better governance. Therefore, it uses the index to capture the quality of national governance and how it affects market valuation. The variable definitions and notations in the study models are presented in Appendix A.

5.6.4 Methodology and empirical model

In general, the prior corporate governance literature considers that endogeneity affects the relationship between board characteristics and firm value (Wintoki et al., 2012; Benuouri et al., 2018). The appointment of women directors to the board is caused by an endogenous variation based on the firm and self-selection rather than an exogenous effect (Adams, 2016). Moreover, the board composition is chosen and constructed by firms to increase their benefits and hence the variables tend to be endogenous and random (Sila et al., 2016). Endogeneity causes inconsistency in coefficients and various biases that are expected to increase the complexity in determining relationships. The relationship between board attributes and market value may be influenced by unobservable variables that are unknown or cannot be controlled. According to Wintoki et al. (2012), the impact of unobservable factors can give rise to problems in determining results and thus careful consideration has to be given to the estimation of the parameters in light of the study objectives. The objective of this study was to test the association of women directors with banks' value (measured by *Tobin's Q*) and so

using ordinary least squares (OLS) estimation would yield biased results because of endogeneity problems (Benuouri et al., 2018). Moreover, unobservable heterogeneity and simultaneity issues would be ignored by this estimation method (Wintoki et al., 2012; Benuouri et al., 2018).

To solve the endogeneity issue, much of the prior literature on board diversity (e.g. Adams and Ferreira, 2009; Agyemang-Mintah and Schadewitz, 2019; Fan et al., 2019; Yang et al., 2019) has tested and employed several estimation models to assess the association of gender diversity within the board and bank market value.[32] This study applies three-stage least squares (3SLS) estimation and instrumental variables (IVs), following Ntim (2015), Trinh et al. (2020) and Elnahass et al. (2020a), in studying the relation between board characteristics, governance mechanisms and bank value. This study employs country fixed effects to control for unobserved country attributes for all models.

Furthermore, to control for additional endogeneity concerns, this study employs several additional procedures. First, it uses specific bank and governance control variables to mitigate omitted variable bias that might cause endogeneity. It uses PSM to control for sample selection bias. Then, to account for reverse causality causing endogeneity, it uses lagged values of the independent variables. Finally, it estimates alternative indicators for gender diversity and market valuation to demonstrate that there is no error in the main estimations.

In this study, two IVs for board diversity are applied (for details, see section 4.5.4). The first is the women's labour force participation rate divided by the male labour force participation rate in each country for each given year (World Bank data) (Chen et al., 2017; Cardillo et al., 2020). The additional IV is the country's income level (World Bank data), defined as a dummy variable equal to 1 if the country is classified as middle to high income and zero otherwise (Elnahass et al., 2020a).

There is low expectation of an endogenous impact of the country-level variables on individual banks' market value, but the IVs might indirectly affect bank market value. The two IVs seem to be correlated with the endogenous variable for the proportion of women on the board (*WOMEN*) and should indirectly predict bank market value, over and above their influence on the endogenous variables (see Black et al., 2006).

To test the hypotheses identifying the possible impact of gender diversity on bank market value, the study follows Ntim (2015) and Elnahass et al. (2020a) in building a simultaneous

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[32] This study performed the Wu–Hausman endogeneity test across all models to examine whether endogeneity exists. The test statistics suggest the presence of endogeneity bias.

equations model, Eq. (1) and Eq. (2), treating the proportion of women directors and Tobin's Q as the endogenous variables respectively. The first equation, Eq. (1), estimates the effect of gender diversity on Tobin's Q, while the second equation, Eq. (2), estimates the effect of Tobin's Q on gender diversity. The simultaneous models estimated are as follows:

$$Tobin's\ Q_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \tag{5.1}$$

$$WOMEN_{it} = \beta_0 + \beta_1 Tobin's\ Q_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \tag{5.2}$$

where $Tobin's\ Q_{it}$ is the bank market value for bank i in year t. $WOMEN_{it}$ is the ratio of women directors to the total number of board members. $CONTROLS_{it}$ denotes the vector of control variables in bank i in year t and ε_{it} represents the remaining disturbance term.

5.7 Results for Women Directors and Market Valuation

5.7.1 Descriptive statistics

Table 5.2 shows the summary statistics for the full sample and sub-samples of fully Islamic and conventional banks in addition to conventional banks with Islamic windows. For the full sample, the results show that the sample banks on average have positive a mean for the *log Tobin's Q* ratio of 0.152. Among the board diversity indicators, the average representation for women directors (*WOMEN*) is 6.9% for the full sample, which is lower than the average values reported by García-Meca et al. (2015) and Bennouri et al. (2018) of 10.22% and 10.72% for European/US and French banks, respectively. In terms of women directors' attributes, for example, in the full sample the ratio of independent women directors to total women directors is 6.2%, with 3.2% of women holding a chair position, in line with Nekhili and Gatfaoui (2013) and Bennouri et al. (2018), who found that most women directors are not independent, but are recruited to the board from inside the banks. Of the demographic characteristics, the highest values are for *PostGrad_Women* (women with a PhD and/or a Master's degree) at 72% of the total number of women directors. In terms of financial expertise, the average proportion of financial expertise women directors is 19.8%. Regarding educational specialization and qualifications, 14% of women directors graduated from foreign universities and 11% had an accounting or finance qualification. The lowest figure is for foreign nationality (4.2% of women directors).

Clustering the full sample into different bank types, this study compares fully Islamic banks and fully conventional banks. The mean values and the two-sample *t*-test indicate that Islamic banks have a significantly higher average logarithmic *Tobin's Q* than fully conventional banks, in line with Elnahass et al. (2020a). Concerning the gender diversity indicators, Islamic banks report lower average representation of women directors at 3.7%, compared to 8.5% for

conventional banks. In terms of women directors' attributes, Islamic banks have higher proportions of *Indep_Women* (10.8%) and *Foreign_Women* (10.4%) than conventional banks (6% and 4.8% respectively). Concerning women directors' education, Islamic banks (conventional banks) report relatively similar means of 14% (15%) for women who graduated from foreign universities. However, the proportion of women directors in Islamic banks with a postgraduate degree (PhD or Master's) is 80% and with an accounting or finance qualification is 12%, lower than the values for conventional banks (94% and 15.4% respectively). Regarding other control variables (governance, financial), *CEODUAL* and *CEO_Women* show lower mean values for Islamic banks than conventional banks. In contrast, *Indep* has a higher mean value for Islamic banks than conventional banks. Consistent with previous studies (e.g. Beck et al., 2013; Elnahass et al., 2018), Islamic banks are smaller in size, younger in age and have lower leverage than conventional banks. Moreover, the results show that conventional banks with Islamic windows generally show lower averages for market value ratios compared to both Islamic banks and fully conventional banks. They also have lower means of 6.7% for *WOMEN* and other attributes.

Table 5.3 presents the Pearson pair-wise correlation coefficients matrix for all variables for the full sample. The table shows no multicollinearity problems as the correlation coefficients for all variables are smaller than 0.8 (Elnahass et al., 2020a).[33]

Table 5.4 shows the average values for the proportions and characteristics for women directors in each of the years 2007–2017. Overall, the summary shows a significant increase in the average proportion of women from 2007 to 2011, dropping off slightly in 2012, then increasing. The results show a steady increase in the representation of women on boards over this period. According to Pathan and Faff (2013), the crisis had a notable impact on banking as it attracted more public attention to the quality of corporate governance mechanisms. The increase in the number of women directors is a response to stakeholders' demands, in order to promote women's representation and inclusivity as a global phenomenon around the world (Bennouri et al., 2018).

The average proportion of independent women directors declines from 2008 to 2011, then increases over the later years. Women leadership figures (*Chair_Women*) shows relative variation during the sample period. The proportion of foreign women directors declines sharply over the sample period until 2012, then fluctuates in later years. The other

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[33] The variance inflation factor (VIF) values (not reported) indicate that the VIF for each variable is lower than 10%, and the mean of VIFs is lower than 6% which indicates that there is no concern about multicollinearity.

demographic attributes (e.g. financial expertise) also fluctuate over the years. The column for women holding a postgraduate qualification (*PostGrad_Women*) shows that the average value decreased over the first six years of the sample period, then fluctuated over the later years. In contrast, the average number of women directors who graduated from foreign universities increases over time and the number of women with finance or accounting qualifications is relatively unchanged over the sample period.

Variables	N	Full Sample		Islamic banks (Mean)	Conventional banks (Mean)	Two-sample t-test (two-tailed)	Conventional banks with Islamic windows (Mean)
		Mean	Standard deviation				
Log Tobin's Q	863	0.152	0.093	0.176	0.145	-3.271***	0.143
WOMEN	1015	0.069	0.109	0.037	0.085	6.618***	0.067
Indep_Women	1015	0.062	0.234	0.108	0.060	-2.713***	0.028
Chair_Women	1009	0.032	0.175	0.061	0.023	-2.270**	0.035
Foreign_Women	1016	0.042	0.188	0.104	0.048	-1.477*	0.014
Expertise_Women	1018	0.198	0.373	0.017	0.295	5.054 ***	0.093
PostGrad_Women	1015	0.720	2.325	0.792	0.938	-0.480	0.236
Inter_Univ_Women	1015	0.142	0.321	0.136	0.149	0.342	0.140
Acc&Fin_Women	1015	0.114	0.300	0.116	0.154	-0.089	0.038
BODSIZE	1015	2.336	0.238	2.333	2.349	0.325	2.321
Indep	1019	0.336	0.166	0.394	0.298	-5.567***	0.356
CEODUAL	991	0.201	0.401	0.085	0.255	6.170***	0.201
CEO_ Women	1015	0.051	0.221	0.039	0.081	1.017	0.004
LOG(CAPEX/TA)	936	0.335	0.637	0.347	0.364	-0.300	0.268
BIG4	966	0.720	0.449	0.828	0.632	-4.492***	0.794
LogAGE	897	3.391	0.724	3.043	3.541	7.342***	3.382
LEVERAGE	1011	7.800	3.151	7.792	8.053	0.031	7.340
LogTA	1008	14.041	3.441	13.829	13.904	1.109	14.566
IB	1018	0.228	0.420				
WINDOW	997	0.256	0.437				
GDP	1018	1.320	3.614				
Governance_Index	941	-0.378	0.780				
HHI	1018	0.244	0.167	0.255	0.226	1.138	0.268

Note: The table presents descriptive statistics for all variables used in the models for the full sample and sub-samples for each bank type. The sample period is between 2007 and 2017. N is the number of bank-year observations. Mean is the mean value. The paired sample means test (t-test) results are also reported. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively and p-values are shown in parentheses. See Appendix A for variable definitions.

Table 5.2. Descriptive statistics for variables in the main tests – Study 2

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	1.000									
(2)	-0.020	1.000								
(3)	-0.022	0.967*	1.000							
(4)	-0.081*	0.131*	0.188*	1.000						
(5)	0.011	0.187*	0.218*	0.132*	1.000					
(6)	0.027	0.465*	0.555*	0.130*	0.229*	1.000				
(7)	-0.051	0.122*	0.169*	0.299*	-0.041	0.132*	1.000			
(8)	-0.059	0.250*	0.302*	0.411*	0.050	0.151*	0.350*	1.000		
(9)	0.078*	0.393*	0.454*	0.342*	0.296*	0.353*	0.060	0.136*	1.000	
(10)	0.055	0.233*	0.311*	0.186*	0.315*	0.473*	0.124*	0.031	0.546*	1.000
(11)	-0.211*	0.012	0.041	0.061	-0.089*	0.030	0.095*	0.111*	0.056	0.083*
(12)	0.064	-0.168*	-0.169*	0.263*	0.179*	-0.092*	0.031	0.080*	0.023	-0.025
(13)	-0.015	0.224*	0.253*	0.072*	0.342*	0.315*	0.129*	0.064*	0.061	0.179*
(14)	0.138*	0.348*	0.339*	-0.123*	0.112*	0.176*	-0.063*	-0.040	0.095*	0.135*
(15)	0.156*	-0.041	-0.061	-0.023	-0.044	-0.049	0.075*	-0.000	-0.076*	-0.034
(16)	-0.123*	0.099*	0.137*	-0.015	0.163*	0.185*	0.080*	0.108*	0.098*	0.154*
(17)	-0.428*	0.026	0.031	0.065*	-0.120*	-0.039	-0.010	0.182*	-0.026	-0.029
(18)	-0.137*	-0.011	0.006	-0.010	0.040	0.066*	-0.033	0.036	0.048	0.055
(19)	0.099*	-0.239*	-0.247*	-0.055	-0.016	-0.016	0.091*	-0.186*	0.045	0.147*
(20)	0.132*	-0.159*	-0.167*	0.105*	0.091*	-0.137*	0.054	0.017	-0.011	0.003
(21)	-0.049	-0.006	-0.047	-0.090*	-0.108*	-0.165*	-0.088*	-0.123*	-0.005	-0.152*
(22)	0.097*	-0.058	-0.076*	-0.017	-0.038	-0.046	0.032	-0.016	-0.038	-0.024
(23)	-0.073*	0.302*	0.315*	-0.039	0.098*	0.115*	-0.041	0.082*	0.095*	0.015
(24)	0.213*	-0.288*	-0.292*	-0.049	0.024	-0.027	0.067*	-0.152*	-0.031	0.078*
(25)	0.119*	-0.184*	-0.192*	0.137*	-0.059	-0.112*	0.037	0.033	-0.061	-0.047

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
(11)	1.000														
(12)	-0.262*	1.000													
(13)	-0.084*	0.026	1.000												
(14)	-0.413*	-0.104*	0.069*	1.000											
(15)	-0.009	-0.044	-0.044	0.055	1.000										
(16)	-0.043	-0.204*	0.108*	0.143*	-0.049	1.000									
(17)	0.134*	-0.203*	-0.109*	-0.048	0.056	-0.024	1.000								
(18)	0.126*	-0.008	-0.036	-0.090*	-0.821*	0.147*	-0.027	1.000							
(19)	-0.067*	0.179*	0.032	-0.047	0.013	0.114*	-0.320*	0.094*	1.000						
(20)	-0.010	0.190*	-0.029	-0.156*	0.010	-0.255*	-0.001	-0.034	0.128*	1.000					
(21)	-0.044	0.072*	-0.128*	-0.002	-0.057	-0.011	-0.071*	0.082*	0.091*	-0.312*	1.000				
(22)	-0.044	0.010	-0.012	0.038	0.698*	-0.059	-0.004	-0.694*	0.046	-0.019	-0.017	1.000			
(23)	0.018	-0.231*	-0.051	0.260*	-0.139*	0.035	0.217*	0.141*	-0.358*	-0.211*	0.055	-0.218*	1.000		
(24)	-0.212*	0.224*	0.063	0.027	0.096*	0.096*	-0.471*	0.013	0.652*	0.113*	-0.044	0.098*	-0.403*	1.000	
(25)	-0.082*	0.357*	0.002	-0.093*	0.293*	-0.125*	-0.147*	-0.359*	0.134*	0.034	0.090*	0.325*	-0.348*	0.204*	1.000

Note: The table presents the Pearson pair-wise correlation matrix for the full sample (2007–2017). This table shows no multicollinearity problems between variables.
* Indicates significance at the 0.05 level. (1) Log Tobin's Q, (2) WOMEN, (3) Blau's index, (4) Indep_Women, (5) Chair_Women (6) Expertise_Women, (7) Foreign_Women, (8) PostGrad_Women, (9) Inter_Univ_Women, (10) Acc&Fin_Women, (11) BODSIZE, (12) Indep, (13) CEO_Women, (14) CEODUAL, (15) LOG(CAPEX/TA), (16) LogAGE, (17) LEVERAGE, (18) LogTA, (19) BIG4, (20) IB, (21) WINDOW, (22) CRISIS, (23) GDP, (24) Governance_Index, (25) HHI.

Table 5.3. Full sample Pearson pair-wise correlation matrix for all variables in the full sample

Year	N	WOMEN	N	Indep_ Women	N	Chair_ Women	N	Foreign_ Women	N	Expertise_ Women	N	PostGrad_ Women	N	Inter_Univ_Women	N	Acc&Fin_ Women
2007	47	0.051	47	0.054	47	0.021	47	0.085	47	0. 183	47	0.762	47	0.096	47	0.128
2008	58	0.054	58	0.060	58	0.017	58	0. 055	58	0. 151	58	0.609	58	0.144	58	0.092
2009	71	0.059	71	0.049	71	0.014	71	0. 035	71	0. 154	71	0.580	71	0.106	71	0.086
2010	81	0.069	81	0.042	81	0.025	81	0.030	81	0.179	81	0.614	81	0.109	81	0.110
2011	93	0.074	93	0.048	93	0.032	93	0.027	93	0.199	93	0.572	93	0.121	93	0.126
2012	106	0.058	106	0.050	106	0.038	106	0.028	106	0.181	106	0.543	106	0.097	106	0.109
2013	110	0.066	110	0.059	110	0.037	110	0.042	110	0.213	110	0.606	110	0.127	110	0.120
2014	113	0.071	148	0.065	113	0 .036	113	0.055	113	0.225	113	0.714	113	0.132	113	0.125
2015	114	0.077	114	0.073	114	0.035	114	0.053	114	0.235	114	0.921	114	0.174	114	0.121
2016	114	0.084	114	0.083	114	0.044	114	0.035	114	0.219	114	0.950	114	0.202	114	0.120
2017	108	0.075	108	0.083	108	0.028	108	0.037	108	0.184	108	0.906	108	0.207	108	0.111

Note: This table presents the number of observations (N) and the average value for each of the women directorships attribute measures for the years 2007 to 2017.

Table 5.4. Mean board diversity values by year – Study 2

5.7.2 Empirical results for women directors and market valuation

First, considering gender diversity and stock market valuations, Table 5.5 shows the results of the 3SLS estimations for the association of women directors with market valuation for the full sample (Model 1), to test the first hypothesis, H_1. For the full sample, the coefficient for *WOMEN* is positively and significantly associated with *LogTobin's Q*, indicating that the proportion of women directors is positively associated with bank value. This result is in line with Agyemang-Mintah and Schadewitz (2019), who find similar evidence for UK non-financial firms.

In terms of control variables, *BOARDSIZE* presents a negative coefficient, which confirms evidence from prior studies (Gyapong et al., 2016, Elnahass et al., 2020a), indicating that smaller boards are more highly associated with growth firms than large boards. *CEO_ Women* also reports a negative association with market value (consistent with Bennouri et al., 2018). This study also finds a negative association between bank size and market value. Larger banks are associated with lower Tobin's Q in line with Elnahass et al. (2020a), suggesting that they may be in the "mature" phase of their business cycle (i.e. relatively few growth options). Managers in large banks may have a greater propensity to engage in risky transactions to meet personal compensation/earnings targets, and/or to meet credit ratings/deposit insurance (see Leventis et al., 2011). The *Big4* also exhibits a negative relationship with market valuation, consistent with Elnahass et al. (2020a). This study finds that Islamic banks (*IB*) generally report a higher market value on average than conventional banks, which can be explained by their high financial reporting quality, strict governance mechanisms, and accounting conservatism (see Abdelsalam et al., 2016; Elnahass et al. 2018). Conventional banks with an Islamic window may have fewer growth opportunities, which could be justified by the peculiar nature of the regulations, business, and trades for those windows which are not purely Islamic in their finance model.

Together, these findings suggest that gender diversity, on average, is positively associated with banks' stock market valuations. This is consistent with the agency, resource dependence, and signalling theories. The findings are relevant as they suggest that women directors are positively perceived by market participants through the provision of access of new resources/skills, innovation, and good reputation, all of which improve the decision-making process in the boardroom. Overall, the results are in line with the research prediction of a positive association between women directors and stock market valuations for the full sample and hence H_1 is supported (see Figure 5.1).

Turning to the effect of women directors' attributes (monitoring and demographics), and the other two hypotheses related to directors' attributes (H$_{2a,b}$ and H$_3$), Table 5.5 also reports the analyses across four models. Model 2 tests the monitoring hypotheses (i.e. independence and leadership; H$_2$), while the other three models (Model 3, Model 4, and Model 5) present the results examining the demographic attributes (financial expertise, foreign nationality, high education qualifications; H$_3$).

For the monitoring attribute, Model 2 shows a significant and positive association between bank value (*LogTobin's Q)* and women directors' independence (*Indep_Women).* This indicates that independent women directors are positively associated with stock market valuations. This is in line with Bennouri et al. (2018), who found the greater the number of independent women directors the higher the market value in French firms. However, women chairpersons have no significant positive or negative association with market value. This result reflects the findings of Nielsen and Huse (2010), who show that women on board of directors have different roles than women in leadership. It also suggests that there are no differences between chairwomen and chairmen in that women behave similarly to men when they are chairpersons.

Regarding how women directors' demographic attributes affect market valuations, Model 3 shows that women's financial expertise (*Expertise_Women*) has a significant negative association with bank value, meaning that a higher proportion of women with expertise on the board is associated with lower market value. This finding suggests that their expertise is perhaps not fully exploited to enhance board decision-making. Directors with financial expertise may perhaps be employed to rubber-stamp strategies without actually influencing them. This result is consistent with prior studies, for example Bennour et al. (2018), Garcia-Sanchez et al. (2017) and Minton et al. (2014).

Moreover, Models 3 and 4 show that the proportion of foreign women board members (*Foreign_Women*) has a marginally significantly negative association with market value. This is in line with prior studies, such as that of García-Meca et al. (2015), who found that foreign directors are negatively associated with firm value. Moreover, Bennouri et al. (2018), showed that the presence of foreign women directors was negatively related to French firms' performance (*Tobin's Q*).

In contrast, this study finds in Models 4 and 5 that there is a significant and positive association between women directors with postgraduate qualifications (PhD and/or Master's degree, or MBA) (*Post_Grad_Women*) and bank value. Business education

(*Acc&Fin_Women*) also shows marginal evidence for increasing bank value. These results suggest that highly educated women directors seem to be positively perceived by investors, who assign high market valuations for their banks.[34] This finding is consistent with Kim and Lim (2010), who found a positive association between firm value measured by Tobin's Q and education level. Also, Nguyen et al. (2015) found a positive association between market returns and directors with a business qualification in US banks. According to Sealy and Doherty (2012), finance qualifications were a "springboard" for women directors to be selected to board positions because of the sense of confidence that they are like their men peers, having suitable language and clear authority (see section 3.4.3).

However, this study finds a significant negative association between women directors who graduated from foreign universities (*Inter_Univ_Women*) and market value. The results for the international education attribute are quite unique (i.e. none of the prior studies in banking examined this attribute per se) and report a significant negative association between women directors who graduated from foreign universities (*Inter_Unvi_Women*) and market value. The finding is in line with Chotiyaputta and Yoon (2018), who show a negative association between women directors with international education and the financial performance of non-financial firms listed on the Thailand Stock Exchange. Directors who have graduated from international universities may have different beliefs and cognitive attributes than those who have graduated from local universities. In line with the prior literature, directors holding an international qualification may monitor and behave in a way (similar to foreign women directors) leading to high communication/societal prices and lower boardroom quality of negotiations (see García-Meca et al., 2015). Furthermore, studied in a country outside that of a bank headquarters, women directors are expected to have a more established understanding (e.g. to critically assess the key principles, codes, and governance of legislation/regulations) related to this country than other countries. Therefore, during and/or after studying for their international degree, women directors may encounter a dissimilar/weak in-depth knowledge of local norms, codes, and legislations related to the local country of the affiliated firm under their supervision (Masulis et al., 2012). Such poor specialization/understanding of the affiliated country's laws and governance code could increase some firm monitoring costs, for example resulting in weak internal control and agency costs alongside regulatory costs. Consequently, the perception of the costs of international education for women directors

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[34] As a sensitivity analysis, this study only examined directors who hold PhDs and the results are consistent with those for directors holding other postgraduate qualifications.

means that they are likely to be less well regarded by sophisticated investors and this will then be reflected in bank market valuations.

Together, these findings consistently suggest that gender diversity on the board has a significant positive association with market valuation. However, in terms of women directors' attributes, this study finds differential effects on stock market values. In relation to the monitoring attribute, the presence of independent women directors is associated with higher market valuation, which is in line with predictions, while women's leadership is not associated with Tobin's Q. The results imply that appointing foreign women board members is negatively associated with bank value, based on marginal evidence. It attributes the negative association to the high cost of communication, reducing the opportunity for those members to express their views and deleteriously affecting the quality of boardroom discussions (García-Meca et al., 2015). However, high educational level and business education for women directors is positively associated with bank value. These findings support those of Audretsch and Lehmann (2006) and Francis et al. (2015), who indicate that academic directors show higher responsibility towards society and commit to higher ethical behaviour than other professionals who work in different fields. Moreover, due to their critical thinking skills, women directors with high academic and/or business qualifications can play a monitoring and advisory role while providing new ideas and innovative points of view. In addition, women directors with financial expertise and those with international qualifications have a negative association with value.

Overall, these findings support H_{2a} but do not confirm H_{2b}. Conversely, these results do not confirm a specific direction for the predicted associations under H_3.[35] This study attributes the negative association between women directors' foreign nationality and bank value to the possible increase in communication and social costs resulting from appointing foreign women board members (see Figure 5.1). García-Meca et al. (2015) argue that high communication/social costs provide fewer opportunities for members who are foreigners to express their views, which reduces the quality of boardroom discussions. Such costs are likely to be perceived by sophisticated investors and reflected in firm valuations. The findings that support and are consistent with the argument in subsections 5.3 and 5.4. Women directors with a postgraduate level of education and women directors with accounting and finance qualifications are perceived positively by market contributors via their good reputation and

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[35] As a robustness check, Qatar was dropped and all models were re-estimated and the findings remained the same.

access to new resources/skills. The findings are relevant as they suggest that women with these characteristics may enhance the decision-making process in the boardroom.

VARIABLE	Model 1	Model 2	Model 3	Model 4	Model 5
	Market value	Market value	Market value	Market value	Market value
	LogTobin's Q	LogTobin's Q	LogTobin's Q	LogTobin's Q	LogTobin's Q
WOMEN	2.596***	3.506***	5.019***	3.191***	1.987***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Indep_ Women		0.617***			
		(0.000)			
Chair_Women		-0.045			
		(0.398)			
Expertise_Women			-0.048***		
			(0.002)		
Foreign_Women			-0.089*	-0.042***	
			(0.095)	(0.000)	
PostGrad_Women				0.061***	0.079***
				(0.000)	(0.000)
Inter_Univ_Women					-0.320***
					(0.000)
Acc&Fin_Women					0.054*
					(0.074)
BODSIZE	-0.115**	-0.098*	-0.082	-0.194***	-0.199***
	(0.012)	(0.055)	(0.239)	(0.001)	(0.001)
Indep	-0.022	-0.153**	-0.101	-0.166*	-0.029
	(0.725)	(0.041)	(0.200)	(0.075)	(0.723)
CEO_Women	-0.295***	-0.404***	-0.284*	-0.271***	-0.324***
	(0.001)	(0.000)	(0.084)	(0.000)	(0.000)
CEODUAL	-0.006	-0.046	-0.042	-0.005	-0.035
	(0.813)	(0.145)	(0.306)	(0.900)	(0.292)
LOG(CAPEX/TA)	0.011	0.014	0.020	0.031	0.025**
	(0.880)	(0.705)	(0.990)	(0.862)	(0.023)
BIG4	-0.019**	-0.033***	-0.059	-0.009	-0.108***
	(0.049)	(0.001)	(0.127)	(0.706)	(0.005)
LogAGE	-0.005	-0.016	-0.037	-0.005	-0.008
	(0.289)	(0.105)	(0.150)	(0.531)	(0.210)
LEVERAGE	-0.005	-0.013	-0.020	-0.011	-0.085***
	(0.942)	(0.526)	(0.552)	(0.497)	(0.008)
LogTA	-0.013***	-0.016***	-0.013***	-0.017***	-0.006**
	(0.000)	(0.000)	(0.001)	(0.000)	(0.010)
IB	0.036**	0.027*	0.015	0.007	0.019
	(0.016)	(0.058)	(0.625)	(0.575)	(0.336)
WINDOW	-0.022**	-0.039***	-0.045	-0.015	-0.005

	(0.044)	(0.001)	(0.123)	(0.223)	(0.812)
CRISIS	0.029	0.057*	0.013	0.019	0.015
	(0.284)	(0.067)	(0.626)	(0.355)	(0.299)
GDP	0.002*	0.004***	0.003	0.002	0.001
	(0.099)	(0.006)	(0.169)	(0.236)	(0.512)
Governance_Index	0.028	0.051	0.024	0.028	0.042
	(0.352)	(0.106)	(0.510)	(0.338)	(0.184)
HHI	-0.004	-0.037	-0.007	-0.002	-0.030
	(0.869)	(0.448)	(0.919)	(0.941)	(0.970)
Constant	0.622***	0.726***	0.670***	0.884***	1.987***
	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)
Wald chi^2	253***	201***	245***	400***	168***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000
Hansen-Sargan overidentification (p-value)	0.451	0.336	0.150	0.180	0.612
Observations	614	608	614	647	614
Country FE	Yes	Yes	Yes	Yes	Yes

Note. The table presents the 3SLS results for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$$Tobin's\ Q_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.1)$$

$$WOMEN_{it} = \beta_0 + \beta_1 Tobin's\ Q_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.2)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including women directors' attributes, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. These models also controlled for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses

Table 5.5. Test for the effect(s) of the proportion of women directorships and women directors' attributes on Tobin's Q for the full sample
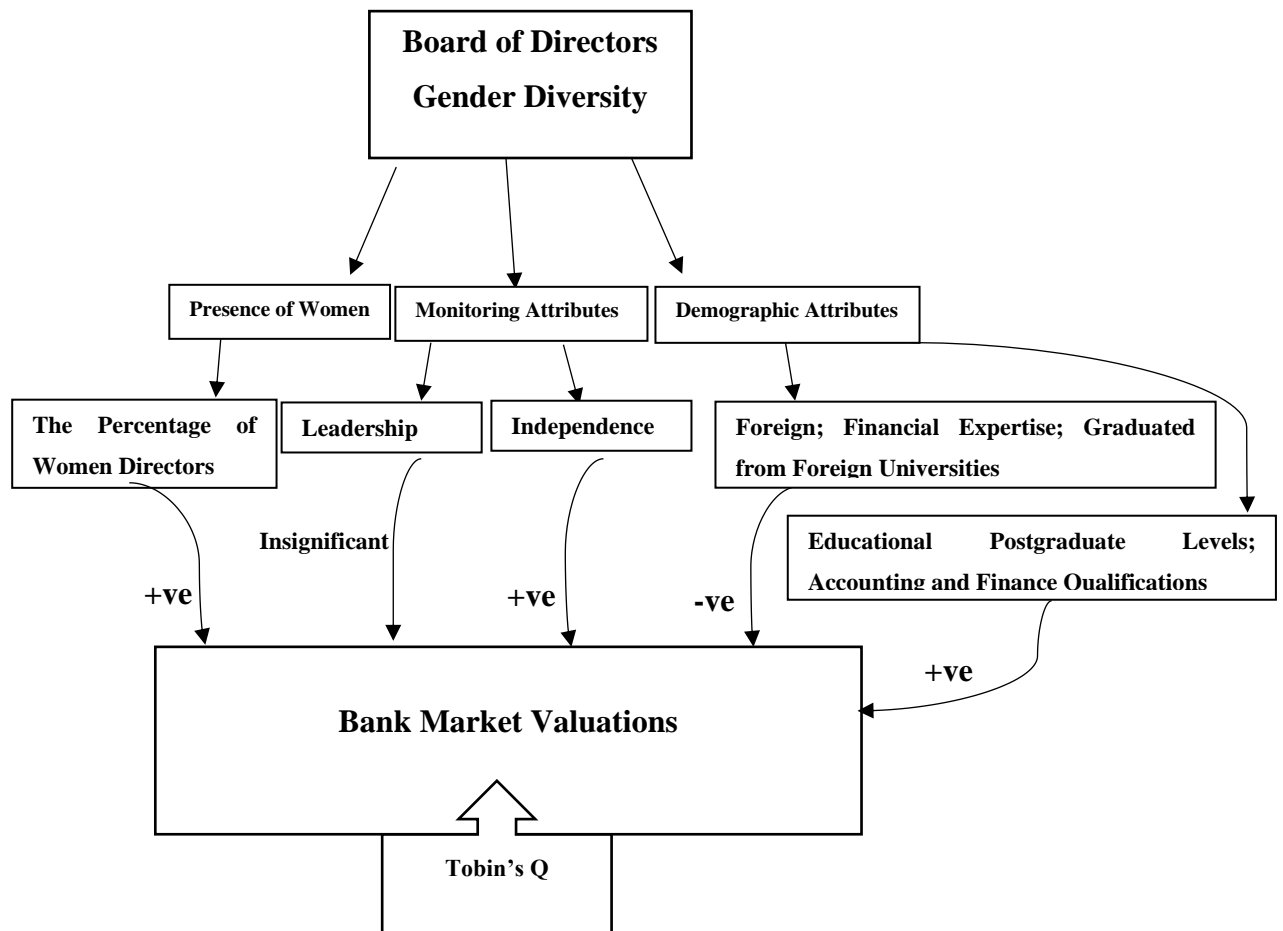
Figure 5.1. Thesis objective 2: The results of the association of board gender diversity and women's attributes with bank market valuation.

(Note: +ve refers to a positive association and -ve refers to a negative association.)

5.8 Extended Analysis

This section undertakes additional analyses to identify institutional bank characteristics related to bank type and different business models mediating the predicted associations between women director representation, with different monitoring/demographic attributes, and bank value. It takes a step further to assess the impact of the financial crisis of 2007 on the predicted relationship.

5.8.1 Effect of different bank types

The aim of this examination is to extend prior studies on firm valuations (e.g. Pathan and Faff, 2013; García-Meca et al., 2015; Agyemang-Mintah and Schadewitz, 2019), which have not assessed possible institutional differences across different bank types that tend to affect firm valuations for women directors. Systematic differences in governance and investment and finance models do exist between Islamic and conventional banks (see Beck et al., 2013; Abdelsalam et al., 2016).[36] The board of directors is accountable for the strategic direction of the firm, the implementation of decision making, protecting the shareholders' interests, and increasing bank value. However, Islamic banks follow a constrained banking model, based on non-interest operation in compliance with *Shari'ah* law. This model aims to enhance profit sharing between depositors and the bank and to minimize uncertainty and eliminate trading in or allocation of funds to areas forbidden in Islam. Moreover, Islamic banks have more complex governance structures than their conventional counterparts (Shibani and Fuentes, 2017; Elnahass et al., 2020a). This banking sector operates on a complicated and double-layered governance structure, including both a board of directors and an SSB comprising specialist scholars who monitor the bank's operations and ensure they conform to Islamic standards (Abdelsalam et al., 2016).

Accordingly, when compared to conventional counterparts, this research expects that women directors will have a differential impact on the stock market valuations of Islamic banks given the extended *Shari'ah* governance, distinct business and investment models, and strict monitoring by investors and depositors due to the excessive agency costs that arise. This is due to a peculiar institutional environment in Islamic banks including the special bank-depositors' relationship.[37]

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[36] The operations of Islamic banks are principally driven by a constrained banking model, which inherits both moral accountability values and legal responsibilities (Abdelsalam et al., 2016). Islamic banks operate on a business model that prohibits interest, complex derivatives, short selling, aggressive risk taking, and speculation, instead encouraging risk/profit sharing between the firms and their depositors. Meanwhile, conventional banks provide their services on an interest basis.

[37] With the absence of representation on the board of directors for depositors, Islamic bank managers have full control of the investment of depositors' funds, which might indicate high agency problems.

This section examines the association identified between women directors and bank market valuation by clustering the full sample into different bank types (Islamic banks and conventional banks, and after controlling for Islamic windows). All models were re-estimated using the sub-samples, as shown in Table 5.6, extending the analysis related to the hypotheses previously tested. The results for Islamic banks are reported in Panel A and the findings for conventional banks are presented in Panel B.

For Islamic banks, Panel A – Model 1, there is a negative relationship between the proportion of women directors and the Islamic bank market value, while conventional banks (i.e. Panel B, Model 5) show a significant positive association. The negative association for Islamic banks can be justified by the greater complexity of the Islamic banking business model, which requires complex and high monitoring and is associated with low efficiency and high operating costs (Abdelsalam et al., 2020). A few male *Shari'ah* advisors seem to dominate the Islamic banking industry (see Elnahass et al., 2020a; Trinh et al., 2020), suggesting that women are less likely to be *Shari'ah* experts. This is also confirmed through the descriptive statistics (see Table 5.2), which show a lower representation of women directors in Islamic banks than in conventional banks.

In terms of women directors' attributes, in both bank types, the main results for women directors' association with bank value remain consistent after controlling for directors' attributes.[38] This study additionally finds that within the two banking sectors, having independent women directors is significantly positively associated with bank value. In conventional banks, both expertise and foreign women directors are significantly negatively associated with bank value. Moreover, no significant differences are observed among the two bank types with respect to women directors' education. Both the Islamic and conventional banks report women directors on the board with a high level of education (i.e. postgraduate) and business education are significantly positively associated with bank value, but women directors with international qualifications show a negative association with bank value.

Concerning the control variables, the *Shari'ah* supervisory board has a positive association with bank value, in line with Mollah and Zaman (2015). Also, *CEO_Women* is positively associated with the bank value of Islamic banks, while there is a negative association in conventional banks. In contrast, independent directors are associated with low stock market valuations in Islamic banks, but high valuations in conventional banks. In Islamic banks, the

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[38] The chair was dropped from the models due to limited data and the low number of observations for Islamic banks.

ratio of capital expenditure to total assets, *LOG(CAPEX/TA)*, is associated negatively with market valuation, but positively in conventional banks. This may relate to low efficiency and the complex business model of Islamic banks.

Altogether, the results in this section present further supporting evidence for the effect of board gender diversity on stock market valuations, demonstrating the differential results for alternative banking systems. Overall, it seems that, on average, the presence of women directors on the board is negatively associated with the bank valuations for Islamic banks, unlike conventional banks. However, the results show a similar association for women directors' attributes among the two bank types, offering new evidence on alternative banking systems and governance (e.g. Mollah and Zaman, 2017; Elnahass et al., 2020a; Trinh et al., 2020).

VARIABLE	Panel A: Islamic banks				Panel B: Conventional Banks			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q
WOMEN	-2.499*	-9.133***	-4.362**	-0.929	1.614***	1.851***	1.565***	1.079***
	(0.060)	(0.004)	(0.024)	(0.410)	(0.001)	(0.000)	(0.000)	(0.000)
Indep_ Women		0.508***				0.572***		
		(0.008)				(0.000)		
Expertise_Women			0.435*				-0.090**	
			(0.057)				(0.013)	
Foreign_Women			0.298*				-0.043**	
			(0.069)				(0.011)	
PostGrad_Women				0.048***				0.060*
				(0.001)				(0.082)
Inter_Univ_Women				-0.285**				-0.174***
				(0.012)				(0.001)
Acc&Fin_Women				0.334**				0.043**
				(0.037)				(0.044)
SSB	0.032*	0.052*	0.109	0.010				
	(0.059)	(0.075)	(0.555)	(0.541)				
BODSIZE	0.134	0.732*	-0.835	0.298*	-0.082**	-0.003	-0.012	-0.138**
	(0.525)	(0.076)	(0.115)	(0.067)	(0.017)	(0.936)	(0.750)	(0.045)
Indep	-0.269**	-0.342	-1.270*	-0.443***	0.107**	0.027	0.154***	0.038
	(0.039)	(0.113)	(0.065)	(0.000)	(0.035)	(0.643)	(0.009)	(0.532)
CEO_Women	0.057	0.521**	0.429	0.050	-0.183***	-0.224***	-0.011	-0.184***
	(0.670)	(0.041)	(0.193)	(0.573)	(0.000)	(0.000)	(0.985)	(0.002)
CEODUAL	-0.047	-0.203*	-0.056	-0.019	-0.004	-0.033	-0.021	-0.010
	(0.409)	(0.058)	(0.470)	(0.574)	(0.865)	(0.243)	(0.992)	(0.478)
LOG(CAPEX/TA)	-0.219**	-0.333	-0.013	-0.080*	0.005	0.027**	0.006	0.032
	(0.018)	(0.108)	(0.910)	(0.089)	(0.498)	(0.015)	(0.510)	(0.168)
BIG4	-0.193**	-0.531***	-0.047	-0.098	0.005	0.023	-0.003	0.029
	(0.048)	(0.010)	(0.708)	(0.123)	(0.423)	(0.970)	(0.631)	(0.646)
LogAGE	-0.051	-0.236**	-0.194*	-0.036*	0.005	0.023**	0.019	0.005
	(0.284)	(0.035)	(0.099)	(0.095)	(0.278)	(0.028)	(0.136)	(0.333)
LEVERAGE	-0.010	-0.007	-0.071	-0.011*	-0.002	-0.003	-0.001	-0.003
	(0.113)	(0.438)	(0.168)	(0.059)	(0.824)	(0.494)	(0.710)	(0.394)
LOGTA	-0.037**	-0.058*	0.038	-0.008	-0.012***	-0.020***	-0.011***	-0.009***
	(0.016)	(0.096)	(0.787)	(0.392)	(0.000)	(0.000)	(0.000)	(0.008)
WINDOW					-0.008	-0.009	-0.007	-0.005
					(0.216)	(0.267)	(0.427)	(0.423)

CRISIS	0.002	0.011	0.241	0.023	-0.002	-0.054*	0.021	-0.010
	(0.908)	(0.814)	(0.284)	(0.601)	(0.905)	(0.100)	(0.997)	(0.396)
GDP	0.002	0.005	0.005	0.002	0.006	0.002	0.021	0.004**
	(0.598)	(0.443)	(0.393)	(0.417)	(0.183)	(0.151)	(0.409)	(0.035)
Governance_Index	-0.029	-0.060	0.399	-0.109**	0.014	0.038	0.030	0.005
	(0.690)	(0.391)	(0.178)	(0.050)	(0.532)	(0.166)	(0.929)	(0.738)
HHI	0.011	0.031	0.406	0.060	-0.014	-0.032	-0.016	-0.021
	(0.911)	(0.715)	(0.275)	(0.419)	(0.448)	(0.525)	(0.722)	(0.959)
Constant	0.475	-0.559	2.851**	1.268***	0.456***	0.325***	0.240**	0.607***
	(0.238)	(0.321)	(0.049)	(0.000)	(0.000)	(0.002)	(0.050)	(0.000)
Wald chi^2	164***	76***	36***	166***	297***	203***	271***	218***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen-Sargan overidentification (p-value)	0.678	0.110	0.263	0.114	0.638	0.248	0.925	0.111
Observations	111	111	111	111	492	492	510	512
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. The table presents the 3SLS results for the sub-samples (Islamic and conventional banks). The estimated models are defined as follows:

$$Tobin's\ Q_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (5.1)$$

$$WOMEN_{it} = \beta_0 + \beta_1 Tobin's\ Q_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (5.2)$$

where $CONTROLS_{it}$ is the vector of control variables in bank I in year t, including women directors' attributes, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. These models also control for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.6. Test for the effect(s) of the proportion of women directorships and women directors' attributes on Tobin's Q for the bank type effect

5.8.2 Effects of the global financial crisis period

This section extends the analyses to provide additional evidence on how the association between bank value and gender diversity could possibly change over periods of financial distress (the financial crisis of 2007-2009). Prior studies have assessed the effect of board characteristics on bank value during the crisis and post-crisis periods (Pathan and Faff, 2013; Mollah and Zaman, 2015). The financial crisis period (2007–2009) is considered to have had an exogenous and systematic impact on banks and investment decisions (Fan et al., 2019). Therefore, an investigation of the quality of governance and women board members' attributes during or following the crisis period is essential to mitigate any endogeneity issues arising from board diversity (Pathan and Faff, 2013).

It clusters the full sample into two sub-samples (crisis 2007–2008 and post crisis 2009–2017). Table 5.7 reports the results from clustering the full sample into the crisis (Panel A) and post-crisis (Panel B) periods.

The results consistently during the crisis period, indicate across all models that thre is an insignificant association between women directors and bank value. This result is in line with Engelen et al. (2012) and these findings can be justified by the overall lower representation of women directors for this sample of countries during the crisis period (see Table 5.4). Moreover, the fact that market values were volatile at this time may mean that Tobin's Q was below 1 on aggregate for a market. In fact, the crisis period had an exogenous impact on economies, especially the banking sector, when women quotas were very limited/less dominant compared to more recent years. An exception is Model 3, which shows a significant negative coefficient for bank value, suggesting that higher representation of women directors during the crisis was associated with lower market value when controlling for financial expertise and foreign nationality. This finding is consistent with Duppati et al., (2019), who found that gender diversity on the board was negatively associated with Irish firms' performance (measured by Tobin's Q) during the financial crisis. The crisis period represented an exogenous shock that affected trading and investments in the banking industry, leading to a substantial economic downturn and hence low bank valuation under the emerging opportunities of earnings management, in addition to the procyclical effect on lending expected for the sample banks (see Elnahass et al., 2018). Moreover, in Model 4, this study finds that foreign nationality is significantly and positively associated with bank value, suggesting that there may be reputational benefits associated with foreign women directors (see Ruigrok et al., 2007; Estélyi and Nisar, 2016). Also, women directors with high levels of education continued to be positively associated with stock market value during this period.

The financial expertise attribute has a marginal effect, which is usually ignored. However, Fernandes and Fich (2013) stated that directors who are financial experts enhance monitoring and reduce conflicts of interest between directors and shareholders due to their rich knowledge and abilities. Moreover, a high level of abilities in the fields of finance, law, accounting, and risk management increases the probability of better decision-making and problem-solving skills, which help reduce uncertainty and improve bank value during a critical time such as a financial crisis. In line with their good reputation during the crisis, boards of directors with expertise and network contacts managed to improve their monitoring effectiveness (Johnson et al., 2013). Hence, this attribute seems to promote investors' confidence during periods of financial distress.

Examining the post-crisis years, there is a significant and positive association between women directors and bank value across all models in Panel B, which suggests that investors do value women's representation on boards outside the period of financial distress. One explanation is that, in general, the global financial crisis was characterized by poor banking practices, particularly weak monitoring addressing low quality of disclosure, transparency, and fair global competition across most global banks (Fosu et al., 2018). This is in addition to the high credit risk and low banking stability which reduced stock market valuations for many banks worldwide (Abdelsalam et al., 2020; Elnahass et al., 2022b). Hence, investors might have perceived bank value as being reduced (i.e. given the poor disclosure and monitoring) during this exogenous shock, irrespective of the presence of women directors. Another explanation can be attributed to the emergence of women's representation on boards in recent years (i.e. after the crisis), given the increase in quotas. Hence, it is likely that such a positive association became significant only following the crisis years. Moreover, in Model 7, the increasing number of independent women on the board is associated with higher market value. Women in the role of chairperson exhibit an insignificant association with market value during and after the crisis. Both financial expertise and foreign women directors are negatively associated with value in the post-crisis period. Regarding education, women with postgraduate and business degrees show positive associations with market valuation in the post-crisis period, a finding consistent with the main results.

Therefore, the comparative assessments between the crisis and post-crisis periods further explains the main results and suggest distinct implications for the presence of women directors across different time periods. The findings for the post-crisis period support the main findings in Table 5.5. The crisis period offers new insights into the implications of gender diversity on boards for banking and stock markets, by which the presence of women directors

and their characteristics are negatively, or not significantly, associated with market value. A possible explanation for these results is that during the crisis period, board members had to become more risk averse for the banks to survive and lower risk may lead to lower returns. However, it is also recognized that the negative association observed may not be related to gender (i.e. the same result may be observed for male board members).

VARIABLE	Panel A: Crisis					Panel B: Post Crisis				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q
WOMEN	-1.029	-0.263	-2.547**	-1.253	-0.268	2.077***	4.938**	12.410**	6.043**	3.389***
	(0.235)	(0.791)	(0.047)	(0.298)	(0.760)	(0.003)	(0.012)	(0.010)	(0.037)	(0.000)
Indep_ Women		-1.267*					0.415**			
		(0.010)					(0.017)			
Chair_ Women		0.083					-0.057			
		(0.312)					(0.504)			
Expertise_Women			2.412*					-0.064**		
			(0.072)					(0.014)		
Foreign_Women			0.028*	0.050***				-0.075**	-0.086***	
			(0.059)	(0.006)				(0.043)	(0.001)	
PostGrad_Women				0.008	0.062*				0.072***	0.091***
				(0.472)	(0.621)				(0.002)	(0.000)
Inter_Univ_Women					0.061					-0.559***
					(0.469)					(0.000)
AccandFin_Women					-0.037					0.110**
					(0.437)					(0.016)
BODSIZE	-0.157	-0.032	-0.024	-0.129	-0.109	-0.048	-0.091	-0.126	-0.218**	-0.184**
	(0.343)	(0.858)	(0.859)	(0.451)	(0.465)	(0.243)	(0.240)	(0.191)	(0.028)	(0.014)
Indep	-0.001	-0.102	-0.134	-0.093	-0.391	-0.029	-0.169	-0.122	-0.151	-0.024
	(0.990)	(0.388)	(0.552)	(0.392)	(0.103)	(0.682)	(0.217)	(0.400)	(0.364)	(0.831)
CEO_Women	-0.124	-0.059	-0.228***	-0.158	-0.111	-0.248***	-0.579***	-0.430	-0.484**	-0.507***
	(0.201)	(0.573)	(0.002)	(0.107)	(0.279)	(0.004)	(0.009)	(0.217)	(0.041)	(0.000)
CEODUAL	-0.070	-0.104*	-0.044	-0.034	-0.014	0.025	0.110*	0.053	0.068	0.033
	(0.101)	(0.059)	(0.287)	(0.442)	(0.771)	(0.480)	(0.084)	(0.414)	(0.387)	(0.536)
LOG(CAPEX/TA)	0.025*	0.027	0.040**	0.037*	0.060*	0.002	0.004	0.051	0.017	-0.009
	(0.054)	(0.120)	(0.036)	(0.099)	(0.066)	(0.932)	(0.951)	(0.195)	(0.486)	(0.517)
BIG4	-0.015	-0.023	-0.059*	-0.093**	-0.151	-0.015	-0.056**	-0.342***	-0.055	-0.033
	(0.650)	(0.501)	(0.097)	(0.023)	(0.164)	(0.227)	(0.046)	(0.006)	(0.400)	(0.282)
LogAGE	-0.003	-0.003	-0.007	-0.016	-0.039	-0.003	-0.028	-0.053	-0.018	-0.006
	(0.808)	(0.857)	(0.537)	(0.526)	(0.208)	(0.644)	(0.159)	(0.119)	(0.431)	(0.357)
LEVERAGE	-0.008	-0.006	-0.013	-0.009	-0.021*	-0.002	-0.009	-0.028	-0.019	-0.017
	(0.380)	(0.491)	(0.102)	(0.423)	(0.078)	(0.663)	(0.390)	(0.293)	(0.299)	(0.451)
LogTA	-0.017	-0.003	0.005	-0.009	-0.049**	-0.008**	-0.010**	-0.004	-0.011	-0.003
	(0.241)	(0.844)	(0.730)	(0.435)	(0.043)	(0.017)	(0.049)	(0.539)	(0.102)	(0.226)
IB	0.067*	0.041	0.036	0.080*	0.012	0.045***	0.022	0.036	0.011	0.005
	(0.099)	(0.314)	(0.402)	(0.098)	(0.809)	(0.007)	(0.335)	(0.281)	(0.704)	(0.639)

WINDOW	-0.003	-0.006	-0.066	-0.002	-0.010	-0.019	-0.060**	-0.145	-0.050	-0.001
	(0.939)	(0.875)	(0.372)	(0.957)	(0.791)	(0.133)	(0.048)	(0.116)	(0.311)	(0.855)
GDP	0.008**	0.008**	0.003	0.004	0.014**	0.007	0.004**	0.003	0.005	0.002
	(0.021)	(0.042)	(0.499)	(0.624)	(0.041)	(0.250)	(0.032)	(0.251)	(0.617)	(0.227)
Governance_Index	-0.327	-0.025	-0.730	-0.041	-0.690*	0.015	0.083	0.232	0.109	0.039
	(0.128)	(0.941)	(0.243)	(0.929)	(0.057)	(0.642)	(0.240)	(0.191)	(0.292)	(0.312)
HHI	0.035	0.083	0.056	0.016	0.021	-0.007	0.044	0.100	0.035	0.010
	(0.519)	(0.293)	(0.289)	(0.817)	(0.811)	(0.805)	(0.600)	(0.246)	(0.729)	(0.679)
Constant	0.915**	0.409	0.018	0.671*	1.383***	0.388***	0.565***	0.552**	0.745***	0.658***
	(0.023)	(0.422)	(0.971)	(0.099)	(0.002)	(0.001)	(0.006)	(0.013)	(0.004)	(0.002)
Wald chi^2	92***	46***	58***	57***	64***	223***	91***	303***	339***	197***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.217	0.895	0.678	0.894	0.110	0.151	0.5036	0.126	0.110	0.9437
Observations	85	85	85	85	85	529	523	529	529	529
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents 3SLS results for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$Tobin's\ Q_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it}$ (5.1)

$WOMEN_{it} = \beta_0 + \beta_1 Tobin's\ Q_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it}$ (5.2)

$CONTROLS_{it}$ is the vector of control variables in bank i in year t, including women directors' attributes, bank-level indicators, country-level indicators, and country governance indicators. These models also control for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the crisis period (2007–2009) and post crisis period (2010–2017). The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.7. Test for the effect (s) of the proportion of women's directorship and women directors' attributes on Tobin's Q for the crisis effect (crisis vs post crisis)

5.9 Robustness Checks

This section undertakes further robustness tests, addressing issues related to possible endogeneity due to omitted variable bias and/or reverse causality in the models through various sensitivity checks and alternative specifications for the main models.

5.9.1 Propensity score matching (PSM)

To control for endogeneity arising from self-selection bias, propensity score matching is used to perform a matched-sample analysis based on gender diversity. This test followed the same approach employed in prior literature (e.g. Bennouri et al., 2018; Cardillo et al., 2020; Elnahass et al., 2020a; Kinateder et al., 2021). It employed a treatment group (observations from banks with at least one woman director) and a control group (observations from banks with only male directors). The matching procedure yielded a matched sample of 522 observations: 261 treatment observations (banks with at least one woman director) and 261 control observations (banks with only male directors). The propensity score is the predicted value from a logit regression using the same controls (i.e. bank-specific controls and country-specific controls and country fixed effects) as included in the main models. Then, it uses the nearest-neighbour matching approach, taking the unit chosen from the banks with no gender diversity as a match for the banks having gender board diversity as the one closest in terms of the propensity score.[39] Finally, it uses the 3SLS estimation for the matched sample, the results of which are reported in Table 5.8.

The findings support the main results and are consistent with the findings in both Tables 5.5 and 5.6, but the matched samples analysis shows slightly more significant results. These findings offer further supportive evidence for the main conclusion that women directors, independent women directors, those with a high educational level (PhD and postgraduate education) and with finance and accounting qualifications are associated with higher bank valuation. Conversely, those with foreign and financial expertise are negatively associated with market value.

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[39] The logistic regressions for all models and further explanation of the matched samples, including the number of observations for the matched sample and other comparison tests between the treatment and control groups, as well as graphs for all the variables in the models, are available in Appendix E.

VARIABLE	Model 1	Model 2	Model 3	Model 4	Model 5
	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q	Market value LogTobin's Q
WOMEN	0.963*	1.601***	7.905***	1.150**	1.152**
	(0.089)	(0.002)	(0.001)	(0.015)	(0.029)
Indep_ Women		0.284**			
		(0.011)			
Chair_ Women		0.028			
		(0.395)			
Expertise_Women			-0.501***		
			(0.000)		
Foreign_Women			-0.127***	-0.019***	
			(0.009)	(0.005)	
PostGrad_Women				0.030**	0.054*
				(0.045)	(0.071)
Inter_Univ_Women					-0.177**
					(0.029)
Acc&Fin_Women					0.060**
					(0.040)
BODSIZE	-0.013	-0.072*	-0.233**	-0.059	-0.132
	(0.649)	(0.075)	(0.033)	(0.201)	(0.166)
Indep	-0.091**	-0.083**	-0.266***	-0.017	-0.020
	(0.013)	(0.044)	(0.007)	(0.767)	(0.845)
CEO_Women	-0.032	-0.031	-0.193**	-0.084**	-0.217**
	(0.418)	(0.444)	(0.044)	(0.017)	(0.023)
CEODUAL	-0.009	-0.010	-0.043	-0.011	-0.015
	(0.601)	(0.711)	(0.162)	(0.501)	(0.422)
LOG(CAPEX/TA)	0.054***	0.024*	0.024	0.037**	0.031*
	(0.000)	(0.067)	(0.225)	(0.016)	(0.063)
BIG4	-0.030*	-0.028**	-0.127**	-0.017	-0.024
	(0.054)	(0.012)	(0.029)	(0.555)	(0.654)
LogAGE	-0.041	-0.015	-0.049*	-0.007	-0.005
	(0.980)	(0.237)	(0.064)	(0.523)	(0.749)
LEVERAGE	-0.004	-0.011	-0.075	-0.076**	-0.093*
	(0.398)	(0.824)	(0.217)	(0.032)	(0.092)
LogTA	-0.021	-0.004	-0.021	-0.014	-0.004
	(0.693)	(0.340)	(0.918)	(0.275)	(0.370)
IB	0.018*	0.032**	0.034	0.029**	0.014
	(0.068)	(0.024)	(0.252)	(0.040)	(0.570)
WINDOW	-0.025**	-0.042***	-0.104**	-0.047***	-0.031**

	(0.028)	(0.000)	(0.012)	(0.000)	(0.037)
CRISIS	0.010	0.102***	0.093	0.101***	0.069**
	(0.698)	(0.006)	(0.159)	(0.007)	(0.041)
GDP	0.022	0.033	0.023	0.014	0.030
	(0.422)	(0.371)	(0.281)	(0.840)	(0.918)
Governance_Index	0.006	0.039	0.055	0.016	0.019
	(0.800)	(0.114)	(0.194)	(0.477)	(0.574)
HHI	0.130*	0.081*	0.199**	0.081**	0.062
	(0.050)	(0.093)	(0.023)	(0.039)	(0.121)
Constant	0.152	-0.157	-0.240	0.254	0.570*
	(0.185)	(0.265)	(0.462)	(0.114)	(0.061)
Wald chi^2	188***	200***	191***	201***	181***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.457	0.972	0.330	0.411	0.350
Observations	348	349	454	460	460
Country FE	Yes	Yes	Yes	Yes	Yes

Note: The table presents the 3SLS results for the matched sample (Islamic and conventional banks). Matched sample analysis is carried out using the PSM procedure, with a treatment group (banks with at least one female director) and control group (banks with only male directors). PSM yields a matched sample includes 522 observations: 261 treatment observations (banks with at least one female director) and 261 control observations (banks with only male directors). Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.8. (Robustness) test for the effect(s) of the proportion of women directorships and women directors' attributes on Tobin's Q for the matched sample

5.9.2 Alternative measures of gender diversity

This section extends the sensitivity and robustness checks by using an alternative measure of women directors' representation. The Blau index has commonly been used in previous studies (e.g. Campbell and Mínguez-Vera, 2008; Fan et al., 2019). This index can be used as an alternative indicator of diversity and is built on the level of heterogeneity among different board members in terms of gender (Blau, 1977). According to Engelen et al. (2012), the greater the diversity within the board, the higher the Blau index. Many gender diversity studies have used this measure as a good proxy of board diversity (see Campbell and Mínguez-Vera, 2008; Aggarwal et al., 2019; Fan et al., 2019). The calculation of Blau's index is as follows:

$$Blau\ index = 1 - \sum_{i=1}^{2} b_i^2$$

where b_i is the proportion of men and women on bank boards and i denotes the gender index (1 = women, 2 = men).

The Blau index ranges in value from zero (when all board members are of the same gender) to 0.5 (when the board has an equal representation of men and women) (Campbell and Mínguez-Vera, 2008). The results for Model 1 in Table 5.9 show a positive association between the Blau index and (*LogTobin's Q*), indicating that the gender diversity in the board of directors is positively associated with market value. To provide an additional control for the possibility of reverse causality giving rise to endogeneity concerns in current financial data affected by past board members' appointments, this study employs a one-year lag for the Blau index (Model 2). The results remain the same, showing a positive association between the Blau index (higher gender diversity in the board of directors) and bank valuation. This indicates that the main results are not driven by possible measurement errors in testing the association between gender diversity and market value.

5.9.3 Market capitalization as an alternative measure for market value

This section uses an alternative measure for bank value, market capitalization (*Market Cap*) (Kaczmarek et al., 2014; Elnahass et al., 2020b) because both Tobin's Q and market capitalization incorporate the value of intangible assets that are not reflected in accounting measures. It undertakes the analyses using the natural logarithm of the market capitalization (i.e. the natural log of the stock price per share multiplied by the number of common shares outstanding).

Table 5.10 shows that the proportion of women directors is positively associated with market capitalization for the full sample. Moreover, the association between the Blau index and market capitalization value is positive. These findings are generally the same as the main findings. Therefore, the findings of this study are not affected by endogeneity problems or bias, or any type of estimation error.

5.9.4 Lagged value of board diversity

As a robustness test for governance measures, this study follows Mollah et al. (2017) and re-estimates the models employing a lagged approach for the full sample. The lagged approach helps to alleviate the possibility of reverse causality, thus mitigating the endogeneity issue that current financial data may be affected by past board members' appointments. The estimation includes the one-year lagged value for the proportion of women directors and proportions of other attributes. The results shown in Table 5.11 provide strong evidence that women directors have a positive association with bank value. Women directors with a high educational level and those with finance and accounting qualifications have a positive association with bank market valuation. In contrast, foreign women directors and those with financial expertise are negatively associated with bank market valuation. Overall, the findings are consistent with the main results and indicate that the findings in this study are not driven by an endogeneity bias.

VARIABLE	Model 1	Model 2
	Market value LogTobin's Q	Market value LogTobin's Q
Blau index	3.109***	
	(0.001)	
L. Blau index		1.768***
		(0.001)
BODSIZE	-0.232***	-0.154**
	(0.006)	(0.027)
Indep	-0.095	-0.005
	(0.307)	(0.881)
CEO_Women	-0.494***	-0.279***
	(0.001)	(0.003)
CEODUAL	0.008	0.009
	(0.815)	(0.846)
LOG(CAPEX/TA)	0.022	0.004
	(0.993)	(0.659)
BIG4	-0.009	-0.003
	(0.401)	(0.643)
LogAGE	-0.025*	-0.002
	(0.089)	(0.840)
LEVERAGE	0.009	0.011
	(0.204)	(0.710)
LogTA	-0.016***	-0.014***
	(0.000)	(0.000)
IB	0.041**	0.052**
	(0.048)	(0.039)
WINDOW	-0.028**	-0.005
	(0.038)	(0.638)
CRISIS	0.038	0.006
	(0.260)	(0.686)
GDP	0.003*	0.021
	(0.073)	(0.632)
Governance_Index	0.092	0.004
	(0.143)	(0.868)
HHI	0.017	0.005
	(0.651)	(0.713)
Constant	0.886***	0.662***
	(0.000)	(0.000)
Wald chi^2	175***	409***
LM statistic (p-value)	0.000	0.000

Hansen–Sargan overidentification (p-value)	0.528	0.752
Observations	614	559
Country FE	Yes	Yes

Note: The table presents the 3SLS results of Blau's index and one year lagged values of Blau's index "*the alternative measures of gender diversity*" for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$$Tobin's Q_{it} = \beta_0 + \beta_1 Blau_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (5.3)$$

$$Blau_{it} = \beta_0 + \beta_1 Tobin's Q_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (5.4)$$

In these models, $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. These models also controlled for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.9. (Blau index) 3SLS regression results for alternative measures of gender diversity

VARIABLE	Model 1	Model 2
	Market Cap	Market Cap
WOMEN	0.280***	
	(0.000)	
Blau's index		12.847***
		(0.004)
BODSIZE	-0.288	-0.429
	(0.536)	(0.319)
Indep	-0.002	-0.193
	(0.995)	(0.668)
CEO_Women	-3.772***	-2.434***
	(0.000)	(0.001)
CEODUAL	-0.507	-0.078
	(0.105)	(0.704)
LOG(CAPEX/TA)	0.620***	0.679***
	(0.001)	(0.000)
LogAGE	-0.078	-0.164*
	(0.242)	(0.097)
LEVERAGE	0.112**	-0.040
	(0.028)	(0.861)
LogTA	0.210***	0.578***
	(0.000)	(0.000)
BIG4	0.092	0.105
	(0.490)	(0.500)
IB	0.459**	0.065
	(0.018)	(0.627)
WINDOW	-0.072	-0.028
	(0.741)	(0.844)
CRISIS	0.335	3.691***
	(0.164)	(0.000)
GDP	0.005	0.008
	(0.720)	(0.614)
Governance_Index	2.275***	0.831**
	(0.000)	(0.018)
HHI	1.417**	0.371
	(0.024)	(0.412)
Constant	2.438*	-0.990

	(0.069)	(0.491)
Wald chi^2	555***	461***
LM statistic (p-value)	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.225	0.113
Observations	699	651
Country FE	Yes	Yes

Note: The table presents the 3SLS results for the full sample (Islamic and conventional banks). Market capitalization is an *alternative measure for market value.* The estimated models are defined as follows:

$$MarkeCap_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.5)$$
$$WOMEN_{it} = \beta_0 + \beta_1 MarketCap_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.6)$$
$$MarkeCap_{it} = \beta_0 + \beta_1 Blue_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.7)$$
$$Blue_{it} = \beta_0 + \beta_1 MarkeCap_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (5.8)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. These models also controlled for Islamic windows using a dummy variable (WINDOW) which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007-2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs indicating that the chosen IVs for board women directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.10. Test for the effect(s) of women's directorship and women directors' attributes on market capitalization for the full sample

VARIABLE	Model 1 Market value LogTobin's Q	Model 2 Market value LogTobin's Q	Model 3 Market value LogTobin's Q	Model 4 Market value LogTobin's Q	Model 5 Market value LogTobin's Q
L.WOMEN	1.197***	1.233***	1.797***	2.297***	1.694***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
L.Indep_ Women		0.454**			
		(0.017)			
L.Chair_ Women		-0.011			
		(0.741)			
L.Expertise_Women			-0.101**		
			(0.031)		
L.Foreign_Women			-0.032**	-0.042***	
			(0.016)	(0.003)	
L.PostGrad_Women				0.066**	0.081**
				(0.033)	(0.023)
L.Inter_Univ_Women					-0.274***
					(0.000)
L.Acc&Fin_Women					0.051*
					(0.073)
BODSIZE	-0.065**	-0.022	-0.059*	-0.210**	-0.204**
	(0.019)	(0.458)	(0.052)	(0.013)	(0.016)
Indep	-0.015	-0.014	-0.040	-0.193	-0.007
	(0.703)	(0.777)	(0.378)	(0.118)	(0.923)
CEO_Women	-0.143***	-0.148***	-0.022	-0.139***	-0.277***
	(0.000)	(0.001)	(0.676)	(0.005)	(0.000)
CEODUAL	-0.010	-0.018	-0.016	-0.013	-0.018
	(0.590)	(0.458)	(0.267)	(0.952)	(0.154)
LOG(CAPEX/TA)	0.006	0.005	0.019	0.005	0.019
	(0.572)	(0.745)	(0.125)	(0.734)	(0.161)
BIG4	-0.014*	-0.019**	-0.024*	-0.011	0.127**
	(0.078)	(0.049)	(0.067)	(0.980)	(0.045)
LogAGE	-0.004	-0.005	-0.008	-0.002	-0.012
	(0.799)	(0.470)	(0.339)	(0.820)	(0.263)
LEVERAGE	-0.004	-0.011***	-0.070***	-0.021	-0.088***
	(0.128)	(0.004)	(0.007)	(0.860)	(0.001)
LogTA	-0.010***	-0.009***	-0.008***	-0.016***	-0.008***
	(0.000)	(0.004)	(0.005)	(0.000)	(0.001)
IB	0.036***	0.030***	0.023*	0.005	0.020
	(0.000)	(0.004)	(0.076)	(0.608)	(0.101)
WINDOW	-0.017**	-0.024**	-0.036***	-0.005	-0.019**

	(0.021)	(0.011)	(0.008)	(0.576)	(0.045)
CRISIS	0.010	0.014	0.021	0.050	0.014
	(0.712)	(0.783)	(0.200)	(0.982)	(0.504)
GDP	0.012	0.002*	0.003**	0.011	0.003***
	(0.109)	(0.091)	(0.039)	(0.612)	(0.010)
Governance_Index	0.020	0.035	0.016	0.003	0.009
	(0.281)	(0.100)	(0.419)	(0.873)	(0.647)
HHI	-0.023	-0.064*	-0.033	-0.008	-0.026
	(0.260)	(0.087)	(0.235)	(0.750)	(0.345)
Constant	0.489***	0.428***	0.591***	0.952***	0.855***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Wald chi^2	166***	254***	227***	349***	166***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.214	0.147	0.227	0.468	0.392
Observations	559	554	559	559	581
Country FE	Yes	Yes	Yes	Yes	Yes

Note: The table presents the 3SLS results of the one year lagged values for women's directorship and women directors' attributes for the full sample (Islamic and conventional banks). Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen Ivs for women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 5.11. (Robustness test) 3SLS regression results: One year lagged values for women's directorship and women directors' attributes for the full sample

5.10 Conclusion

In the field of corporate governance there has been substantial interest in promoting the empowerment of women and equality in the workplace, given the increasing recognition of their importance in the market and the prevalence of regulatory debates emphasizing financial and business ethics. Whereas earlier studies presented evidence of the effect of gender diversity on firm market value within non-financial institutions, this study is the first to examine gender diversity in the banking sector with hypotheses based on more comprehensive measures, namely the characteristics and attributes of women directors. In this regard, the analysis considered two categories of women directors' attributes, monitoring (independence, leadership position as board chair) and human capital attributes (financial expertise, nationality, academic qualifications, and educational level and background).

Th study employed a unique dataset of banks located in 12 countries to study the association between women directors and their particular attributes and bank market valuation over the period 2007–2017. Three research hypotheses were established based on four theories: agency theory, resource dependence theory, human capital theory, and signalling theory. The study findings are extended to offer additional insights into the impact of bank type, assessing institutional and differential associations with market value. Moreover, the study takes account of the effect of the financial crisis within the sample period, offering a comparative assessment between the crisis versus non-crisis years.

The empirical assessments present strong evidence that gender diversity (i.e. women's representation on boards) is associated with high market valuation for banks (see section 5.7.2 for an explanation of the results). This is in line with the theorical argument which suggests that women directors may be positively perceived by investors, via their ability to access new resources, their knowledge and good reputation, all of which enhance the boardroom decision-making process. These findings remain unchanged when adding different women directors' attributes to the models. Independent women directors have a positive association with market value, while the leadership indictor shows no association. However, having women directors with financial expertise and foreign nationality are both associated with lower bank value. The findings also show that the proportion of women directors with postgraduate degrees and with accounting and finance qualifications are significantly and positively associated with market value. Having women on the board who are alumni of foreign universities is associated with lower market value.

Analysis conducted on the different bank types show differential effects and indicate that a high proportion of women on the board is associated with lower market valuation in Islamic

banks, but a higher valuation in conventional banks. The association between independent women directors and market valuation significantly increases the bank value across the two alternative banking systems. However, women who act as chair of the board show no association with market value. For both, a higher proportion of financial expertise and foreign women directors are negatively associated with bank value in conventional banks. Furthermore, the findings across the two alternative banking systems suggest that women board members with a high educational level and accounting and finance degrees are associated with higher market value. Finally, women alumni from foreign universities are associated with lower market value in both bank types.

Clustering the sample into crisis and post-crisis periods, this study finds that women directors have no association with bank value during the crisis years. However, there is a positive association between women directors and independent members in the post-crisis period. During the crisis, both financial expertise and foreign nationality attributes are associated positively with bank value, but financial expertise only marginally so. In addition, women board members with postgraduate level education have a consistent influence in both the crisis and post-crisis periods related to high market value. Women who are alumni from foreign universities and those with finance and accounting qualifications have no significant impact on bank value during the crisis, but for the post-crisis period there is a negative association for the former and a positive association for the latter.

The main findings suggest that "wonder woman" attributes in banks are mainly represented by independent directorships, higher levels of education (including the study of accounting and finance), and local knowledge through studying in the home country. The study findings present new insights for the corporate governance literature and the global banking industry, presenting important implications for policymakers, regulators, investors and several sets of stakeholders. The findings might offer primary indications for the optimal composition of bank boards, especially regarding the inclusion of women board members who are characterized by board independence and who hold high educational and special qualifications in finance-related fields. A high level of education may enhance a director's confidence in expressing an opinion. These findings support those of Singh et al. (2015), who reported that highly educated women directors have a greater influence in boardroom discussions. Increasing the number of qualified and educated directors on the board can also help to avoid misunderstandings concerning complex business problems and help in analysing and resolving issues in periods of financial distress.

The findings presented in this study call for regulators and policymakers to develop more detailed guidelines regarding gender quotas, taking the different characteristics of women into consideration when considering board appointments. The study also points to the impact of the characteristics of the two bank types in countries operating a dual banking system, as well as emphasizing the response of capital markets to gender diversity during periods of financial distress. The results addressing the financial crisis effect could benefit regulators and researchers continuing to assess board diversity during the current COVID-19 pandemic and/or future economic banking crises. However, the lack of availability of data for the sample banks, particularly Islamic banks, meant it was not possible to extend analyses to incorporate more attributes of women directors, such as age, leadership, and busyness. It is recommended that future studies could extend this research by analysing the effect of these additional board attributes while capturing the existence of a critical mass. Moreover, future work might examine socio-cultural differences among foreign directors based on their specific nationalities. Variations in the relationships between diversity measures and bank market valuations between countries could also be a fruitful avenue for future research.

Chapter 6. Study 3 – Bank Risk and Mitigation: Opening the Black Box of Women Directors' Attributes and Demographics

6.1 Abstract

Gender diversity in corporate boards of directors is a key area under urgent regulatory calls for equality and inclusivity in banking, while bank risk has become a complex matter due to its direct implications for economic stability. This study investigates the impact of women directors' representations and their attributes on bank risk for countries operating a dual banking system (Islamic and conventional banks). The study utilizes a unique international sample for 12 countries operating a dual banking system during 2010–2017. This study examines different women's monitoring attributes (independence and leadership) and demographic attributes (educational level and background, nationality, and financial expertise). The results show strong evidence that women directors are significantly negatively associated with bank risk, irrespective of the bank type. Independent women directors show a negative association with risk with no evidence for monitoring attributes. Both financial expertise and foreign nationality for women directors tend to promote high bank risk. Moreover, women directors holding high educational qualifications (postgraduate level) and those with accounting and finance qualifications are negatively associated with bank risk. In addition, women directors are associated with effective risk management. Conditional on the bank type, women on the board have an overall adverse association with risk for Islamic banks, showing high bank risk across various risk indicators and directors' attributes/demographics. The results in this study offer new insights into board gender diversity and bank risk and financial stability, presenting valuable recommendations for policymakers regulating countries with dual banking systems.

6.2 Introduction

There is increasing academic and regulatory demand to reduce risk in banks to avoid unnecessary exposure for individuals, institutions, and other financial firms and to minimize financial instability in general (Srivastav and Hagendorff, 2016). In this context, bank risk may include credit risk (the ratio of loan loss reserves to gross loans (*LLR/GL*)), equity risk (the standard deviation of the bank's monthly stock returns) and insolvency risk (the inverse of the Z-score (*1/Z-score*)). The financial crisis showed deficiencies in internal and external governance (Minton et al., 2014) which led to increases in all types of risk. The associated scandals in the banking sector created a demand for stronger governance, including increased board diversity (García-Meca et al., 2015). Diversity among board members is important in an uncertain environment because it creates heterogeneity, and this may improve the quality of

decision making through the expression of contrasting views (Forbes and Milliken, 1999). Furthermore, when decisions result from discussions and the presenting of cognitive arguments by members with demographic diversity, the strategies evaluated and judged by these members should be superior (Zhou et al., 2019). In terms of gender diversity, having women directors on the board minimizes the impact of financial suffering in firms via their use of less aggressive strategies than those of men directors (Chen et al., 2019a).

The growing numbers of women directors and their role in strengthening bank governance mechanisms has captured the attention of bank legislators (Owen and Temesvary, 2018). For example, women directors have high monitoring skills (Adams and Ferreira, 2009). Women enhance decision making and provide a greater balance than if they were not present (Graham et al., 2016). Moreover, women provide creative solutions in boardroom discussions (Ben-Amar et al., 2013). Women directors enhance the corporate image and increase market understanding, helping to meet market requirements through their higher innovation and creativity (Solakoglu and Demir, 2016).

Prior literature has documented mixed and limited evidence on the association between women directors on the board and bank risk. On the one hand, prior studies have used restricted measures for bank risk (i.e. credit risk or equity risk) without offering a comprehensive and systematic assessment for the predicted association. For example, Berger et al. (2014), found that increasing the number of executive women increased bank risk. On the other hand, Kinateder et al. (2021) found that three or more women directors reduce bank credit risk. Moreover, De Cabo et al. (2012) and Dong et al. (2017) found a negative association between women directors on the board and bank risk. However, previous studies have generally examined gender diversity by considering only one proxy (i.e. the percentage/or number of women directors) employing a single-country analysis (Berger et al., 2014; Dong et al., 2017) or regional analysis, for example in the European context (De Cabo et al., 2012; Palvia et al., 2020).

Furthermore, prior studies have not examined women directors' attributes and demographics to identify the incremental and joint effect on bank risk. An important point in the theoretical arguments for increasing diversity on the board is that women can help meet the firm's needs in running the business through the different characteristics and qualities they bring to the task (Bear et al., 2010; Fan et al., 2019). Women directors may have qualifications, skills, and backgrounds that differ from those of men. This study goes beyond considering diversity solely in terms of gender to examine how women's different characteristics are associated

with bank risk. Board efficiency comes from members' experience, functional expertise, and education, which may have an impact on bank risk (Srivastav and Hagendorff, 2016).

Accordingly, this study aims to address gaps in the previous literature by undertaking a comprehensive empirical examination of various women directors' attributes and qualities in in addition to women directors' representation, for an international sample of banks. This study follows Bennouri et al. (2018) and Gull et al. (2018) regarding defining and modelling women directors' attributes. Bennouri et al. (2018) argued that "beyond the mere presence of female directors, it is important to understand what women bring to the boardroom and how their skills change the monitoring and advisory missions of the board" (p. 269). Examining their attributes can help to understand how and which women directors may affect bank risk. This study considers three aspects for gender diversity and attributes: the proportion of women directors (the number of women directors against the total number of board members), women directors' monitoring attributes (independence and leadership), and women directors' demographic attributes (expertise, nationality, educational level, and background). This research draws on several theoretical perspectives to derive the three main hypotheses (agency theory, resource dependence theory, and upper echelons theory), and investigate how women directors influence the effectiveness of board monitoring and bank risk. The investigation will help understand the women directors' association with bank risk and open up the "black box" with respect to women's different attributes by addressing two research questions: (1) Is the representation of women directors on the board associated with bank risk? (2) How are the different attributes of women directors associated with bank risk? This study also employs various indicators for bank risk representing credit, insolvency, and equity risk.

The study premise is that women directors' representation and their characteristics are likely to be associated with bank risk, but this relationship could also be mediated by different institutional characteristics related to the type of bank. Accordingly, this study expands the scope and implications by using a unique sample of emerging economies that operate on a dual banking system (Islamic and conventional banks) and possess a conservative culture.[40] In doing so, this chapter extends existing research and addresses gaps in the banking literature, as previous studies have not considered the potential systematic differences in bank risk in the presence of women directors across different bank types (e.g. Elnahass et al., 2020a, 2021;

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[40] The operations of Islamic banks are principally driven by a constrained banking model, which prohibits interest, complex derivatives, short selling, aggressive risk taking, and speculation, while encouraging risk/profit sharing between the firms and their depositors. Meanwhile, conventional banks provide their services on an interest basis.

Trinh et al., 2020). The governance structure employed by Islamic banks is likely to be more complicated and promote extended agency costs than that of conventional banks (Mollah and Zaman, 2015; Abdelsalam et al., 2016). Accordingly, this research expects gender diversity to have differential impacts on bank risk among the two bank types; it is important to investigate this given the constant and rapid growth of Islamic banking and its central economic influence on the resilience of the global banking industry.[41]

The study utilizes financial and corporate governance data on 111 listed banks from 2010 to 2017 for 12 emerging countries in the Middle East and Asia. The motivation for selecting this sample was the fact that women in these regions are more likely to challenge discriminatory practices than in developed countries due to the conservative society and standards built on religion (Kim and Sandler, 2020). Moreover, in the conservative culture, there are additional norms related to religion and stereotypes, such that it is viewed as more appropriate for women to stay in the home in the role of housewife (Othman, 2006). This concept of the role of women promotes discrimination in the selection of women to board positions. The Arab Human Development Report (2016) stated that in the Middle East, women tend to have minimal involvement in political, economic, and social life, low admission to employment and fewer employment opportunities than men, as well as low wages. However, according to Salloum et al. (2019), there have recently been some reforms in this area aimed at addressing discrimination and empowering women. For instance, they point to changes in many corporate regulations and the implementation of political amendments in countries such as Saudi Arabia, the United Arab Emirates (UAE), Lebanon, Jordan, and Qatar, empowering more women to reach high positions in organizations.

Beside Middle Eastern countries, Asian countries also have institutional and socio-cultural norms that are resistant to appointing women directors (Low et al., 2015). Although most Asian countries have higher women's board representation than the Middle Eastern region, the appointment of women directors is still low in most Asian countries compared to Western nations (Low et al., 2015). Therefore, this study presents new perspectives that can shed light on existing practices in banking systems with growing numbers of women directors on their boards.

This study employs three-stage least squares (3SLS) estimation with valid independent variables (Ivs) and propensity score matching (PSM) with three risk proxies (insolvency risk,

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[41] The annual growth of Islamic banking is around 20% per year (Elnahass et al., 2021a). By 2015, their total assets had reached $1.38 trillion, and this is projected to increase further to $6.5 trillion by 2022 (IFSB, 2017).

credit risk, equity risk). The main findings show that the presence of women directors on boards, on average, is negatively associated with bank risk. The results for many women directors' attributes are consistent with the main findings. The findings examining different monitoring attributes (independence and leadership) demonstrate that independent women directors are associated with lower bank risk, while there is no significant association for women holding the role of board chair. In terms of women directors' demographic attributes, financial expertise and foreign nationality are associated with higher bank risk compared to women directors with no low financial expertise and domestic nationality. In contrast, women directors with a postgraduate level of education and those with accounting and finance qualifications are both significantly associated with lower bank risk than women directors without a postgraduate or accounting and finance qualification. However, there is strong evidence that banks with women members who graduated from international universities are on average associated with a significant increase in bank risk compared to directors who did not graduate from international universities.

When assessing the impact of bank type (Islamic vs conventional banks) on the predicted association, this study finds that a high representation of women on the board is associated (solely) with reduced equity risk for Islamic banks, and is associated with low risk across different indicators within conventional banks. The presence of independent women directors on the board is significantly associated with high risk for Islamic banks, with no evidence for conventional banks. Regarding education, the presence of women directors with postgraduate degrees and accounting and finance qualifications is significantly associated with high Islamic bank risk, while the opposite association is found for conventional banks. Moreover, women directors who have studied at foreign universities are associated with low Islamic bank risk and associated with high conventional bank risk. On average, gender diversity shows detrimental effects on bank risk within Islamic banks compared to their conventional counterparts. This is attributable to the complex business model, extended agency costs, and scarcity of women *Shari'ah* advisors and directors on a global basis.

This study additionally examines the effect of having women directors on the effectiveness of bank risk management. This study employs the upper echelons and agency theories in hypothesizing board gender diversity as an underlying channel with moderating effects on the relationship with bank risk and performance. The effectiveness of risk management is measured by examining the moderate impact of risk on the association between women's directorship and bank profitability. The findings indicate that women directors have a positive effect on the effectiveness of risk management (i.e. there is a positive association between

performance and risk). To illustrate further, there is a significant negative association between women directors and banks' insolvency, and credit and equity risk, and a significant negative association between all bank risk and bank performance. Nevertheless, the interaction between women's representation and bank risk presents a significant positive relationship with bank performance. To identify a matched sample of banks without women directors to control for self-selection bias, the study used PSM. The results for the matched sample support the main findings. The overall results are robust and consistent with the main results under several sensitivity checks.

This study makes several contributions to the literature on board gender diversity and corporate governance. First, to the best of my knowledge, this study is the first in the banking literature to test the association between women directors' representation (and attributes/demographics) and comprehensive bank risk proxies. The study explores the black box of the association between women directors and bank risk through systematic and independent analyses, using inclusive indicators related to the presence of women directors, their attributes, and demographics. Therefore, this study extends the findings of the few previous banking studies that have focused on investigating gender diversity in relation to credit risk only (i.e. as one type of bank risk) but have not captured other comprehensive indicators of different risks, such as insolvency and market-based risks (Berger et al., 2014; Dong et al., 2017; Kinateder et al., 2021). This study also extends prior studies by offering significant evidence on the impact of gender diversity on the effectiveness of risk management by women directors within non-financial industries (Nadeem et al., 2019). To the best of my knowledge, no study has yet examined this important effect within the banking sector.

Second, this chapter represents new perceptions regarding gender diversity and bank risk through extending the main analyses to capture women directors' attributes and demographics. This study adds to the on-going debate associated with factors contributing to the resilience and stability of both banking sectors. Finally, this study identifies the potential impact of institutional type between different banking business models. Accordingly, the study is among the first attempt to offer comparative assessments of gender diversity and women directors' attributes and hence this study adds to the current literature related to corporate governance for the two bank types, which has not hitherto considered board diversity or women directors' attributes (e.g. Shibani and Fuentes, 2017; Elnahass et al., 2020a, 2021; Trinh et al., 2020).

This chapter offers critical perspectives and important policy implications for regulators and market participants engaging with different banking systems. The findings of this study imply that the representation of women on boards mitigates risk in banking, indicating a monitoring role. Over the years, the increasing quotas for women directors have indicated a constantly growing movement towards equality and inclusive representation among board members in different countries. This research also highlights to regulators the potential value of appointing women directors in line with their attributes rather than according to a visionless gender quota. The evidence provided in this chapter offers support for the benefit of empowering women in banking and the movement of society internationally towards this. Accordingly, legislators should take into consideration the allocation of more quotas for independent women directors. International regulators also need to reflect on various women directors' attributes and demographics when developing banking/financial reporting standards and common governance codes.

Shareholders and other stakeholders need to address the importance of women directors' higher educational qualifications and chair independence. This study offers strong evidence that women on boards and certain other attributes of women directors, such as independence, higher levels of education, and accounting and finance qualifications, tend to promote better risk mitigation for their banks.

This study calls for regulators and investors to recognize the importance of not only considering institutional characteristics in banks, which have long been argued in the literature, but also assessing board of directors' characteristics and attributes, including gender diversity and demographics. Such board characteristics seem to have an impact on bank risk and resilience in alternative banking systems such as Islamic and conventional banks. While the representation of women directors mitigates risk in conventional banks, a high presence of women directors shows differential impacts within Islamic banking. This outcome could be related to the restricted business model and complexity of the agency environment in Islamic banking.

The rest of the chapter is organized as follows. Section 6.3 provides an overview of the theoretical framework and then develops the hypotheses in section 6.4. Section 6.5 presents the data and sample, while the methodology is outlined in section 6.6. Section 6.7 reports the empirical results. Sections 6.8 and 6.9 explain the additional robustness checks undertaken. Finally, section 6.10 concludes.

6.3 Theoretical Framework

Corporate governance is considered to comprise "the system of checks and balances, both internal and external to companies, which ensures that companies discharge their accountability to all their shareholders and act in a socially responsible way in all areas of their business activity" (Solomon, 2020, p. 14). The board of directors acts as the core of internal governance, protecting shareholders' interests by enhancing decision making that can increase financial performance and protect the firm from potential risk; therefore, the board structure is an indicator of how well the duty of governance is being fulfilled (Hsu et al., 2019). Board diversity is critical for organizations because it increases heterogeneity among board members, thus enhancing the advisory capacity of the board brought by the members' different skills, experiences, and backgrounds (Kim and Starks, 2016).

There are numerous theories that address the roles of internal and external members of boards of directors, such as agency theory, resource dependence theory, and upper echelons theory (see Chapter 3). An essential role of the board is monitoring, an aspect focused on in agency theory, which proposes that the board protects shareholders' interests by controlling the managers' self-serving inclinations, which may not be aligned with those of shareholders (Fama, 1980).

In the literature, agency theory and gender diversity have been investigated in several ways, including monitoring skills, risk aversion, and ethical awareness. In terms of monitoring, the skills and motivation of women and men directors differ in several respects (Post and Byron, 2015). First, women engage in greater monitoring efforts, which can lead to increased firm performance in a weak governance environment (Adams and Ferreira, 2009). Women directors effectively monitor managers and reduce agency costs (Chen at al., 2017). Moreover, strong monitoring from women not only leads to enhanced firm performance, but also a greater degree of sensitivity to executive managers' compensation and CEO turnover, which may affect dividend policy (Cardillo et al., 2020). Women have the ability and motivation to be efficient in their monitoring (Nekhili, et al., 2021). Second, women's vigilance in monitoring comes from their ability to pay particularly close attention to boardroom activities and discussions, helping them collect information about the firm (Ben-Amar et al., 2013). Third, women tend to be less confident than men (Huang and Kisgen, 2013), especially in terms of risk (Adams and Funk, 2012); this makes them better at working under difficult circumstances, basing their risk decisions on the need to mitigate the costs of potential financial disaster and reduce systemic risk (Bayazitova and Shivdasani, 2012). According to Belaounia et al. (2020), women's strict advisory and monitoring style enhances

their risk evaluation and because of their risk aversion they can reduce any over-investment behaviour by balancing the otherwise dominant voices of men. Moreover, women have high ethical standards and are aware of ethical issues (Jain and Zaman, 2020), as well as being more compliant with rules and regulations than men (Capezio and Mavisakalyn, 2016). Therefore, they avoid making risky decisions which might harm the shareholders. Women are naturally inclined to take others' rights into consideration, while men tend to prefer a controlling manner in decision making (Eagly and Carli, 2007). Therefore, bondholders typically prefer having women directors on the board to protect their interests because, as Tanaka (2014) found with regard to Japanese corporate bond issues, having outside women directors reduces agency conflict through their monitoring and advice. In the banking sector, women directors reduce agency costs because they are more likely to agree to a policy of higher dividend pay-outs than men directors, which can act as a discipline mechanism for managers as it may help to curtail the wasting of free cash flows (e.g. overinvestment in negative net present value projects) (Cardillo et al., 2020).

In today's business environment, due to increased business complexity and ambiguity, there are calls for board diversity, particularly the presence of members with access to external market resources. The resource function helps to achieve the firm's goals by bringing in vital opportunities, securing the firm's legal position and enhancing the firm's reputation by incorporating different board members' perspectives (Hsu et al., 2019). Diversity within the board reflects the wider resources available to the firm. Women directors open up a new window for financial and market resources which can enhance board function, linking firms with different perspectives (see Fan et al., 2019) and they can be proficient in engaging in boardroom discussions (Huse and Solberg, 2006).

To understand the different leadership characteristics that are brought to the boardroom, it is possible to integrate the theoretical perspectives outlined above with upper echelons theory. According to this theory, individuals evaluate strategic options through their own personal lenses based on experience, values, etc. Therefore, these characteristics could influence decision-making (Hambrick and Mason, 1984; Post and Byron, 2015; Perryman et al., 2016). After the financial crisis in 2008 and the scandal of corporate governance failures, attention was drawn to boards of directors' strategic decisions and the role of upper echelon teams (Muller-Kahle and Lewellyn, 2011), particularly in terms of how they applied their managerial skills to act in the interests of the firm. According to Hsu et al. (2019), "The strategy function refers to the board helping the management develop and plan company strategies and establish overall development direction, mission, and vision" (p. 2449). The

diversity of board members is reflected in the firm's functional performance and corporate strategies, decided based on their faith, beliefs and principles, cognitive backgrounds, and attitudes towards risk (Hambrick and Mason, 1984).

Diverse board composition provides different perspectives and experiences that enhance problem solving and the application of new and varied planning strategies (Lim et al., 2019). Both women and men directors have a diverse knowledge, values, and beliefs, known as cognitive frame composition (Post and Byron, 2015), which inform their decision-making strategies (Karim, 2021). Moreover, gender diversity is important because, based on upper echelons theory, the knowledge and experiences that women directors bring to boardroom discussions might help the board to consider the implications of strategic decisions in terms of the broader scope of stakeholders (Karim, 2021). According to Hambrick and Mason (1984), to understand and deal with the complexity of the market and information exchange processes, the board needs members with different educational levels and backgrounds. Recently, this leadership theory has been applied to explain in depth how board characteristics (e.g. socio-demographic, educational level, background, socioeconomic status) might affect corporate strategy (e.g. Abatecola and Cristofaro, 2018). The cognitive influence of each individual is important in terms of demonstrating how each director's ability and skills can be applied in the decision-making process (Hambrick and Mason, 1984; John et al., 2020). Thus, it is important to take the education and functional experience of women directors into consideration. For example, from this perspective, directors with a higher level of education will be more open to accepting others and will be more tolerant, they will engage in higher information processing and be able to evaluate alternatives (John et al., 2020).

Based on research in various fields, including psycho-sociology, gender and management, it is apparent that women directors are psychologically and psycho-sociologically predisposed to behaviour that encourages a strategic approach based on values and reflexive decision making, resulting in a lower willingness to engage in risky decision (Jianakoplos and Bernasek, 1998; Bruna et al., 2019).

To sum up, women directors bring to the boardroom greater vigilance, more strategic choices, and enhanced information processing, resulting in enhanced monitoring (Upadhyay and Zeng, 2014). They can also reduce risk through improved "group dynamics" in the boardroom (Nadeem et al., 2019). Moreover, prior studies have not accounted for the implications of different bank types, as analysed in this study.

6.4 Hypothesis Development

6.4.1 Women directors and risk

Prior studies in non-financial firms have documented a positive association between women directors and investment opportunities and firm cash holdings due to their risk aversion (Loukil and Yousfi, 2016). In particular, women directors reduce the firm's risk at the same time as increasing performance (Perryman et al., 2016). Lenard et al. (2014) found a negative association between the percentage of women on the board and the equity risk of companies in the RiskMetrics database from 2007 to 2011. In non-financial firms listed on the FTSE350, Jizi and Nehme (2017) found that women directors are associated with reduced firm risk (i.e. stock return volatility) from 2008 to 2013. Similarly, in US listed firms, the increasing numbers of women directors and differing demographic characteristics have been associated with reductions in stock return volatility (Bernile et al., 2018). Nadeem et al. (2019) examined the representation of women directors in UK listed firms in the period 2007–2016 and found a negative relationship between women and firm risk; in contrast, there was a positive association with firm performance. With respect to risk, gender diversity enhances decision making in the boardroom, enabling the making of optimal choices that reduce risk based on the new resources and skills offered by women directors (Jizi and Nehme, 2017).

In a banking context, evidence on gender diversity and bank risk is still mixed and limited, since prior studies have not considered women's representation on boards together with their various attributes and demographics. For example, Dong et al. (2017) investigated the Chinese setting and found that having a higher percentage of women directors on the board is related to reduced credit risk. Cardillo et al. (2020) found that increasing the gender diversity on bank boards led to lower probability of bank bailout in their study of European listed banks.

A high representation of women on the board is reflected in a strong awareness of the shareholders, providing new ideas and knowledge that can improve decision making (Khaoula and Moez, 2019) and promote effective monitoring. Women directors are associated with increased investment efficiency (Ullah et al., 2020), indicating that they are good at strategic decision making. When appointing directors to banking firms, one of the most important corporate governance criteria is that they must have a strong knowledge base and be effective, understanding the complexities and the risks associated with the banking industry (D'Amato and Gallo, 2019). Women enhance the board's role through their understanding of the complex market and business model and their ability to respond to the requirements of stakeholders (Hillman and Dalziel, 2003). They offer a range of solutions from different

perspectives, which increases the quality of decisions, enhancing the reputation of the firm/bank, and providing new and crucial resources that help to reduce uncertainty and transaction costs (Nielsen and Huse, 2010). Women are highly sensitive to reputation risk (Chen et al., 2017).

Building on the above points, this study hypothesises that women directors will enhance the governance and monitoring in their banks. This is a result of a range of features, such as monitoring vigilance, their risk aversion, bringing new resources and skills, implementing conservative investment strategies and their high awareness. This leads to the following hypothesis, stated in the alternative form:

H₁: Gender diversity on the board of directors is negatively and significantly associated with bank risk.

6.4.2 Women directors' monitoring and leadership attributes and risk

Since no study has yet examined the association between women directors' attributes and bank risk, the premise and expectations of this study incorporate underlying theories and the limited evidence from previous studies for listed non-financial firms.

Independent directors are less obligated to the management and thus are better at monitoring, working on the shareholders' behalf and interests (Hermalin and Weisbach, 2001). According to the agency perspective, the effective monitoring of managers relies on board composition (Adams et al., 2010). Independent directors are motivated to engage in effective supervision of managers (i.e. monitoring and disciplining them to reduce expediency costs and act in the interests of shareholders) to protect their name in the independent directorship market (Fama and Jensen, 1983). Pathan (2009) shows that independent directors avoid risky projects because they seek to balance the interests of shareholders and those of other bank stakeholders, depositors, and regulators. Increasing board diversity results in increased board independence, which then enhances monitoring (Adams et al., 2015). Consequently, the present of women directors on the board is considered an indicator of independence (Ferreira, 2015), based on prior studies that have identified women directors as more likely to be independent (Bøhren and Staubo, 2016).

Regarding the presence of independent directors and risk, Pathan (2009) found a negative relationship between board independence and bank risk in US bank holding companies. Mollah et al. (2017) found a negative relationship between board independence and insolvency and funding risk, but a positive association with credit risk. Vallascas et al. (2017), examining a large cross-country sample of banks, found board independence decreased bank

risk following 2009 in the study period 2004–2014. In UK financial firms, Akbar et al. (2017) identified a negative relationship between independent directors and corporate risk in the period 2003–2012. With regard to Japanese corporate bond issues, bondholders view independent women directors on boards as a means of protecting their interests because they mitigate the risk of default by reducing yield spreads (Tanaka, 2014).

The effectiveness of the board of directors also depends on the chairperson's leadership style because the chair's main role is to lead the board and members' decisions. The impact of the chair on board effectiveness is shown in enhanced member participation and involvement, boardroom management, and the performance of monitoring by executives, all of which benefit from having a chairperson capable of leadership (Machold et al., 2011). Therefore, directors' leadership style is considered to be the main determinant of board strategy and a driver of the board's value (Leblanc, 2005). In terms of board diversity, effective leadership by the chairperson is important in terms of leading members with different characteristics and backgrounds (Machold et al., 2011). Attention to diversity focuses on how the chair will manage the board's dynamic (Leblanc and Gillies, 2005).

Based on the importance that board diversity has for the boardroom, it is crucial to identify the role of the chair in influencing board strategies and decision making in the banking industry, especially if the chairperson is a woman. Women chairpersons may have many qualities, such as being good listeners and problem solvers, that result in a supportive leadership style and promote the work of board members (Nekhili et al., 2018). According to Dezsö and Ross (2012), "women are said to encourage participation by soliciting input from others, share power and information by keeping open communication channels with their subordinates, and bolster their subordinates' sense of self-worth" (p. 1075). This manner of leadership has been described as a "feminine management style" (Dezsö and Ross, 2012, p. 1075); indeed, Dezsö and Ross (2012) go on to state that as the "CEO of Sodexo Michael Landel phrases it 'Women like power, but they like to share it'" (p. 1075). Palvia et al., (2020) show that female Chief Executive Officers (CEOs) and chairpersons of the board are associated with better lending performance and lower default risk when faced with severe real estate price shocks. Using a large panel of US commercial banks. Therefore, it can be argued that women's leadership style is critical and successful in today's uncertain business environment (Eagly and Carli, 2007).

Based on the empirical and theoretical arguments that the presence of women results in greater compliance in corporate governance and sensitivity to risk and moral issues, this study expects that having independent women directors on the board together with women

chairpersons will be associated with reduced bank risk.[42] This leads to the second hypothesis, formulated as two sub-hypotheses to address women directors' independence and leadership attributes separately, as follows:

H_{2a}: Having independent women directors on the board is significantly and negatively associated with bank risk.

H_{2b}: Having women chairpersons is significantly and negatively associated with bank risk.

6.4.3 Women directors' demographic attributes and risk

This study also examines the association of women directors' demographic characteristics, such as education level and background, foreign nationality (Bennouri et al., 2018), and financial expertise, with bank risk. To date, no empirical study has examined the relationship between women directors' different attributes and bank risk. The complexity of the banking field and related firm risk requires the appointment of highly qualified directors with a wide range of functional capabilities and knowledge (D'Amato and Gallo, 2019). Therefore, it is important to investigate the impact of women's qualifications on bank risk.

Regarding directors' education, higher levels of education among board members enhance the cognitive skills available, promoting the quality of decisions and the ability to employ different resources effectively (Ullah et al., 2020), and producing more alternatives and high-quality decisions (Harjoto et al., 2019). For example, Cashman et al. (2013) found that directors with an MBA are more likely to be appointed to seats on the boards of S&P firms and that their higher educational level enhanced board efficiency. Papadimitri et al. (2020) found that the presence of more highly qualified board members increased the likelihood of obtaining a better credit rating. They attributed their results to the cognitive skills of more educated members, which help to provide better future predictions and yield enhanced decision making. Therefore, under conditions of uncertainty, managers with higher education levels help to enhance firms' opportunities (Carpenter and Fredrickson, 2001). In Chinese listed firms, the educational level of the board members was found to affect investments positively (Ullah et al., 2020). Also, based on a sample of Chinese firms, Bhat et al. (2019) found that task-oriented and relation-oriented diversity (i.e. education level, gender) reduced corporate risk.

Moreover, directors with financial expertise have high cognitive functioning, as described in the case of women directors with experience (past or present) as an executive officer – CEO,

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[42] Independent women directors are defined in this study as the proportion of independent non-executive women directors to total women directors (Bennouri et al., 2018; Gull et al., 2018).

chief financial officer (CFO), or chief risk officer (CRO) – in a financial firm (i.e. bank, insurance), or academic society (e.g. professor in finance, accounting, economics, or business) (Güner et al., 2008). The presence of directors with a reputation for financial expertise is positively associated with share price (DeFond et al., 2005). Fernandes and Fich (2012) testified that there is a negative relationship between outside financial expert directors and bank risk because such directors can monitor and advise managers and diminish the conflicts of interest between inside directors and shareholders through the application of a greater breadth of information and skills. For instance, MBA holders as senior executives enhance the quality of decisions (Graham and Harvey, 2002).

Alongside education and financial expertise for women directors, there has been limited discussion of the role of national diversity among directors in corporate governance studies. Foreign directors (i.e. directors of another nationality in the bank in the country of the bank headquarters) can be considered a channel for new resources and information, representing different cultures in the global market that are dissimilar from the local market, and they also enhance firm reputation (Ruigrok et al., 2007; Estélyi and Nisar, 2016). According to upper echelons theory, foreign directors have diverse abilities that may help to promote the board, in particular in terms of their experience of different markets and diversity in terms of networking connections (Masulis et al., 2012; Ben-Amar et al., 2013).

Regarding to the agency view, the purpose of appointing foreign directors is that they do not have a professional association with management. Indeed, based on the agency perspective, they have a high reputation in terms of monitoring because they do not have a connection with the managers (Estélyi and Nisar, 2016). Most studies show that foreign directors increase firm performance (Choi et al., 2007; Oxelheim and Randøy, 2003, Oxelheim et al., 2013; Estélyi and Nisar, 2016). In the Korean banking industry, an increase in foreign directors was found to lead to an increase in bank performance (Choi and Hassan, 2005). Directors from countries with high legal levels that safeguard investors can positively affect firm performance (Miletkov et al., 2014). However, Dong et al. (2017) presented mixed results for bank cost efficiency in Chinese banks due to a lack of familiarity with the Chinese banking system. In terms of gender diversity, women are more likely to have international experience (Singh et al., 2008), particularly if they are foreign (Gull et al., 2018).

Based on the theoretical propositions and prior evidence, this study conjectures that a higher educational level and a higher degree of professional financial expertise will enhance the monitoring function by women directors (Singh, 2007). Nekhili and Gatfaoui (2013) found that women were more highly educated and were more likely to be business graduates than

men. Similarly, Hillman et al. (2002), examining a US sample, found that the level of education of white women was significantly higher than that of white men. Therefore, appointing women to directorships may be subject to their capital demographic qualities (i.e. educational background and experience) (Nekhili and Gatfaoui, 2013; Gull et al., 2018). Accordingly, women directors with diverse demographic attributes (i.e. higher educational qualifications, international qualifications from global universities, foreign nationality, or financial expertise) may be expected to help banks mitigate risk through their skills and abilities and by adopting conservative strategies that combine their qualifications, expertise, and attitudes to risk. Moreover, foreign women directors can also bring to bank boardrooms new technology and capabilities, accompanied by different management techniques that help to provide extra supervision and enhance corporate governance and bank performance (Liang et al., 2013). Thus, the third hypothesis is defined as follows:

H₃: Women directors' demographic attributes (i.e. educational background and level, foreign nationality or financial expertise) are negatively associated with bank risk.

6.5 The Sample and Data Collection

In this study, the financial data were collected from Thomson DataStream, Orbis (in US dollars). The county-level data were collected from the World Bank "Development Indicators database". The corporate governance data, such as numbers of women directors and their attributes, as well as additional board characteristics, such as board size, independence, and CEO information, were hand collected from the annual reports published on the banks' official websites. The sample was filtered following previous banking studies (e.g. Mollah et al., 2017; Elnahass et al., 2020a; Trinh et al., 2020). The inclusion criteria were as follows: i) there was at least one Islamic bank and one conventional bank in each country; ii) the banks posted full annual reports on their official websites, published by 31 December; iii) for each bank, data were available for at least three consecutive years.

The final sample of unbalanced panel data for 12 countries included 111 listed banks (827 observations) over the period 2010–2017. The sample contained 27 Islamic banks (195 bank-year observations), 55 conventional banks (418 bank-year observations), and 29 conventional banks with Islamic windows (i.e. conventional banks with financial products in compliance

with Shariah law) (214 bank-year observations).[43] The selection of this period avoided the possible impact of the financial crisis period (2007–2009) on the examination. The importance of the sample period is that Basel II requirements became obligatory for Islamic banks in 2007 (see IFSB, 2005; Elnahass et al., 2018).

Table 6.1 illustrates the distribution of the sample by bank type and by country. The sample includes 24% Islamic banks, 50% conventional banks, and 26% conventional banks with Islamic windows. With regard to the bank-year observations for Islamic banks, Bahrain has the greatest number (40 observations), followed by Kuwait (32 observations). Turkey has the highest number of conventional banks (80 observations), followed by Indonesia (74 observations). For conventional banks with Islamic windows, Saudi Arabia has the highest number of bank-year observations (55 observations).

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[43] This study controls for conventional banks with an Islamic window in selecting the sample, following Beck et al. (2013), using (WINDOW) as a dummy variable taking the value 1 for conventional banks with Islamic windows and zero otherwise (Abedifar et al., 2013). Moreover, this study undertook several sensitivity analyses to identify the impact of these Islamic windows on the main findings, running estimations with/without Islamic windows and the main findings remained consistent. The reason for having such banks in the models was that they are considered part of these countries' banking system culture and hence they cannot not be dropped when studying the banking system in the countries sampled.

Country	Islamic banks		Conventional banks		Conventional Banks with Islamic Windows		Full Sample	
	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)	Observations	Percentage (%)
Bahrain	40	20	16	4	8	4	64	8
Bangladesh	11	6	48	11	28	13	87	10
Egypt	6	3	20	5	0	0	26	3
Indonesia	8	4	70	17	36	17	114	14
Jordan	15	8	74	18	0	0	89	11
Kuwait	32	16	38	9	0	0	70	8
Oman	11	6	0	0	20	9	31	4
Pakistan	8	4	32	8	32	15	72	9
Qatar	16	8	32	8	0	0	48	6
Saudi Arabia	26	13	0	0	55	26	81	10
Turkey	7	4	80	19	0	0	87	10
UAE	15	8	8	1	35	16	58	7
Bank-year observations	**195**	**100**	**418**	**100**	**214**	**100**	**827**	**100**
Number of banks	**27**	_	**55**	-	**29**	-	**111**	-

Note: The final sample contains unbalanced panel data of 111 banks (1019 observations) with 27 Islamic commercial banks (232 observations), 58 conventional commercial banks (532 observations) and 29 conventional commercial banks with Islamic window (255 observations) in 12 countries over the period (2010–2017). See Appendix A for variable definitions.

Table 6.1. Sample distributions – Study 3

6.6 Model and Measures

6.6.1 Measures of bank risk

To examine the association of board gender diversity with bank risk, three different risk indicators were adopted: insolvency risk, credit risk, equity-based risk (Zhou et al., 2019). First, this study uses the accounting risk measure (i.e. insolvency risk), as in previous studies (Zhou et al., 2019; Trinh et al., 2020) that measured insolvency risk for banks, by first calculating the probability of default through the Z-score, computing the Z-score as the sum of the return on assets and the capital assets ratios, divided by the standard deviation of the return on assets. Then, this study used the inverse of the Z-score (i.e. *1/Z-score*) as a measure of insolvency risk, with a positive 1/Z-score indicating high insolvency risk (Abedifar et al., 2013; Beck et al., 2013; Mollah et al., 2017). The second risk proxy, credit risk, is calculated as the ratio of loan loss reserves to gross loans (*LLR/GL*) to capture the loan portfolio risk, which accounts for the past performance of the current loan portfolio and the expectation of performance in the future (Abedifar et al., 2013; Zhou et al., 2019). The higher the ratio, the higher the credit risk for the bank (Abedifar et al., 2013; Beck et al., 2013). Finally, the equity risk (*ER*) is calculated as the total risk, namely the stock return volatility (Pathan, 2009; Sun and Liu, 2014; Baixauli-Soler et al., 2015; Elyasiani and Zhang, 2015). Equity risk is calculated as the standard deviation of the bank's monthly stock returns at the end of each fiscal year over the sequential returns of 60 months with at least 36 months, following previous studies (Alford and Boatsman, 1995; Baixauli-Soler et al., 2015; Elyasiani and Zhang, 2015). However, some studies calculate the total risk as the volatility of daily stock returns (Sun and Liu, 2014; Sila et al., 2016). According to Alford and Boatsman (1995), historical volatility should be calculated using weekly or monthly returns, and the estimation period should be approximately 5 years. They argue that, empirically, using historical data for monthly returns is the most accurate measure of volatility. This risk measure is important because it gives a comprehensive picture to managers, directors, and regulators of the reflection of the market view about risks hidden in banks' assets and liabilities, and also the off-balance sheet situation based on the overall stock return volatility (Pathan, 2009). It considers the results of market price movements and losses from the balance sheet (Bessis, 2011).

This study computes the banks' monthly stock returns using the following equation following Soares and Stark (2009) and Aljughaiman and Salama (2019):

$$R_{ijt} = \frac{RI_{ijt}}{RI_{ij(t-1)}} - 1 \qquad (6.1)$$

where *RI* is the return index, R_{ijt} is the monthly stock return in bank *I*, country *j*, and month *t*, RI_{ijt} is the return index for bank *i*, in country *j* and month *t*, and $RI_{ij(t-1)}$ is the return index for bank *i*, in country *j* for the previous month. The equity risk is then *ER = Standard Deviation* $(R_{ijt}\ each\ fiscal\ year)$.

6.6.2 Measures of board gender diversity and director attributes

This study follows Bennouri et al. (2018) and Gull et al. (2018) in measuring women directors' representation within the board and women board members' attributes. First, the main gender diversity proxy used to test the first hypothesis is the proportion of women directors on the board: the number of women directors to the total number of directors (*WOMEN*), as generally used in gender-related studies (Adams and Ferreira, 2009; Berger et al., 2014; Sila et al., 2016; Bennouri et al., 2018; Chen et al., 2019a; Fan et al., 2019). This study expects a negative relationship between the proportion of women directors and bank risk, consistent with prior studies examining non-financial institutions (Bhat et al., 2019; Nadeem et al., 2019; Yang et al., 2019).

To examine women directors' attributes, this study divides them into two classifications (monitoring and demographic). The monitoring attribute is investigated using the proportion of directors that are women: the number of independent women directors to the total women directors on the board (*Indep_Women*) (Bennouri et al., 2018; Gull et al., 2018). In addition, women chairpersons (*Chair_Women*) comprise another indicator for the monitoring attribute (Bennouri et al., 2018). This is defined as a dummy variable which is equal to 1 if the chairperson is a woman and zero otherwise (Bennouri et al., 2018; Gull et al., 2018; Nekhili et al., 2018).

With regard to board demographic attributes, this study follows prior studies (Bennouri et al., 2018; Gull et al., 2018), as well as the resource dependence and upper echelons theories, to classify board members with extensive professional knowledge and skills and various backgrounds. To test the demographic capital attributes of women on the board, this study examines financial expertise, nationality, and education. First, financial expertise (*Expertise_Women*) is defined as the proportion of women directors with experience (past or present) as an executive officer in a bank or insurance company (CEO, CFO, CRO), or in an academic institution (e.g. professor in finance, accounting, economics, or business) (Güner et al., 2008; Aebi et al., 2012; Minton et al., 2014). It is measured as the number of women directors with financial expertise to the total women directors on the board. To capture nationality (*Foreign_Women*), this study uses the number of foreign women directors (i.e.

number of foreign nationals) to the total number of women members on the board (Bennouri et al., 2018; Gull et al., 2018). Educational level is measured using the number of women directors holding a postgraduate degree, such as a PhD and/or Master's degree (e.g. MA, MSc, or MBA) to the total number of women members on the board (*PostGrad_Women*), (Bennouri et al., 2018; Gull et al., 2018). Moreover, to capture women directors' educational background and culture, this study uses the number of women directors who graduated from foreign universities to the total number of women directors (*Inter_Univ_Women*). Chen et al. (2019b) found a positive significant market reaction to the appointment of academic alumni from foreign universities to the board because they bring foreign academic experience to the boardroom in terms of management codes and practices. For educational specialism, this study uses the number of women with an academic qualification in finance and/or accounting and/or Islamic finance to the total number of women members on the board (*Acc&Fin_Women*). This indicator is adopted as an alternative measure of financial expertise for two reasons. First, women's expertise is an essential attribute of women directors (Nekhili and Gatfaoui, 2013). Second, women have fewer opportunities to attain executive positions than men (Nekhili and Gatfaoui, 2013; Berger et al., 2014).[44]

6.6.3 Control variables

First, the control variables include corporate governance characteristics. Board size (*BODSIZE*) is calculated as the natural logarithm of the total number of board members (Sun and Liu; 2014; Sila et al., 2016; Gull et al., 2018; Elnahass et al., 2020). To examine the role of the board, this study controls for board independence (*Indep*), measured using the percentage of independent (non-executive) directors on the board (Sun and Liu, 2014; Sila et al., 2016). In addition, following the corporate governance literature, this study controls for CEO power using a dummy variable (*CEODUAL*) that takes the value of 1 if the CEO is the chairperson of the board and zero otherwise (Pathan, 2009; Abedifar et al., 2013; Sun and Liu, 2014; Mollah and Zaman, 2015; Mollah et al., 2017). This study further controls for CEO gender as in most previous gender diversity studies by using a dummy variable (*CEO_Women*) equal to 1 if the CEO is female and zero otherwise (Baixauli-Soler et al., 2015; Bennouri et al., 2018; Gull et al., 2018; Cardillo et al., 2020).

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[44] Sealy and Doherty (2012) found that women directors may have more financial experience (i.e. 57% of women directors were more likely to have a financial qualification and background than men when appointed to boards in FTSE 100 companies). They stated that financial qualifications were a "springboard" for women to board positions, because they may be hired to moderate the risky actions of men. They also indicated that such a finance background provides the impression that these women are not dissimilar from their men colleagues as they have the suitable language and obvious knowledge, thus beating the enduring stereotypes of women in the workplace.

Next, in terms of bank-level variables, following previous literature on bank risk (e.g. Pathan, 2009; Berger et al., 2014; Sun and Liu, 2014; Cardillo et al., 2020; Elnahass et al., 2020a; Palvia et al., 2020), this study utilizes a number of control variables including growth, bank value, capitalization, and bank size, to control for the effects of the specific institutional influences on bank risk (Palvia et al., 2020). Thus, this study controls for the market valuation for each bank using the logarithmic value of Tobin's Q (*LogTobi"s Q*) (Pathan, 2009; Sun and Liu, 2014; Cardillo et al., 2020). This study also controls for capital expenditure (*LOG(CAPEX/TA)*) (Sila et al., 2016; Nadeem et al., 2019; Elnahass et al., 2020a) as an indicator of investment and growth opportunities (Nadeem et al., 2019). To control for bank capitalization, this study uses the equity-to-assets ratio (*EQ/TA*) (Pathan, 2009).

To control for bank complexity, the model computes the bank size (*LogTA*) using the natural logarithm of the total assets of a bank at the end of the fiscal year measured in thousands of USD (Baixauli-Soler et al., 2015; Sila et al., 2016; Trinh et al., 2020), and bank age (*LogAGE*) using the difference between the sample year and the bank establishment year (Pathan and Skully, 2010; Sila et al., 2016). Furthermore, bank leverage (*LEVERAGE*) is calculated using total liabilities divided by total equity (Sun and Liu, 2014; Trinh et al., 2020).

To control for the different bank types (Islamic vs conventional), the model uses a dummy variable (*IB*), which takes the value of 1 if the bank is Islamic and zero otherwise. Moreover, this study controls for banks with an Islamic window to differentiate between fully conventional banks and those conventional banks with some Islamic functions. The Islamic window dummy variable (*WINDOW*) takes the value of 1 if the conventional bank has an Islamic window and zero otherwise (Abedifar et al., 2013).

To address environmental and institutional management at the country level, this study first uses the annual gross domestic product (*GDP*) to control for development in the cross-country data (Berger et al., 2014; Mollah et al., 2017). Then, the analysis uses the six Worldwide Governance Indicators (World Bank, 2016) to capture the quality of national governance, estimating the level of the governance index (*Governance_Index*). This index is calculated through the average of six governance measures (regulatory quality, rule of law, control of corruption, political stability, governance effectiveness, voice, and accountability) (Čihák and Hesse, 2010; Elnahass et al., 2020a). Each governance measure index ranges from -2.5 (weak) to 2.5 (strong) for governance performance; greater values indicate better governance. Consequently, using this index captures the quality of national governance and the extent to which it affects bank risk. To control for risks in the banking sector in each country, the mode

uses the Herfindahl–Hirschman index (*HHI*) (Abedifar et al., 2013). The definitions of all variables and notations are shown in Appendix A.

6.6.4 Empirical model

Previous corporate governance literature has reported that endogeneity affects the association between board characteristics and firm/bank risk and value (Wintoki et al., 2012; Elyasiani and Zhang, 2015; Sila et al., 2016; Bennouri et al., 2018). The appointment of women directors to the board is an endogenous feature (not exogenous) that varies based on the firm and self-selection (Adams, 2016). Furthermore, the board structure is selected and created by firms to increase their benefits and thus variables are inclined to be endogenous and random (Sila et al., 2016). To solve the endogeneity issue, most previous studies on board characteristics (e.g. Baixauli-Soler et al., 2015; Sila et al., 2016; Cardillo et al., 2020) have tested and used numerous models in their estimations of the effects of variables on bank risk.[45] This study applies 3SLS estimation and IVs, following Elyasiani and Zhang (2015) and Trinh et al. (2019), in studying the relation between board characteristics, governance mechanisms, and bank risk.[46] Country and year fixed effects are employed to control for unobserved country/year attributes for all models.

In addition, to control for other endogeneity issues, several additional procedures are employed. First, this estimation controls for specific bank, governance, and country-level variables in all models to mitigate extra endogeneity issues, such as omitted variable bias. To control for selection bias, PSM is used. Next, the independent variables are lagged one year to deal with the potential for reverse causality causing endogeneity. Finally, this study examines alternative risk and gender diversity proxies to demonstrate that there are no inaccuracies in the main analysis.

This study employs two IVs for board diversity (for details, see section 4.5.4). The first IV is the women's labour force participation rate divided by the male labour force participation rate in each country for each given year (World Bank data) (Chen et al., 2017; Cardillo et al., 2020). The country's income level is the second IV (World Bank data), comprising a dummy variable equal to 1 if the country is classified as middle to high income and zero otherwise (Elnahass et al., 2020a).

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[45] See footnote 18.
[46] The Wu–Hausman endogeneity test was performed through all models to test for endogeneity. The test statistics indicate the presence of endogeneity bias.

There is less likelihood of endogenous influence from country-level variables on individual banks' risk, but the IVs may indirectly affect bank risk. Indeed, the two IVs may be associated with the endogenous variables and indirectly predict bank risk through their influence on the endogenous variables (see Black et al., 2006).

Following Elyasiani and Zhang (2015) and Elnahass et al. (2020a), to test the hypotheses of the possible effect of gender diversity on bank risk, this estimation builds a simultaneous equations model, Eq. (6.1) and Eq. (6.2), treating the percentage of women directors and risks as the endogenous variables respectively. The first equation, Eq. (6.1), estimates the impact of gender diversity on bank risk, whereas the second equation, Eq. (6.2), estimates the impact of bank risk on gender diversity. The equations estimated for banks are as follows:

$$Risk_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.2)$$

$$WOMEN_{it} = \beta_0 + \beta_1 Risk_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.3)$$

where $Risk_{it}$ is Insolvencyy risk, credit risk, and equity risk for bank i at year t. $WOMEN_{it}$ is the percentage of women directors to the total number of board members. $CONTROLS_{it}$ is the vector of control variables in bank i in year t and ε_{it} denotes the remaining disturbance term.

6.7 Results

6.7.1. Descriptive statistics

Table 6.2 illustrates the summary statistics for the full sample and sub-samples of fully Islamic and fully conventional banks, as well as conventional banks with Islamic windows. In the full sample, the findings show that the sample banks on average have a negative mean for the 1/Z-score of -4.002, but the credit risk and equity risk mean values are positive at 1.559 and 0.107 respectively. Regarding the board diversity indicators, the mean representation for women directors (*WOMEN*) is 7.1% for the full sample, which is less than the mean values found by García-Meca et al. (2015) of 10.22% for European/US banks. In terms of women directors' attributes, the proportion of independent women directors to total women directors is 6.5%, with 3.5% of women holding a chair position. This is consistent with Nekhili and Gatfaoui (2013) and Bennouri et al. (2018) for non-financial French firms, who found that the majority of women directors are not independent but are appointed to the board from inside the banks. Of the women directors in the sample, 21% have financial expertise and the average proportion of foreign women directors is 4%. Regarding demographic attributes, the greatest values are for women with a PhD and/or a Master's degree (*PostGrad_Women*) at

75% of the total number of women directors. Related to educational specialization and qualifications, 15% of women directors graduated from foreign universities, while 12% had an accounting or finance qualification.

Categorizing the full sample by different bank types (Islamic vs conventional), while controlling for banks with Islamic windows, the average values and the two-sample *t*-test show that Islamic banks have a higher mean value for insolvency, and greater credit but lower equity risk than full-fledged conventional banks, which is consistent with Trinh et al. (2020). Regarding the gender diversity indicators, conventional banks show a higher proportion of women directors at 8.8%, compared to 4.1% for Islamic banks. Comparing women directors' attributes, Islamic banks have a higher representation of independent women to total women (foreign women) directors at 10.3% (5.6%) than conventional banks 6.6% (4.6%) respectively. Given the niche and small size of Islamic banks, the findings can be explained by the high concentration of a few women directors in Islamic banks, who seem to dominate the industry and be recruited by international Islamic banks. In terms of women directors' education, for women who graduated from foreign universities, Islamic banks (conventional banks) show similar means of 14% (15%). However, the average proportion of women directors with a postgraduate degree (PhD or Master's) in Islamic banks is 80% and with an accounting or finance qualification the proportion is 13.8%, less than the mean values for conventional banks (95% and 14.6% respectively). For the control variables (governance, financial), *CEODUAL* and *CEO_Women* present higher average values for conventional banks than Islamic banks. However, *Indep* has a greater mean value for Islamic banks than conventional banks. In line with prior studies (e.g. Beck et al., 2013; Elnahass et al., 2018), Islamic banks are younger in age, seem to be less leveraged, and are smaller in size than conventional banks.

Variable	N	Full Sample		Islamic Banks Sample Mean	Conventional Banks Sample Mean	Two-sample t-test (two-tailed)	Conventional Banks with Islamic Windows Sample Mean
		Mean	Standard Deviation				
Insolvency risk log (1/Z-score)	787	-4.002	1.077	-3.765	-4.027	-3.051***	-4.136
Credit risk (LLR/GL)	805	1.559	0.532	1.656	1.568	-2.147**	1.475
Equity risk (ER)	827	0.107	0.054	0.096	0.112	3.376***	0.109
WOMEN	824	0.071	0.106	0.041	0.088	5.495***	0.066
Indep_Women	827	0.065	0.239	0.103	0.066	-2.085**	0.033
Chair_Women	818	0.035	0.185	0.073	0.037	-2.464***	0
Expertise_Women	825	0.212	0.379	0.124	0.318	4.135***	0 .098
Foreign_Women	827	0.040	0.187	0.056	0.046	-1.278	0 .014
PostGrad_Women	816	0.749	2.380	0.796	0.950	-0.282	0.262
Inter_Univ_Women	827	0.145	0.325	0.151	0.142	-0.262	0.153
Acc&Fin_Women	827	0.115	0.301	0.138	0.146	-1.126	0.038
BODSIZE	824	2.347	0.233	2.333	2.369	1.015	2.325
Indep	827	0.338	0.170	0.391	0.302	-4.515***	0.355
CEODUAL	805	0.179	0.383	0.084	0.224	4.765***	0.187
CEO_Women	824	0.057	0.232	0.041	0.093	1.177	0.005
LOG(CAPEX/TA)	774	0.135	0.399	0.127	0.139	0.301	0.132
EQ/TA	827	12.943	4.727	14.416	11.61	-5.005***	14.069
LogTobi''s Q	753	0.148	0.092	0.177	0.137	-3.980***	0.140
LogAGE	730	3.402	0.672	3.067	3.544	6.971***	3.416
LEVERAGE	819	7.824	3.307	7.698	8.128	0.473	7.400
LogTA	820	15.159	2.621	14.826	15.100	2.031**	15.576
IB	827	0.236	0.425				
WINDOW	811	0.264	0.441				
GDP	826	1.636	3.377				
Governance_Index	826	-0.24	0.467				
HHI	826	0.217	0.124	0.233	0.205	-1.617*	0.240

Note: The table presents descriptive statistics for all variables used in the models for the full sample and sub-samples for each bank type. The sample period is between 2010 and 2017. N is the number of bank-year observations. Mean is the mean value. The paired sample means test (t-test) results are also reported. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses. See Appendix A for variable definition.

Table 6.2. Descriptive statistics for variables in the main tests – Study 3

Table 6.3 shows the Pearson pair-wise correlation coefficients matrix for all variables for the full sample. The table indicates no multicollinearity problems as the correlation coefficients for all variables are smaller than 0.8 (Elnahass et al., 2020).[47]

Table 6.4 shows the mean values for the proportions and attributes for women directors in each of the years 2010–2017. The table shows an increase in mean women's representation from 2010 to 2011, declining in 2012, then increasing. Overall, the results present a steady increase in the proportion of women on the board throughout this period. As stated by Pathan and Faff (2013), the crisis had a remarkable effect on banking as it drew more public awareness to the quality of corporate governance mechanisms. The growth in the number of women directors is the result of stakeholders' requirements, aimed at enhancing the representation of women on the board and promoting inclusivity, and is a worldwide phenomenon (Bennouri et al., 2018).

The average proportion of independent women directors rises over the years. Women in leadership positions (i.e. *Chair_Women*) presents variations throughout the study period. The proportion of women directors with financial expertise drops dramatically from 2010 to 2012, increases for the next three years, then fluctuates. The average proportion of foreign women directors increases over the years, then drops in the last two. The mean number of women with a postgraduate qualification (*PostGrad_Women*) falls over the first three years of the sample period, then increases over the later years. In contrast, the mean number of women directors who graduated from foreign universities increases over time and the mean of those with finance or accounting qualifications remains quite unchanged over the sample period.

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[47] The variance inflation factor (VIF) values (not reported) show that each variable's VIF is lower than 10% and the mean of VIF values is lower than 6%, demonstrating that there are no multicollinearity issues.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	1.000											
(2)	0.090*	1.000										
(3)	0.255*	-0.137*	1.000									
(4)	0.065	-0.024	0.297*	1.000								
(5)	0.079*	0.084*	0.020	0.133*	1.000							
(6)	-0.024	-0.087*	0.104*	0.205*	0.140*	1.000						
(7)	-0.070*	-0.019	0.075*	0.493*	0.160*	0.229*	1.000					
(8)	-0.033	0.165*	-0.030	0.129*	0.302*	-0.042	0.128*	1.000				
(9)	0.057	0.099*	0.072*	0.256*	0.375*	0.021	0.147*	0.381*	1.000			
(10)	-0.036	0.046	-0.034	0.395*	0.371*	0.309*	0.317*	0.097*	0.162*	1.000		
(11)	-0.112*	0.074*	-0.086*	0.221*	0.241*	0.330*	0.397*	0.121*	0.039	0.548*	1.000	
(12)	-0.019	0.058	-0.217*	-0.016	0.052	-0.111*	0.028	0.072*	0.122*	0.057	0.098*	1.000
(13)	0.004	-0.015	-0.045	-0.137*	0.264*	0.178*	-0.078*	0.065	0.038	0.060	0.008	-0.298*
(14)	-0.039	-0.292*	0.359*	0.358*	-0.118*	0.153*	0.178*	-0.102*	-0.035	0.088*	0.108*	-0.399*
(15)	-0.079*	0.033	-0.032	0.275*	0.075*	0.350*	0.357*	0.133*	0.056	0.080*	0.183*	-0.085*
(16)	0.085*	0.045	0.195*	-0.014	-0.005	-0.027	-0.040	0.067	0.019	-0.067	-0.026	-0.039
(17)	-0.138*	-0.165*	-0.304*	-0.284*	0.054	-0.018	-0.059	0.103*	-0.112*	0.013	0.065	-0.225*
(18)	-0.088*	-0.195*	-0.044	-0.028	-0.086*	-0.000	0.002	-0.059	-0.078*	0.068	0.047	-0.182*
(19)	-0.216*	0.130*	-0.036	0.090*	-0.015	0.186*	0.182*	0.063	0.108*	0.114*	0.152*	-0.015
(20)	0.244*	0.036	0.212*	0.006	0.055	-0.135*	-0.039	-0.027	0.187*	-0.045	-0.044	0.151*
(21)	-0.253*	-0.109*	-0.228*	-0.074*	-0.026	0.006	0.049	-0.029	0.025	0.058	0.077*	0.126*
(22)	0.117*	0.098*	-0.111*	-0.154*	0.087*	0.111*	-0.128*	0.051	0.011	0.010	0.043	-0.035
(23)	-0.075*	-0.099*	0.020	-0.030	-0.084*	-0.117*	-0.179*	-0.086*	-0.125*	0.010	-0.155*	-0.058
(24)	0.165*	-0.140*	0.461*	0.300*	-0.071*	0.114*	0.117*	-0.072*	0.082*	0.049	-0.040	0.050
(25)	-0.114*	-0.210*	-0.253*	-0.197*	0.011	0.006	-0.006	0.061	-0.102*	1.000	1.000	1.000
(26)	-0.005	0.121*	-0.170*	-0.186*	0.153*	-0.072*	-0.063	0.061	0.014	0.548*	0.098*	-0.298*

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
(13)	1.000													
(14)	-0.066	1.000												
(15)	0.024	0.105*	1.000											
(16)	-0.054	0.037	-0.044	1.000										
(17)	0.544*	-0.045	0.004	-0.036	1.000									
(18)	0.066	0.131*	-0.024	0.165*	0.207*	1.000								
(19)	-0.202*	0.081*	0.121*	-0.013	-0.076*	-0.109*	1.000							
(20)	-0.226*	-0.044	-0.094*	0.031	-0.412*	-0.439*	-0.034	1.000						
(21)	-0.022	-0.068	-0.057	-0.791*	0.112*	-0.100*	0.182*	-0.035	1.000					
(22)	0.173*	-0.137*	-0.037	-0.011	0.173*	0.170*	-0.271*	-0.021	-0.070*	1.000				
(23)	0.061	0.007	-0.137*	-0.004	0.140*	-0.045	0.008	-0.064	0.095*	-0.328*	1.000			
(24)	-0.238*	0.216*	-0.052	-0.032	-0.494*	-0.093*	-0.008	0.245*	0.040	-0.200*	0.080*	1.000		
(25)	1.000	1.000	0.035	0.002	0.673*	0.250*	0.031	-0.440*	0.146*	0.157*	-0.053	-0.321*	1.000	
(26)	-0.066	0.105*	-0.011	0.199*	0.452*	0.085*	-0.073*	-0.150*	-0.261*	0.048	0.079*	-0.377*	0.249*	1.000

Note: The table presents the Pearson pair-wise correlation matrix for the full sample (2010–2017). This table shows no multicollinearity problems between variables. * indicates significance at the 0.05 level. (1) Insolvency risk log (1/Z-score), (2) Credit risk LLR/GL, (3) Equity risk MR, (4) WOMEN, (5) Indep_Women, (6) Chair_Women, (7), Expertise_Women, (8) Foreign_Women, (9) PostGrad_Women, (10) Inter_Univ_Women, (11) Acc&Fin_Women, (12) BODSIZE, (13) Indep, (14) CEO_ Women, (15) CEODUAL, (16) LOG(CAPEX/TA), (18) LogAGE, (19) LEVERAGE, (20) LogTA, (21) IB, (22) WINDOW, (23) CRISIS, (24) GDP, (25) Governance_Index, (26) HHI.

Table 6.3. Full sample Pearson pair-wise correlation matrix for all variables – Study 3

Year	N	WOMEN	N	Indep_Women	N	Chair_Women	N	Foreign_Women	N	Expertise_Women	N	PostGrad_Women	N	Inter_Univ_Women	N	Acc&Fin_Women
2010	81	0.069	81	0.042	81	0.025	81	0.030	81	0.181	81	0.614	81	0.109	81	0.110
2011	93	0.074	93	0.048	93	0.032	93	0.027	93	0.193	93	0.572	93	0.121	93	0.126
2012	106	0.058	106	0.050	106	0.038	106	0.029	106	0.192	106	0.543	106	0.097	106	0.109
2013	110	0.066	110	0.059	110	0.037	110	0.043	110	0.223	110	0.606	110	0.127	110	0.120
2014	113	0.071	148	0.065	113	0.036	113	0.056	113	0.236	113	0.714	113	0.132	113	0.125
2015	114	0.077	114	0.073	114	0.035	114	0.054	114	0.246	114	0.921	114	0.174	114	0.121
2016	114	0.084	114	0.083	114	0.044	114	0.036	114	0.229	114	0.950	114	0.202	114	0.120
2017	108	0.075	108	0.083	108	0.028	108	0.038	108	0.184	108	0.906	108	0.207	108	0.111

Note: This table presents the number of observations (N) and the average value for each of the women directorships attributes measures for the years 2010 to 2017.

Table 6.4. Average board diversity values by year – Study 3

6.7.2 Empirical results for women directors and bank risk

Considering first the findings for gender diversity and bank risk, Table 6.5 presents the results of the 3SLS estimations for the association of women directors with risk proxies for the full sample, examining the first study hypothesis, H_1. In Model 1, the coefficient for *WOMEN* is negatively and significantly associated with insolvency risk (*log 1/Z-score*), indicating that a higher proportion of women is associated with lower bank default risk. Regarding loan portfolio risk (*LLR/GL*), Model 2 shows significant and negative associations between women directors and credit risk. This result is in line with Dong et al. (2017), who found that the presence of women directors in Chinese banks was negatively related to nonperforming loans (NPLs). Similarly, Model 3 shows a significant and negative association with the proxy of equity risk (*ER*) and women's representation on bank boards. This means women's participation on the board is associated with reduced stock return volatility, consistent with prior studies for non-financial firms (Jizi and Nehme, 2017; Bernile et al., 2018; Nadeem et al., 2019).

In terms of control variables, *Indep* is associated significantly and positively with higher credit risk, in line with Trinh et al. (2020), and also with equity risk (Pathan, 2009). Likewise, *CEO_ Women* exhibits a marginally positive relationship with risk indicators. Moreover, in a meta-analysis of 146 studies, Jeong and Harrison (2017) reported that women CEOs were negatively associated with equity risk (stock return volatility). *LOG(CAPEX/TA)* shows a positive relationship with insolvency risk. Finally, large banks (*LOGTA*) are related to lower insolvency risk and lower equity risk, consistent with Pathan (2009) and Beck et al. (2013).

Together, the results suggest that women's representation on bank boards is on average negatively associated with several bank risk measures. These findings are consistent with agency, resource dependence, and upper echelons theories, suggesting that women directors monitor risk activities and are associated with enhanced decision-making concerning the provision of access to new resources, as well as the mitigation of risk in investment strategies. The findings are relevant for banks seeking new markets and areas of activities, as they suggest characteristics that may be valuable when selecting women directors. This study findings are consistent with this study's predictions of a negative association between women directors and bank risk for this study sample's banks, supporting H_1 (Figure 6.1).

VARIABLE	(1) Insolvency risk log (1/Z-score)	(2) Credit risk (LLR/GL)	(3) Equity risk (ER)
WOMEN	-0.147**	-0.107***	-0.011*
	(0.020)	(0.002)	(0.076)
BODSIZE	0.608*	0.305*	-0.010
	(0.083)	(0.096)	(0.524)
Indep	0.625	0.836**	0.077*
	(0.367)	(0.023)	(0.051)
CEODUAL	-0.345	-0.015	-0.014
	(0.217)	(0.804)	(0.199)
CEO_Women	1.137*	1.064***	0.095*
	(0.075)	(0.003)	(0.092)
LOG(CAPEX/TA)	-1.222***	0.096	-0.014
	(0.000)	(0.231)	(0.205)
LogTobin's Q	-0.140	-0.516	0.046
	(0.814)	(0.185)	(0.396)
EQ/TA	-0.473***	-0.120	-0.005
	(0.009)	(0.269)	(0.112)
LogAGE	-0.047	0.049	-0.005
	(0.607)	(0.159)	(0.354)
LEVERAGE	-0.009	-0.019	-0.010
	(0.818)	(0.315)	(0.132)
LogTA	-0.198***	0.002	-0.010**
	(0.000)	(0.881)	(0.025)
IB	0.199*	0.085	-0.005
	(0.092)	(0.119)	(0.387)
WINDOW	0.013	0.085	0.009
	(0.950)	(0.477)	(0.669)
GDP	-0.008	0.001	0.010
	(0.665)	(0.923)	(0.938)
Governance_Index	0.901**	-0.016	0.036
	(0.030)	(0.941)	(0.158)
HHI	0.096	0.039	-0.011
	(0.801)	(0.765)	(0.656)
Constant	4.737	2.740	0.407**
	(0.156)	(0.133)	(0.014)

Wald chi^2	142***	354***	365***
LM statistic (p-value)	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.631	0.169	0.162
Observations	576	573	580
Country FE	Yes	Yes	Yes
Year FF	Yes	Yes	Yes

Note: The table presents 3SLS results for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$Risk_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it}$ (6.2)

$WOMEN_{it} = \beta_0 + \beta_1 Risk_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it}$ (6.3)

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification test p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.5. Test for the effect(s) of the proportion of women directors on bank risk for the full sample

Turning to women directors' attributes (monitoring and demographics) and bank risk, Table 6.6 shows the results for the other two hypotheses (H_2 and H_3), reported in relation to the four models for each risk proxy. Model 1 tests the monitoring hypothesis (independence and leadership; $H_{2a, b}$), whereas the other two models show the results for the hypothesis concerning demographic attributes (Model 2 and Model 3: financial expertise, foreign nationality, higher educational qualifications).

Model 1 presents the monitoring attributes and shows a significant and negative association between the presence of independent women directors (*Indep_Women*) and all bank risk measures: (i) insolvency risk (*log 1/Z-score*); (ii) credit risk (*LLR/GL*); (iii) equity risk (*ER*). These findings suggest that independent women directors are negatively associated with bank risk. This is in line with Vallascas et al. (2017), who found that the greater the number of independent directors (i.e. without capturing the effect of gender specification for directors), the lower the bank risk.

Model 2 considers the association of women directors' demographic attributes (expertise and foreign) with bank risk. First, the results show that women directors with financial expertise (*Expertise_Women*) have a positive association with bank risk (insolvency risk, credit risk, equity risk), indicating that a higher percentage of women with financial expertise on the board is associated with higher bank risk. This in line with Menton et al. (2014), who found that directors (i.e. regardless their gender) with financial expertise increase bank risk. In addition, Model 2 shows that the percentage of foreign women directors (*Foreign_Women*) has a significantly positive association with insolvency risk and equity risk.

However, Model 3 shows that there is a significantly negative association between women directors with postgraduate qualifications (PhD and/or Master's degree, or MBA; *Post_Grad_Women*) and all risk proxies. Women directors with accounting and finance qualifications (*Acc&Fin_Women*) also shows significant negative association with insolvency and equity risk, with marginal evidence for reducing credit risk. This indicates that women directors' qualifications (higher education and accounting and finance degrees) are negatively associated with bank risk.[48] This finding is consistent with expectations. Given the highly complex environment in which banks operate, better education may benefit the directors in terms of understanding and ability to engage in advanced risk management and evaluation, thus affecting the bank's risk policies (Srivastav and Hagendorff, 2016). Nevertheless, this

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[48] In further sensitivity analyses, this study included only directors holding a PhD and the outcomes were consistent with those for directors holding any postgraduate qualification.

study finds women directors who graduated from foreign universities (*Inter_Univ_Women*) are associated significantly and positively with all types of bank risk. The findings suggest that women directors who have studied in international universities may not be perceived to have a clear understanding of the of main principles, standards and regulations in the country of the bank headquarters. Moreover, they may actually be unaware of the local regulations and standards (Masulis et al., 2012). Weak knowledge of the country's governance standers and regulations / legislations leads to monitoring costs and high agency costs, along with regulatory costs. Consistent with the previous literature, woment directors who graduated from international universities may act and behave in a particular way, resulting in high communication costs and lower quality of boardroom discussions (see García-Meca et al., 2015).

Overall, these findings show that gender diversity on the board is consistently significantly and negatively associated with bank risk. However, regarding women directors' attributes, these results demonstrate a different association with bank risk. In terms of the monitoring attribute, this study finds that independent women directors are associated with lower bank risk, consistent with expectations, whereas women in leadership roles tend to have an insignificant association with bank risk. However, it seems that appointing foreign women board directors is associated with increased risk in banks, an association this study attributes to their lesser familiarity with local regulations and lack of understanding of the language and culture, which leads to less effective monitoring (Dong et al., 2017). Moreover, Masulis et al. (2012) found low attendance at board meetings for foreign members (irrespective of their gender) again resulted in less effective corporate governance.

In contrast, women directors with a high educational level and accounting and finance education are negatively associated with bank risk. This study follows Audretsch and Lehmann (2006) and Francis et al. (2015) in attributing this to academically qualified directors presenting a greater level of social responsibility and greater commitment to ethical matters than professional directors working in different disciplines. In addition, as a result of the critical thinking skills developed by highly educated directors and those with relevant business qualifications, the monitoring and counselling function may be enhanced such that women directors offer new opinions and innovative solutions. However, women directors with financial expertise and those with international qualifications are positively associated with bank risk.

To sum up, the arguments made here are supported by empirical evidence, leading us to accept H_{2a} but reject H_{2b}, namely that the presence of independent women directors mitigates

bank risk, whereas women in the chairperson role show insignificant evidence in mitigating risk. In contrast, for H$_3$, the outcomes do not indicate any specific direction concerning the expected relationship (see Figure 6.1).[49] The findings support and are in line with the theoretical argument (see sections 6.3 and 6.4), highlighting that particular characteristics of women directors, namely independence women directors, those who are highly educated or have business qualifications monitor risky behaviour, promote decision-making processes, and provide access to new resources.

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[49] In separate unreported robustness tests, Qatar was dropped because it has zero women's representation and the results in Table 6.4 and Table 6.6 remained consistent with the main findings.

VARIABLE	(1) Insolvency risk log (1/Z-score)	(2) Insolvency risk log (1/Z-score)	(3) Insolvency risk log (1/Z -score)	(4) Credit risk (LLR/GL)	(5) Credit risk (LLR/GL)	(6) Credit risk (LLR/GL)	(7) Equity risk (ER)	(8) Equity risk (ER)	(9) Equity risk (ER)
WOMEN	-0.136*	-0.182***	-0.090***	-0.127***	-0.089**	-0.120***	-1.040***	-1.627***	-0.635**
	(0.057)	(0.000)	(0.009)	(0.008)	(0.010)	(0.000)	(0.001)	(0.000)	(0.018)
Indep_Women	-8.269***			-1.738***			-0.115**		
	(0.000)			(0.001)			(0.025)		
Chair_Women	0.625			0.222			-0.002		
	(0.241)			(0.366)			(0.926)		
Expertise_Women		0.138***			0.075**			0.013**	
		(0.000)			(0.034)			(0.028)	
Foreign_Women		1.075***			0.311***			0.009***	
		(0.000)			(0.001)			(0.007)	
PostGrad_Women			-1.582***			-0.648***			-0.033**
			(0.007)			(0.005)			(0.025)
Inter_Univ_Women			3.476***			2.341***			0.132***
			(0.000)			(0.000)			(0.004)
Acc&Fin_Women			-1.896***			-0.529*			-0.054***
			(0.007)			(0.054)			(0.002)
BODSIZE	-0.024	0.475	2.591***	0.227	0.045	0.602*	-0.024	-0.014	0.009
	(0.939)	(0.233)	(0.009)	(0.136)	(0.486)	(0.097)	(0.126)	(0.241)	(0.721)
Indep	2.667***	0.145	1.292	1.276***	0.108	1.227**	0.051**	0.059**	0.061*
	(0.001)	(0.834)	(0.273)	(0.004)	(0.520)	(0.033)	(0.048)	(0.012)	(0.066)
CEODUAL	-0.558**	0.001	-0.298	-0.065	0.008	-0.039	-0.010	-0.011	-0.010
	(0.023)	(0.995)	(0.222)	(0.484)	(0.893)	(0.685)	(0.243)	(0.254)	(0.178)
CEO_Women	2.136***	-2.370***	2.474***	1.460***	-0.506**	1.761***	0.109***	0.008	0.088**
	(0.003)	(0.000)	(0.002)	(0.004)	(0.026)	(0.001)	(0.002)	(0.814)	(0.013)
LOG(CAPEX/TA)	-0.523*	-2.747***	-0.762**	0.104	0.067	0.266*	-0.015*	-0.026	-0.005
	(0.061)	(0.000)	(0.013)	(0.181)	(0.622)	(0.052)	(0.088)	(0.130)	(0.651)
LogTobin's Q	-0.666	-0.957	-0.275	-0.714**	-1.135***	-0.965**	0.020	0.037	-0.016
	(0.312)	(0.355)	(0.820)	(0.032)	(0.006)	(0.011)	(0.378)	(0.326)	(0.530)
EQ/TA	-0.551***	-0.199	-0.678***	-0.147	-0.033*	-0.269**	-0.031***	-0.004**	-0.000
	(0.008)	(0.142)	(0.001)	(0.275)	(0.093)	(0.011)	(0.000)	(0.021)	(0.933)
LogAGE	-0.047	-0.222*	0.178	0.052	0.025	0.168**	-0.003	-0.006	0.003
	(0.569)	(0.081)	(0.207)	(0.133)	(0.405)	(0.012)	(0.370)	(0.287)	(0.595)
LEVERAGE	0.108**	0.001	0.183**	-0.034	-0.088**	-0.010	-0.002	-0.008*	0.002
	(0.024)	(0.967)	(0.018)	(0.118)	(0.011)	(0.708)	(0.167)	(0.054)	(0.591)

LogTA	-0.132**	-0.310***	-0.168**	-0.007	0.004	-0.010	-0.008***	-0.012***	-0.007***
	(0.015)	(0.000)	(0.012)	(0.713)	(0.814)	(0.994)	(0.000)	(0.001)	(0.000)
IB	0.316**	0.178	0.559**	0.125**	0.032	0.283**	-0.004	-0.005	0.005
	(0.017)	(0.137)	(0.035)	(0.021)	(0.594)	(0.029)	(0.281)	(0.644)	(0.550)
WINDOW	-0.052	0.680***	-0.229	0.202	0.004	0.012	0.011	0.023	-0.009
	(0.829)	(0.004)	(0.125)	(0.245)	(0.976)	(0.856)	(0.293)	(0.140)	(0.123)
GDP	0.010	-0.004	-0.003	-0.001	0.011	-0.005	-0.010	-0.020	-0.007
	(0.633)	(0.818)	(0.882)	(0.927)	(0.954)	(0.627)	(0.673)	(0.977)	(0.838)
Governance_Index	1.490***	0.436	0.102	-0.099	-0.131	-0.593*	0.033*	0.033	0.030*
	(0.002)	(0.523)	(0.884)	(0.658)	(0.581)	(0.088)	(0.092)	(0.275)	(0.083)
HHI	1.997***	0.492	0.154	-0.004	0.005	-0.133	-0.013	-0.003	-0.007
	(0.009)	(0.448)	(0.734)	(0.975)	(0.950)	(0.501)	(0.470)	(0.868)	(0.650)
Constant	4.025	3.290	0.848	3.569	2.922***	3.996***	0.790***	0.431***	0.127
	(0.279)	(0.197)	(0.757)	(0.133)	(0.000)	(0.004)	(0.000)	(0.000)	(0.211)
Wald chi^2	145***	144***	89***	273***	206***	156***	411***	246***	373***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.145	0.199	0.863	0.117	0.147	0.860	0.125	0.121	0.910
Observations	570	576	570	567	566	567	581	580	574
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents 3SLS results for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$$Risk_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.2)$$
$$WOMEN_{it} = \beta_0 + \beta_1 Risk_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.3)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including women directors' attributes, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has Islamic window and zero otherwise. Models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification test p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.6. Test for the effect(s) of the proportion of women directors and women directors' attributes on bank risk for the full sample
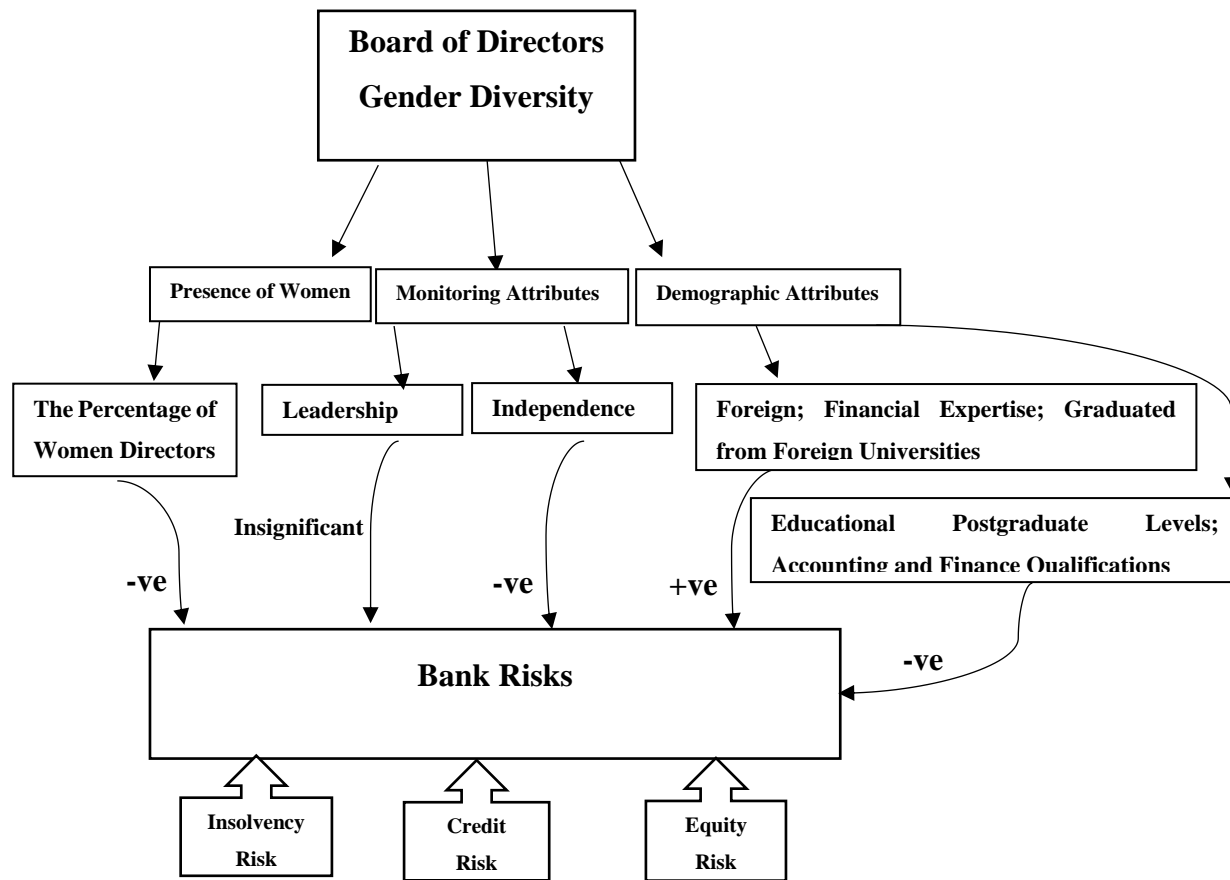
Figure 6.1. Thesis objective 3: Results for the association of board gender diversity with bank risk

(Note: +ve refers to a positive association and -ve refers to a negative association.)

6.8 Additional Analyses

This section reports further analyses aimed at distinguishing between different institutional bank features linked to bank type and dissimilar business models in terms of arbitrating the estimation relations between the representation of women directors and diverse attributes related to monitoring/demographic attributes and bank risk. In addition, the impact of the presence of women directors on the effectiveness of risk management is tested.

6.8.1 Effect of different bank types

This study expands on previous studies of bank risk (e.g. Berger et al., 2014; Dong et al., 2017), which did not evaluate the potential effects of different functional business models based on bank type that would be likely to influence bank risk, specifically concerning the presence of women directors. There are differences in the governance, investment, and finance models and systems between Islamic and conventional banks, but gender diversity has not been previously considered for such comparative assessment (see Abdelsalam et al., 2016; Elnahass et al., 2020a).[50]

In both bank types, the board of directors is responsible for the implementation of strategic decisions, the protection of shareholders' interests, and maximizing bank value. However, for Islamic banks, under the constrained banking model and given the nature of the products/services offered, the board of directors has additional responsibilities related to the establishment of the appropriate *Shari'ah* governance framework, besides the development of relevant policies to ensure that all activities are conducted in compliance with *Shari'ah* law (Elnahass et al., 2020a). Furthermore, additional agency costs are likely to be associated with the Islamic banking model. This is due to the peculiar institutional environment in Islamic banks, including the special bank/depositor relationship.[51] Moreover, additional agency costs arise in Islamic banking since outside directors who are expert in *Shari'ah* legitimacy are scarce worldwide and only a few prominent and expert outside directors dominate the Islamic banking industry. Finally, given the scarcity of male experts in *Shari'ah* able to sit on both boards of directors and SSBs, it is not surprise that there is a lack of women on the boards of directors of Islamic banks and SSBs (see Trinh et al., 2020).

Consequently, this study assumes that women directors will have a different influence on risk for Islamic banks due to their different structure (extended *Shari'ah* authority) and the

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[50] Islamic bank operations are basically driven by a strict banking model, which derives from both ethical and legal responsibilities (Abdelsalam et al., 2016; see section 2.3).

[51] With the absence of representation on the board of directors for depositors, Islamic bank managers have full control of the investment of depositors' funds, which suggests high agency problems.

complexity of their business and investment models, characterized by strict monitoring on the part of investors and depositors due to the higher agency costs compared to their conventional counterparts.

To examine the distinguishing characteristics concerning the association between women directors and different bank types in terms of risk, Table 6.7 shows the re-estimation of the baseline models including interaction terms between the Islamic bank dummy variable and the main independent variables.

Model 1 shows results consistent with the main findings, indicating the significant and negative association of women directors' representation with bank risk after controlling for women directors' attributes/demographics and while capturing the effect of different bank types (*WOMEN_IB*). For insolvency risk, this study finds a negative association with the interaction term, which is marginally significant. However, the absolute value of the magnitude for the *WOMEN_IB* coefficient is less than that for the *WOMEN* coefficient, indicating that women directors have a greater negative association with insolvency risk in conventional banks than in Islamic banks. Moreover, the interaction term *WOMEN_IB* shows an insignificant association with credit risk and a negative association with equity risk. Since the absolute value of *WOMEN_IB* is greater than that of *WOMEN*, women directors are shown to have a stronger negative association with equity risk in Islamic banks than conventional banks.

With respect to women directors' attributes and demographics, the interaction term of women independent directors and Islamic banks (*Indep_Women_IB*) shows a significant and positive association with all bank risk types, indicating that independent women directors increase Islamic bank risk. In contrast, there is a negative association with insolvency risk in conventional banks, albeit with a lesser effect. Moreover, this study finds that bank risk (i.e. insolvency and credit risk) is negatively associated with women's financial expertise for the Islamic bank interaction *Expertise_Women_IB*, but the absolute value of the interaction term is less than for *Expertise_Women*, indicating that women's expertise is associated with an increase in all types of risk in conventional banks. The interaction term for the proportion of foreign women directors and Islamic banks (*Foreign_Women_IB*) is positively associated with all types of bank risk; comparing the absolute value for both coefficients, this study finds that foreign women directors increase Islamic bank risk. Furthermore, this study observes a positive significant association between the interaction term for women directors' higher education (*PostGrad_Women_IB*) and accounting and finance qualifications (*Acc&Fin_Women_IB*) and bank risk. This suggests that women directors with such levels of

education and qualifications have a positive association with bank risk for Islamic banks. However, women directors with international qualifications (*Inter_Univ_Women_IB*) have a negative association with bank risk for this bank type.

To summarize, the findings in this section show additional support for the effect of board gender diversity on bank risk after mitigating differences in bank type, providing new insights related to alternative banking systems and governance and extending earlier studies (e.g. Mollah and Zaman, 2017; Elnahass et al., 2020a; Trinh et al., 2020). On average, the presence of women directors on the boards of both bank types tends to reduce bank risk. There are differential effects for women directors' attributes and demographics among the two bank types. Overall, the results indicate more negative associations between gender diversity and bank risk within the Islamic context than in conventional banking. This study attributes these findings to the complexity of the Islamic banking business model, which requires extended *Shari'ah* governance. There is a scarcity of women directors, worldwide, who are specialized in *Shari'ah* and are thus able effectively to monitor Islamic banks. The low number of women directors in Islamic banks is also verified by the descriptive statistics (see Table 6.2), which show a smaller proportion of women directors in Islamic banks than in conventional banks.

VARIABLES	(1) Insolvency risk	(2) Insolvency risk	(3) Insolvency risk	(4) Insolvency risk	(5) Credit risk	(6) Credit risk	(7) Credit risk	(8) Credit risk	(9) Equity risk	(10) Equity risk	(11) Equity risk	(12) Equity risk
WOMEN	-17.144***	-15.299***	-0.058**	-6.926*	-9.211*	-3.957***	-0.002	-6.494***	-2.322***	-0.582**	-0.638*	-1.595***
	(0.000)	(0.006)	(0.028)	(0.059)	(0.060)	(0.002)	(0.765)	(0.007)	(0.000)	(0.046)	(0.061)	(0.001)
WOMEN*IB	-15.325*				-12.028				-2.482***			
	(0.092)				(0.599)				(0.004)			
Indep_ Women		-10.297***				-0.034				-0.033		
		(0.000)				(0.778)				(0.605)		
Indep_ Women*IB		11.490***				0.848***				0.146*		
		(0.000)				(0.000)				(0.060)		
Expertise_Women			1.209***				1.434***				0.070*	
			(0.000)				(0.000)				(0.059)	
Expertise_Women*IB			-1.176**				-0.948***				-0.016	
			(0.015)				(0.003)				(0.440)	
Foreign_Women			-7.102***				-0.418***				-0.029	
			(0.000)				(0.004)				(0.656)	
Foreign_Women*IB			8.354***				0.482**				0.181**	
			(0.000)				(0.041)				(0.034)	
PostGrad_Women				-1.789***				-0.950*				-0.162*
				(0.005)				(0.089)				(0.055)
PostGrad_Women*IB				1.879***				1.041*				0.181**
				(0.002)				(0.057)				(0.041)
Inter_Univ_Women				3.044***				1.638***				0.363***
				(0.000)				(0.000)				(0.003)
Inter_Univ_Women*IB				-4.798**				-2.747**				-0.562**
				(0.024)				(0.041)				(0.025)
Acc&Fin_Women				-1.329**				-0.496				-0.120*
				(0.023)				(0.264)				(0.071)
Acc&Fin_Women* IB				3.561*				2.405*				0.434**
				(0.076)				(0.055)				(0.049)
BODSIZE	0.041	-0.165	0.215	2.323***	0.322	0.016	-0.001	1.035	0.019	-0.022	-0.025**	0.049
	(0.173)	(0.515)	(0.484)	(0.010)	(0.257)	(0.100)	(0.990)	(0.177)	(0.620)	(0.121)	(0.030)	(0.534)
Indep	-0.243	3.439***	-0.404	0.579	0.950	0.371*	0.062	0.149	0.075*	0.024	0.026	0.088
	(0.100)	(0.000)	(0.439)	(0.107)	(0.196)	(0.054)	(0.745)	(0.563)	(0.097)	(0.298)	(0.108)	(0.445)
CEODUAL	-0.192	-0.355*	-0.196	-0.210	-0.025	-0.116	0.197**	-0.063	-0.015	-0.003	-0.003	-0.013
	(0.213)	(0.064)	(0.222)	(0.334)	(0.758)	(0.180)	(0.043)	(0.663)	(0.181)	(0.691)	(0.662)	(0.427)
CEO_Women	1.599***	2.832***	0.851***	2.180***	1.002*	0.396***	-0.546***	1.483***	0.232***	0.055	0.024	0.292***
	(0.000)	(0.000)	(0.004)	(0.001)	(0.064)	(0.002)	(0.001)	(0.003)	(0.000)	(0.108)	(0.300)	(0.010)
LOG(CAPEX/TA)	-0.806***	-0.451**	-0.176	-0.838**	0.203	0.130	0.216***	-0.047	-0.015	-0.017*	-0.020*	-0.025

	(0.000)	(0.038)	(0.514)	(0.015)	(0.119)	(0.118)	(0.008)	(0.780)	(0.189)	(0.051)	(0.078)	(0.426)
EQ/TA	0.773	-0.339	0.769	0.147	-0.890	-0.568***	-1.189***	0.031	0.064	0.007	-0.003	0.064
	(0.336)	(0.488)	(0.289)	(0.836)	(0.200)	(0.008)	(0.000)	(0.944)	(0.422)	(0.765)	(0.910)	(0.537)
LogTobin's Q	-0.418***	-0.453***	0.166***	-0.722***	-0.038	0.011	-0.024**	-0.343**	-0.053***	-0.022***	-0.022***	-0.002
	(0.000)	(0.004)	(0.000)	(0.000)	(0.792)	(0.745)	(0.014)	(0.040)	(0.001)	(0.005)	(0.001)	(0.444)
LogAGE	-0.097	-0.097	0.007	-0.008	0.125	-0.010	0.173***	0.018	-0.006	-0.006	-0.002	-0.005
	(0.252)	(0.170)	(0.942)	(0.963)	(0.307)	(0.726)	(0.000)	(0.668)	(0.344)	(0.110)	(0.494)	(0.448)
LEVERAGE	0.398**	0.036	0.037**	0.088**	-0.009	-0.104	-0.002	0.137	-0.001	-0.003	-0.002	-0.002
	(0.018)	(0.311)	(0.041)	(0.035)	(0.644)	(0.226)	(0.787)	(0.521)	(0.830)	(0.140)	(0.182)	(0.596)
LogTA	-0.142***	-0.063	-0.026	-0.051	0.030	0.018	0.005	0.007	-0.010*	-0.007***	-0.008***	-0.001
	(0.000)	(0.115)	(0.518)	(0.296)	(0.632)	(0.180)	(0.636)	(0.771)	(0.053)	(0.000)	(0.000)	(0.603)
IB	0.575**	-0.032	0.192	-0.367	0.272	-0.016	0.407***	-0.361	0.044**	-0.016**	-0.001	-0.071*
	(0.039)	(0.783)	(0.207)	(0.297)	(0.587)	(0.737)	(0.000)	(0.145)	(0.022)	(0.026)	(0.887)	(0.081)
WINDOW	0.080	-0.069	-0.152	-0.301	0.018	-0.010	0.063	-0.068	0.028	-0.000	0.013	-0.011
	(0.505)	(0.688)	(0.231)	(0.124)	(0.947)	(0.857)	(0.312)	(0.618)	(0.165)	(0.960)	(0.334)	(0.357)
GPD	-0.003	0.010	-0.001	-0.001	0.001	0.006	0.002	0.005	-0.010	-0.011	-0.007	0.010
	(0.851)	(0.540)	(0.927)	(0.966)	(0.958)	(0.342)	(0.704)	(0.655)	(0.856)	(0.823)	(0.847)	(0.854)
Governance_Index	0.689	0.665*	1.401***	-0.217	-0.208	-0.060	-0.023	-0.110	0.024	0.025	0.040**	-0.011
	(0.112)	(0.054)	(0.007)	(0.768)	(0.473)	(0.500)	(0.908)	(0.724)	(0.218)	(0.156)	(0.023)	(0.778)
HHI	0.228	0.552	0.477	0.160	0.050	-0.008	0.023	0.054	-0.002	-0.021	-0.011	-0.002
	(0.471)	(0.151)	(0.255)	(0.809)	(0.821)	(0.964)	(0.853)	(0.829)	(0.913)	(0.187)	(0.455)	(0.902)
Constant	4.385**	3.041	-8.015***	0.302	0.709	1.419**	1.449***	3.948**	1.038***	0.652***	0.634***	0.034
	(0.023)	(0.301)	(0.000)	(0.927)	(0.766)	(0.037)	(0.002)	(0.016)	(0.001)	(0.000)	(0.000)	(0.835)
Wald chi^2	169***	206***	205***	87***	176***	545***	495***	169***	397***	601***	616***	371***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan (p-value)	0.249	0.454	0.111	0.244	0.139	0.112	0.135	0.632	0.149	0.122	0.564	0.139
Observations	576	576	593	570	566	540	597	534	587	587	586	574
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents 3SLS results for the bank type effect (IB vs CB). The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 WOMEN_{it} * IB + \beta_3 CONTROLS_{it} + \varepsilon_{it} \quad (6.4)$$

$$WOMEN_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 WOMEN_{it} * IB + \beta_3 CONTROLS_{it} + \varepsilon_{it} \quad (6.5)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, and RISK j, with j= 1,2,3 referring to insolvency risk, credit risk, and equity risk respectively, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification test p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.7. Test for the effect(s) of the proportion of women directors and women directors' attributes on bank risk for the bank type effect (IB vs CB)

6.8.2 Effect of women directors on the association between bank profitability and risk (risk management effectiveness)

The aim of this sub-section is to explore the underlying channel for the relationships between women directors and low risk. The results from testing H_1 show and confirm that women directors are risk averse and thus is worth investigating whether the negative relationship between women directors and bank risk affects bank performance or not and whether this association could have a moderating effect that enhances the effectiveness of risk management.

I also examine the association between women directors and the moderating effect of the risk and return relationship (Nadeem et al., 2019). This is an important issue because the level of risk taken may not actually affect the effectiveness of risk management until financial performance is taken into consideration. In addition to the main question of this study (*Do women directors reduce bank risk?*), an additional question that arises regarding the main findings is: *Do women directors affect the effectiveness of risk management?* In other words, do they affect the positive association between bank risk and performance?

Effective risk management implies that returns should be positively associated with risk according to the risk–return trade-off assumption and as such, the effectiveness of risk management should not always be evaluated in terms of high or low risk (Aljughaiman and Salama, 2019). In option theory, shareholders are likely to encourage management to invest in high-risk projects, but such projects may not always bring high returns and thus the board of directors may reject high risk/low return projects on the recommendation of audit committees (Sun and Liu, 2014). Effective board members can mitigate engagement in such high risk/low return investment options, preferring high risk/high return investment decisions identified by audit committees. Thus, the expectation is that the bank's financial performance (i.e. bank profitability) will be positively associated with bank risk, particularly in banks with board members who offer effective monitoring.

In addition to considering the effect of women directors' risk aversion in terms of a potential negative relationship between women directors and bank risk affecting bank performance and a moderating effect enhancing the effectiveness of risk management, it is expected that strong women's directorship attributes – enhancing monitoring, improving decision making based on providing balance and enabling innovative solutions in boardroom negotiations, improving corporate image, and increasing market understanding – will effectively mitigate bank risk and accordingly positively influence the bank's financial performance. In line with the theoretical argument, Nadeem et al.'s (2019) findings show that women directors enhance the

ability to manage risk while reducing risk through better boardroom "group dynamics" rather than their risk-averse attitudes. Therefore, women's directorship on the board can be the underlying channel that improves the effectiveness of banks' risk management and promotes better financial performance for their banks.

This section examines the interaction between *WOMEN* and all three risk proxies (*WOMEN*RISKj*, where *j 1,2,3*, refers to insolvency risk, credit risk, and equity risk respectively), for each of the three risk models. Following Sun and Liu (2014), high effectiveness by women directors leads to high (low) effectiveness of risk management and the coefficient of (*WOMEN*RISK*) is expected to be positive (negative).[52] Table 6.8 presents the results for the moderating effects of women directors on the relationship between banks' performance and risk (i.e. the effectiveness of women directors' risk management, which affects the association between bank risk and accounting-based bank performance measures, i.e. bank profitability). Therefore, the moderating effect denotes whether women's directorship is associated with enhanced risk management.

The results in Table 6.8 show a negative association between all types of risk and bank profitability, in line with the finding that having more risk is associated with a decrease in firm performance (Krüger et al., 2015). The results for the interaction term *WOMEN*RISKj* show positive and significant coefficients for insolvency risk (*RISK1*), credit risk (*RISK2*), and equity risk (*RISK3*). These findings suggest that having women on the board enables more effective management of bank risk. These results also suggest that greater women's representation on the board tends to mitigate bank risk not due to their risk-averse stereotype, but rather due to their role in enhancing the effectiveness of risk management. This finding is in line with upper echelons theory, namely that board diversity enhances decision-making strategies and thus improves banks' financial position with optimal risk levels. Moreover, this is in line with agency theory in terms of the board of directors' role in enhancing the monitoring of management with regard to risk/return decision making; women directors enhance the board structure and thus help balance risk and return.

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[52] Sun and Liu (2014) used this test to examine differences in the effectiveness of managing bank risk based on the characteristics of audit committees rather than the board of directors. Nadeem et al. (2019) applied this test to examine women directors' effectiveness in relation to firm risk.

VARIABLE	(1) ROAA	(2) ROAA	(3) ROAA
WOMEN	0.140***	0.027**	0.052***
	(0.000)	(0.040)	(0.000)
WOMEN*RISK1	2.565**		
	(0.015)		
Insolvency risk	-0.261***		
	(0.000)		
WOMEN*RISK2		2.636**	
		(0.012)	
Credit risk		-0.037***	
		(0.001)	
WOMEN*RISK3			19.541**
			(0.034)
Equity risk			-4.528***
			(0.000)
BODSIZE	0.149	0.130	-0.139
	(0.228)	(0.224)	(0.283)
Indep	-0.175	-0.191	-0.213
	(0.421)	(0.271)	(0.295)
CEODUAL	-0.014	0.107	0.024
	(0.885)	(0.210)	(0.600)
CEO_Women	-0.290	-0.770***	-0.643***
	(0.227)	(0.000)	(0.000)
LOG(CAPEX/TA)	0.050	0.013	0.196**
	(0.411)	(0.209)	(0.022)
EQ/TA	0.092	0.013	0.011
	(0.101)	(0.707)	(0.915)
LogAGE	0.043	0.061**	0.022
	(0.112)	(0.012)	(0.534)
LEVERAGE	-0.004	-0.005	0.016
	(0.810)	(0.228)	(0.138)
LogTA	0.028	0.007	0.034***
	(0.139)	(0.195)	(0.008)
IB	0.004	-0.037*	-0.015
	(0.864)	(0.074)	(0.542)
WINDOW	-0.219***	-0.163**	-0.178***
	(0.003)	(0.019)	(0.009)
GDP	0.003	0.006**	0.004
	(0.528)	(0.041)	(0.352)

Governance_index	0.121	0.327**	0.288
	(0.440)	(0.049)	(0.156)
HHI	-0.162	-0.127	-0.203
	(0.231)	(0.148)	(0.340)
Constant	-2.407**	0.461	0.894*
	(0.020)	(0.188)	(0.064)
Wald chi^2	147***	288***	171***
LM statistic (p-value)	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.447	0.127	0.111
Observations	568	608	597
Country FE	Yes	Yes	Yes
Year FF	Yes	Yes	Yes

Note: The table presents 3SLS results for women representation effectiveness in managing the risk and its effect on the bank' performance the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$$ROAA_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 WOMEN_{it} * RISK_{jit} + \beta_3 RISK_{jit} + \beta_4 CONTROLS_{it} + \varepsilon_{it} \qquad (6.6)$$

$$WOMEN_{it} = \beta_0 + \beta_1 ROAA_{it} + \beta_2 WOMEN_{it} * RISK_{jit} + \beta_3 RISK_{jit} + \beta_4 CONTROLS_{it} + \varepsilon_{it} \qquad (6.7)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, and RISK j, with j = 1,2,3 referring to insolvency risk, credit risk, and equity risk, respectively, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p–value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.8. Test for the effect(s) of the effectiveness of women's directorship on bank risk and profitability for the full sample

6.9 Robustness Checks

To check the robustness of the findings, various robustness tests were undertaken to address possible endogeneity because of omitted variable bias and/or reverse causality in the main models. The various sensitivity checks for the main models of this study are detailed below.

6.9.1 Propensity score matching (PSM)

This study used PSM to manage potential endogeneity occurring from unobservable variables that may be related to gender issues, creating an omitted variable/selection bias. Moreover, women may self-select to directorships in banks with less risk, which may produce the result showing that women take fewer risks than men (Cardillo et al., 2020). Therefore, to solve this problem and have greater control for endogeneity, PSM is applied to derive a matched sample based on gender diversity, comprising a treatment group (banks with at least one woman director) and a control group (banks with only male directors) (Bennouri et al., 2018).

Table 6.9 shows the results for the matched sample using 3SLS estimation. PSM produces an approximately matched sample of 490 observations: 245 treatment observations (banks with at least one woman director) and 245 control observations (banks with only male directors). First, this estimation employs a logit regression using the same controls as included in the main models (i.e. bank-specific controls, country-specific controls, and country fixed effects), the predicted value of which is the propensity score. Second, the nearest-neighbour matching approach is employed, selecting the unit from the banks with no women directors as a match for the banks with women directors as the one nearest in terms of the propensity score.[53] Finally, in Table 6.9, the 3SLS estimation is employed for the matched sample. The results support the main findings and are in line with the outcomes in both Tables 6.5 and 6.6, although the matched samples method indicates slightly more significant findings. The results for the matched sample provide additional support for the main conclusion that women directors, independent women directors, and women directors with a postgraduate degree, or finance and accounting qualifications are significantly associated with reduced bank risk. However, women directors with a foreign nationality, financial expertise, or educational qualifications from foreign institutions are positively associated with bank risk.

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[53] For example models, the logistic regressions, and additional explanations of the matched samples, including the figures for matched sample observations and other comparison tests between the treatment and control groups and figures, see Appendices F and G.

VARIABLE	(1) Insolvency risk	(2) Insolvency risk	(3) Insolvency risk	(4) Insolvency risk	(5) Credit risk	(6) Credit risk	(7) Credit risk	(8) Credit risk	(9) Equity risk	(10) Equity risk	(11) Equity risk	(12) Equity risk
WOMEN	-11.638*	-11.809***	-14.377***	-9.113***	-3.469**	-4.811***	-12.758***	-9.276***	-0.804***	-0.631**	-1.501***	-0.273*
	(0.096)	(0.000)	(0.000)	(0.000)	(0.024)	(0.000)	(0.001)	(0.001)	(0.009)	(0.036)	(0.008)	(0.078)
Indep_Women		-5.903***				-1.651**				-0.104*		
		(0.001)				(0.036)				(0.086)		
Chair_Women		-0.046				-0.203				-0.019		
		(0.929)				(0.391)				(0.276)		
Expertise_Women			0.115***				0.153***				0.018***	
			(0.000)				(0.005)				(0.007)	
Foreign_Women			0.764***				0.031				0.006*	
			(0.000)				(0.328)				(0.054)	
PostGrad_Women				-1.158***				-0.493*				-0.012*
				(0.004)				(0.070)				(0.097)
Inter_Univ_Women				2.799***				1.740***				0.067***
				(0.000)				(0.004)				(0.008)
Acc&Fin_Women				-1.346***				-0.492*				-0.043***
				(0.002)				(0.086)				(0.000)
BODSIZE	0.134	-0.982*	0.236	2.290**	0.048	-0.379	-0.004	0.790	-0.079***	-0.090***	-0.064*	-0.008
	(0.749)	(0.073)	(0.565)	(0.011)	(0.793)	(0.125)	(0.986)	(0.118)	(0.002)	(0.004)	(0.050)	(0.683)
Indep	1.121	2.793***	-0.018	1.902	0.816***	1.349***	0.837*	1.630*	0.041	0.048	0.033	0.022
	(0.176)	(0.002)	(0.979)	(0.146)	(0.005)	(0.001)	(0.072)	(0.067)	(0.107)	(0.127)	(0.208)	(0.432)
CEODUAL	-0.732*	-1.482***	-0.056	-0.481	-0.172	-0.367**	0.019	-0.167	-0.023*	-0.041**	-0.011	-0.011
	(0.056)	(0.001)	(0.702)	(0.101)	(0.223)	(0.049)	(0.940)	(0.257)	(0.092)	(0.031)	(0.407)	(0.222)
CEO_Women	0.556	0.067	-3.464***	2.341***	0.236	0.229	-0.539	1.704**	0.049*	0.023	-0.101***	0.028
	(0.435)	(0.887)	(0.000)	(0.004)	(0.253)	(0.285)	(0.213)	(0.020)	(0.095)	(0.410)	(0.006)	(0.268)
LOG(CAPEX/TA)	-1.049***	-0.714**	-2.429***	-0.691**	0.237	0.483***	0.048	0.487***	-0.021**	-0.023**	-0.020	-0.022**
	(0.002)	(0.015)	(0.000)	(0.036)	(0.120)	(0.005)	(0.702)	(0.004)	(0.021)	(0.018)	(0.245)	(0.023)
LogTobin's Q	0.570	-0.415	1.763	-0.876	-0.549	-0.795	0.380	-1.956**	0.025	0.006	0.032	-0.063*
	(0.533)	(0.712)	(0.107)	(0.542)	(0.214)	(0.107)	(0.578)	(0.028)	(0.612)	(0.887)	(0.624)	(0.082)
EQ/TA	-0.548**	-0.510***	-0.278**	-0.720***	-0.053***	-0.012	-0.114***	-0.053**	-0.010	0.006	-0.002	-0.022***
	(0.024)	(0.000)	(0.048)	(0.000)	(0.008)	(0.684)	(0.004)	(0.039)	(0.983)	(0.155)	(0.332)	(0.000)
LogAGE	-0.413*	-0.524***	-0.559***	0.056	-0.087	-0.206**	-0.002	0.001	-0.019**	-0.015	-0.006	0.001
	(0.059)	(0.000)	(0.001)	(0.753)	(0.313)	(0.046)	(0.990)	(0.734)	(0.048)	(0.113)	(0.564)	(0.836)
LEVERAGE	-0.012	0.070**	0.021	0.144**	-0.042**	-0.048***	-0.044	-0.059***	-0.005**	-0.002	-0.003	0.001
	(0.839)	(0.050)	(0.494)	(0.016)	(0.014)	(0.009)	(0.241)	(0.001)	(0.031)	(0.312)	(0.431)	(0.717)

LogTA	-0.158**	-0.122**	-0.321***	-0.130**	0.045*	0.054**	-0.004	0.072***	-0.009***	-0.009***	-0.011***	-0.008***
	(0.018)	(0.011)	(0.000)	(0.040)	(0.087)	(0.018)	(0.840)	(0.009)	(0.000)	(0.000)	(0.006)	(0.000)
IB	0.127	0.209	0.106	0.553*	0.334***	0.290***	0.571***	0.670**	-0.004	0.002	0.008	0.001
	(0.461)	(0.249)	(0.627)	(0.089)	(0.000)	(0.004)	(0.001)	(0.018)	(0.505)	(0.831)	(0.520)	(0.870)
WINDOW	0.382	0.361*	1.065***	0.035	0.177	0.312**	0.637**	0.027	0.013	0.010	0.025	-0.014**
	(0.337)	(0.067)	(0.000)	(0.834)	(0.209)	(0.023)	(0.017)	(0.775)	(0.417)	(0.524)	(0.334)	(0.021)
GDP	-0.049	-0.042	-0.021	-0.038	-0.033**	-0.042**	-0.015	-0.041**	0.010	0.005	0.011	0.020
	(0.180)	(0.157)	(0.291)	(0.242)	(0.036)	(0.024)	(0.207)	(0.022)	(0.694)	(0.655)	(0.620)	(0.640)
Governance_Index	0.993*	0.957*	0.142	0.228	-0.295	-0.389	-1.291**	-0.802**	0.016	0.016	-0.020	0.016
	(0.061)	(0.083)	(0.838)	(0.756)	(0.269)	(0.208)	(0.012)	(0.025)	(0.312)	(0.298)	(0.625)	(0.412)
HHI	0.479	0.755	1.283*	0.098	0.487	0.770**	0.209	0.321	-0.003	-0.005	0.015	0.008
	(0.364)	(0.182)	(0.063)	(0.868)	(0.147)	(0.027)	(0.283)	(0.379)	(0.880)	(0.792)	(0.483)	(0.668)
	(0.109)	(0.155)	(0.111)	(0.001)	(0.994)	(0.888)	(0.097)	(0.427)	(0.482)	(0.746)	(0.198)	(0.000)
Constant	7.774	8.533***	6.572**	2.376	2.227**	2.627***	4.013**	-0.109	0.502***	0.417***	0.479**	0.560***
	(0.151)	(0.003)	(0.023)	(0.419)	(0.026)	(0.005)	(0.019)	(0.930)	(0.000)	(0.000)	(0.014)	(0.000)
Wald chi^2	116***	129***	180***	95***	239***	176***	106***	157***	451***	565***	516***	686***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.193	0.120	0.386	0.884	0.285	0.130	0.747	0.620	0.230	0.394	0.362	0.165
Observations	418	418	418	414	418	411	418	414	424	424	414	416
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents the 3SLS results for the matched sample (Islamic and conventional banks). Matched sample analysis was carried out using the propensity score matching procedure for a treatment group (banks with at least one female director) and control group (banks with only male directors). The matched sample comprised 490 cases: 245 treatment cases and 245 control cases.

The models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.9. (Robustness) test for the effect(s) of the proportion of women directors and women directors' attributes on risk for the matched sample

6.9.2 Alternative risk measures

This research uses operational risk (*SDROAA)* (De Cabo, 2012; Bruna et al., 2019) and assets risk (*ROAA/SDROAA*) (Trinh et al., 2020) as the two alternative indicators for bank risk. First, asset risk indicator is used to capture the amount of risk taken in banking operations using corporate returns volatility as the measure (John et al., 2008). Higher volatility in returns is associated with higher risk in the business operations (Bruna et al., 2019). Based on a rise in the bank's income volatility, operational risk is calculated as the standard deviation of ROAA over a three-year rolling period (John et al., 2008; Trinh et al., 2020). Thus, a greater value of *SDROAA* indicates higher operational risk for banks. Second, assets risk is calculated using ROAA scaled by the standard deviation of ROAA, and the lower the ratio the higher the assets risk (Trinh et al., 2020).

Table 6.10 shows that a higher proportion of women directors is negatively associated with the two types of bank risk for the full sample. Moreover, the results for women directors' attributes are in line with the main findings for the other main risk proxies. Overall, these results are consistent with the main findings. Therefore, the results of this study are not influenced by endogeneity issues or any type of estimation inaccuracy.

VARIABLE	(1) Operational risk SDROAA	(2) Operational risk SDROAA	(3) Operational risk SDROAA	(4) Operational risk SDROAA	(5) Asset risk ROAA/SDROAA	(6) Asset risk ROAA/SDROAA	(7) Asset risk ROAA/SDROAA	(8) Asset risk ROAA/SDROAA
WOMEN	-3.890**	-6.600***	-13.798**	-4.906***	7.650***	5.467*	12.662**	6.785**
	(0.042)	(0.001)	(0.043)	(0.004)	(0.006)	(0.081)	(0.024)	(0.039)
Indep_Women		-0.134				5.572***		
		(0.763)				(0.000)		
Chair_Women		0.234				-0.114		
		(0.113)				(0.798)		
Expertise_Women			0.172*				-0.087	
			(0.093)				(0.189)	
Foreign_Women			0.030				-0.553**	
			(0.225)				(0.030)	
PostGrad_Women				-0.763***				1.035***
				(0.002)				(0.002)
Inter_Univ_Women				1.704***				-2.460***
				(0.000)				(0.000)
Acc&Fin_Women				-1.015***				1.474***
				(0.002)				(0.001)
BODSIZE	-0.038	0.200	-0.109	1.120**	-0.544*	-0.150	-0.450	-1.104*
	(0.694)	(0.104)	(0.475)	(0.026)	(0.060)	(0.618)	(0.284)	(0.062)
Indep	0.258	0.531*	0.203	0.831	-0.948*	-2.059***	-0.864	-0.874
	(0.241)	(0.059)	(0.412)	(0.120)	(0.075)	(0.004)	(0.106)	(0.165)
CEODUAL	-0.104*	-0.159**	-0.037	-0.171*	0.314	0.389*	0.237	0.294
	(0.090)	(0.022)	(0.674)	(0.089)	(0.136)	(0.083)	(0.288)	(0.149)
CEO_Women	0.330*	0.551**	-0.306	1.241***	-0.292	-0.922**	1.430**	-1.402***
	(0.082)	(0.012)	(0.404)	(0.001)	(0.376)	(0.046)	(0.017)	(0.008)
LOG(CAPEX/TA)	-0.136	-0.065	-0.129	0.681	-0.108	0.083	0.159	-0.185
	(0.182)	(0.491)	(0.459)	(0.158)	(0.769)	(0.829)	(0.818)	(0.583)
LogTobin's Q	-0.158	0.041	0.300	-0.802	2.394***	2.721***	2.833**	2.112***
	(0.499)	(0.882)	(0.572)	(0.225)	(0.002)	(0.002)	(0.017)	(0.009)
EQ/TA	-0.101	-0.010	-0.021	-0.367***	0.001	-0.065*	0.111*	0.553***
	(0.116)	(0.339)	(0.297)	(0.004)	(0.968)	(0.055)	(0.070)	(0.000)
LogAGE	-0.025	-0.046	-0.004	0.076	0.038	0.118	0.144	-0.031
	(0.290)	(0.114)	(0.966)	(0.356)	(0.665)	(0.255)	(0.304)	(0.784)
LEVERAGE	-0.016	-0.042***	-0.037	0.031	0.611***	0.001	0.035	-0.023
	(0.113)	(0.001)	(0.290)	(0.143)	(0.001)	(0.997)	(0.119)	(0.566)
LogTA	-0.048***	-0.067***	-0.027	-0.098**	0.327***	0.263***	0.416***	0.164***
	(0.003)	(0.001)	(0.339)	(0.039)	(0.000)	(0.000)	(0.000)	(0.004)

IB	0.036	0.046	0.053	0.196*	-0.172	-0.025	-0.254*	-0.233
	(0.305)	(0.408)	(0.711)	(0.069)	(0.214)	(0.881)	(0.073)	(0.100)
WINDOW	-0.018	0.138*	0.131	-0.047	-0.027	0.033	-0.165	0.190
	(0.786)	(0.097)	(0.484)	(0.299)	(0.874)	(0.866)	(0.449)	(0.163)
GDP	-0.006	-0.003	-0.001	-0.005	-0.002	-0.001	-0.001	-0.006
	(0.369)	(0.493)	(0.826)	(0.492)	(0.942)	(0.955)	(0.980)	(0.786)
Governance_Index	0.202	0.427**	-0.066	0.046	-1.137**	-1.361**	-0.333	-0.178
	(0.179)	(0.027)	(0.879)	(0.825)	(0.021)	(0.013)	(0.580)	(0.755)
HHI	0.040	0.344	-0.030	0.299	-1.245**	-3.268***	-1.005*	-0.536
	(0.755)	(0.249)	(0.786)	(0.185)	(0.048)	(0.000)	(0.051)	(0.228)
Constant	2.857**	0.996**	1.663*	4.344***	-2.423*	0.693	-6.004**	-6.321***
	(0.014)	(0.031)	(0.088)	(0.004)	(0.061)	(0.630)	(0.029)	(0.006)
Wald chi^2	89.33***	60.93***	78***	150.58***	142.82***	126.92***	65.02***	82.68***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.1485	0.1329	0.5675	0.1162	0.1114	0.2359	0.1313	0.6620
Observations	524	563	517	518	531	515	531	507
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents 3SLS results for the full sample (Islamic and conventional banks). Our estimated models are defined as follows:

$$Risk_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.1)$$
$$WOMEN_{it} = \beta_0 + \beta_1 Risk_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.2)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including women directors' attributes, bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2010–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.10. Test for the effect(s) of the proportion of women directors and women directors' attributes on alternative measures of bank risk for the full sample

6.9.3 Alternative measures of gender diversity

In addition to the sensitivity tests and robustness checks detailed above, the Blau index can be applied as an alternative proxy for the representation of women directors and board gender diversity (for more detail, see section 5.9.2). The Blau index has commonly been used in prior gender diversity research (e.g. Bhat et al., 2019; Bruna et al., 2019).[54] The computation of Blau's index is as follows:

Table 6.11 shows the regression results for the Blau index and bank risk. In Models 1, 2, and 3, there is a negative association between the Blau index and all risk proxies, suggesting that higher gender diversity within directors is negatively associated with insolvency risk. The findings support the main findings in gender terms, indicating a negative relationship between the Blau index (higher gender diversity between the directors) and bank risk. This implies that the main conclusions are not driven by potential measurement errors in examining the association between gender diversity and bank risk.

6.9.4 Lagged value of board diversity

A final sensitivity check for governance measures is to re-estimate the main models using a lagged approach for the full sample, following Mollah et al. (2017) and Elnahass et al. (2020a). This method controls for possible reverse causality, hence controlling the endogeneity problem arising from the fact that current financial performance might be affected by past board members' appointments. Therefore, the one-year lagged value for the proportion of women directors and proportions of other attributes for all estimation models is taken. In Table 6.12, the results provide additional evidence that there is a negative association between women directors and bank risk. Moreover, independent women directors, those with a postgraduate level degree, and those with finance and accounting qualifications also have a negative association with bank risk. However, foreign women directors, those with financial expertise, and those with international qualifications are positively associated with bank risk. Overall, the findings support the main results and indicate that the main assumptions are not driven by an endogeneity problem.

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[54] This index is built on the degree of heterogeneity in the board of directors, such as gender (Blau, 1977). The higher the Blau index, the higher the level of diversity (Engelen et al., 2012).

VARIABLE	(1) Insolvency risk log (1/ Z-score)	(2) Credit risk (LLR/GL)	(3) Equity risk (ER)
Blau index	-8.102***	-4.414***	-2.256***
	(0.000)	(0.000)	(0.002)
BODSIZE	0.863***	0.348***	0.049
	(0.003)	(0.005)	(0.348)
Indep	0.656	0.601***	0.062
	(0.202)	(0.007)	(0.239)
CEODUAL	-0.392*	0.005	-0.039
	(0.095)	(0.936)	(0.303)
CEO_Women	0.859**	0.655***	0.321***
	(0.014)	(0.000)	(0.002)
LOG(CAPEX/TA)	-1.170***	0.122	-0.016
	(0.000)	(0.118)	(0.297)
LogTobin's Q	-0.081	-0.613**	0.102
	(0.878)	(0.030)	(0.396)
EQ/TA	-0.387***	-0.012	-0.003
	(0.000)	(0.812)	(0.429)
LogAGE	0.022	0.087***	0.018
	(0.774)	(0.004)	(0.173)
LEVERAGE	0.014	-0.008	-0.010**
	(0.558)	(0.364)	(0.014)
LogTA	-0.189***	0.012	-0.007
	(0.000)	(0.373)	(0.181)
IB	0.187*	0.096**	-0.010
	(0.074)	(0.024)	(0.294)
WINDOW	-0.049	-0.001	0.022
	(0.680)	(0.985)	(0.334)
GDP	-0.004	0.004	0.010
	(0.805)	(0.545)	(0.823)
Governance_Index	0.758**	-0.165	-0.007
	(0.038)	(0.324)	(0.788)
HHI	0.113	0.056	-0.010
	(0.736)	(0.712)	(0.584)
Constant	2.959*	0.760	0.153
Wald chi^2	(0.096)	(0.363)	(0.245)
LM statistic (p-value)	142***	407***	345***
Hansen–Sargan overidentification (p-value)	0.000	0.000	0.000
	0.631	0.241	0.514

Observations	576	573	612
Country FE	Yes	Yes	Yes
Year FF	Yes	Yes	Yes

Note: The table presents the 3SLS results for Blau's index and one year lagged value of Blau's index "*alternative measures of gender diversity*" for the full sample (Islamic and conventional banks). The estimated models are defined as follows:

$$RISK_{it} = \beta_0 + \beta_1 Blau_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.7)$$
$$Blau_{it} = \beta_0 + \beta_1 RISK_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \qquad (6.8)$$

where $CONTROLS_{it}$ is the vector of control variables in bank i in year t, including bank-level indicators, country-level indicators, and country governance indicators. IB is a dummy variable controlling for the bank type, taking the value 1 if the bank is Islamic and zero for a conventional bank. We also controlled for Islamic windows using a dummy variable (WINDOW), which takes the value 1 if the conventional bank has an Islamic window and zero otherwise. Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.11. (Blau index) 3SLS regression results for alternative measures of gender diversity

VARIABLE	(1) Insolvency risk	(2) Insolvency risk	(3 Insolvency risk	(4) Insolvency risk	(5) Credit risk	(6) Credit risk	(7) Credit risk	(8) Credit risk	(9) Equity risk	(10) Equity risk	(11) Equity risk	(12) Equity risk
L.WOMEN	-0.101***	-0.159**	-0.268***	-6.004***	-1.978**	-0.056***	-0.073*	-0.060**	-0.828***	-0.548**	-1.903***	-0.542***
	(0.005)	(0.012)	(0.000)	(0.001)	(0.023)	(0.001)	(0.080)	(0.024)	(0.009)	(0.015)	(0.000)	(0.006)
L.Indep_ Women		-3.555*				-0.283				-0.089*		
		(0.074)				(0.534)				(0.061)		
L.Chair_ Women		0.153				-0.066				-0.029*		
		(0.796)				(0.643)				(0.067)		
L.Expertise_Women			0.343***				0.061				0.023***	
			(0.003)				(0.160)				(0.006)	
L.Foreign_Women			0.013				0.309***				0.005*	
			(0.773)				(0.000)				(0.081)	
L.PostGrad_Women				-0.575**				-0.229				-0.022***
				(0.013)				(0.264)				(0.002)
L.Inter_Univ_Women				1.728***				1.065**				0.102***
				(0.000)				(0.016)				(0.001)
L.Acc&Fin_Women				-0.921***				-0.101				-0.036***
				(0.001)				(0.586)				(0.000)
BODSIZE	0.548*	0.191	1.186***	1.473***	0.222**	0.328**	0.407*	0.571	-0.003	-0.011	0.033	0.020
	(0.081)	(0.708)	(0.005)	(0.002)	(0.021)	(0.017)	(0.059)	(0.135)	(0.858)	(0.301)	(0.166)	(0.265)
Indep	0.617	1.887*	0.961	1.086	0.491**	0.775***	0.563*	0.845	0.070**	0.062**	0.077***	0.052**
	(0.287)	(0.072)	(0.161)	(0.148)	(0.012)	(0.002)	(0.098)	(0.117)	(0.016)	(0.013)	(0.006)	(0.028)
CEODUAL	-0.267	-0.448	-0.208	-0.292	0.008	0.010	0.031	0.015	-0.013	-0.010	-0.015	-0.012
	(0.232)	(0.217)	(0.303)	(0.155)	(0.929)	(0.886)	(0.490)	(0.866)	(0.102)	(0.192)	(0.115)	(0.121)
CEO_Women	0.710*	1.650**	-0.833	0.935**	0.243**	0.631***	-0.748***	0.813**	0.073**	0.057**	-0.057	0.070***
	(0.086)	(0.025)	(0.182)	(0.022)	(0.049)	(0.006)	(0.000)	(0.035)	(0.021)	(0.027)	(0.209)	(0.004)
LOG(CAPEX/TA)	-0.761**	-0.231	-0.298	-0.552*	0.247**	0.236*	-0.063	0.374*	0.009	0.004	0.021	0.014
	(0.011)	(0.587)	(0.490)	(0.083)	(0.044)	(0.077)	(0.622)	(0.078)	(0.463)	(0.733)	(0.348)	(0.340)
LogTobin's Q	-0.027	0.221	0.971	-0.826	-0.820***	-0.660**	-0.748**	-0.856***	0.058	0.019	0.055	-0.001
	(0.972)	(0.856)	(0.283)	(0.204)	(0.004)	(0.028)	(0.035)	(0.001)	(0.204)	(0.493)	(0.159)	(0.477)
EQ/TA	-0.532***	-0.780***	-0.045	-0.508***	-0.030***	-0.034***	0.083**	-0.035**	-0.004**	-0.025***	-0.005***	-0.010
	(0.000)	(0.001)	(0.258)	(0.000)	(0.004)	(0.003)	(0.030)	(0.031)	(0.017)	(0.001)	(0.006)	(0.701)
LogAGE	0.015	-0.056	0.142	0.092	0.140***	0.146***	0.032	0.190***	-0.003	0.010	0.006	0.001
	(0.868)	(0.625)	(0.277)	(0.330)	(0.000)	(0.000)	(0.309)	(0.001)	(0.390)	(0.925)	(0.424)	(0.708)
LEVERAGE	0.004	0.149	0.058	0.077**	-0.013**	-0.026**	-0.035*	-0.019	-0.009**	-0.000	-0.009**	0.000
	(0.893)	(0.740)	(0.796)	(0.014)	(0.034)	(0.025)	(0.054)	(0.490)	(0.023)	(0.781)	(0.017)	(0.951)
LogTA	-0.155***	-0.216***	-0.176***	-0.139***	0.025	0.017	0.007	0.028	-0.008***	-0.007***	-0.011***	-0.007***

	(0.001)	(0.000)	(0.000)	(0.005)	(0.177)	(0.298)	(0.652)	(0.323)	(0.000)	(0.000)	(0.000)	(0.000)
IB	0.310**	0.140	0.696***	0.366***	0.191***	0.195***	0.071	0.196**	-0.002	-0.001	0.012	0.003
	(0.023)	(0.276)	(0.006)	(0.008)	(0.001)	(0.001)	(0.326)	(0.024)	(0.737)	(0.792)	(0.378)	(0.603)
WINDOW	0.182	0.338	0.703**	-0.194	0.012	0.140	0.105	-0.015	0.007	0.001	0.032*	-0.006
	(0.359)	(0.283)	(0.013)	(0.136)	(0.869)	(0.127)	(0.525)	(0.841)	(0.600)	(0.880)	(0.060)	(0.308)
GDP	-0.019	-0.033	-0.010	-0.010	0.002	-0.003	0.002	-0.003	-0.011	-0.014	0.007	-0.020
	(0.427)	(0.386)	(0.638)	(0.639)	(0.244)	(0.705)	(0.650)	(0.767)	(0.835)	(0.970)	(0.796)	(0.971)
Governance_Index	1.383***	1.655**	0.862	1.001**	0.042	-0.069	-0.044	-0.163	0.039**	0.038**	0.020	0.038**
	(0.007)	(0.026)	(0.165)	(0.047)	(0.835)	(0.734)	(0.792)	(0.529)	(0.017)	(0.027)	(0.535)	(0.034)
HHI	1.025*	2.130**	0.980	0.808	0.037	-0.134	0.008	-0.056	0.016	0.009	0.035	0.015
	(0.098)	(0.045)	(0.200)	(0.143)	(0.886)	(0.540)	(0.946)	(0.855)	(0.537)	(0.649)	(0.114)	(0.426)
Constant	3.973	8.790**	-5.461***	0.770	0.804*	0.783	-0.556	-0.133	0.325***	0.582***	0.268***	0.123*
	(0.117)	(0.027)	(0.000)	(0.701)	(0.095)	(0.155)	(0.470)	(0.884)	(0.000)	(0.000)	(0.001)	(0.079)
Wald chi^2	150***	77***	120***	137***	456***	382***	208***	151***	433***	815***	280***	490***
LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen–Sargan overidentification (p-value)	0.270	0.245	0.351	0.554	0.972	0.139	0.389	0.277	0.110	0.267	0.121	0.910
Observations	555	543	561	549	573	568	551	567	556	558	556	550
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents the 3SLS results of the one year lagged values for women's directorship and women directors' attributes for the full sample (Islamic and conventional banks). Models are tested for the period 2007–2017. The diagnostic tests show that the LM statistic (p-value) is less than 1% and the Hansen–Sargan test for over-identification p-value is greater than 10% across all models, indicating that the chosen IVs for board women's directorship are valid and the models are not over-identified. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses.

Table 6.12. (Robustness test) 3SLS regression results: One year lagged values for women's directorship and women directors' attributes for the full sample

6.10 Conclusion

Over the past few years, considerable attention has been paid to the issue of empowering women and ensuring equality in the workplace because of the growing recognition of the value of women directors, as well as the regulatory debates that highlight financial and business ethics issues. Limited studies have addressed the effects of gender diversity on bank risk and this paper is the first to investigate gender diversity in the banking industry with hypotheses built on joint examination of inclusive indicators, specifically the characteristics and attributes of women directors. Women directors' attributes represent monitoring (independence and leadership position as board chair) and demographic capital attributes (financial expertise, nationality, academic qualifications, and educational level and background).

A unique dataset of banks from 12 countries was used to study the association between women directors and their specific attributes and bank risk over the period 2010–2017. Based on three theories (agency, resource dependence, upper echelons), three testable hypotheses were established. The analysis was broadened to present further insights into the effect of bank type, assessing the moderating effect of institutional characteristics such as alternative banking models. Moreover, the analysis also captures the association of women directors with risk and the eventual association with financial performance (i.e. the effectiveness of bank risk management).

This study finds strong evidence that gender diversity (women's representation on boards) is significantly associated with mitigating different types of bank risk (insolvency, credit, and equity). These findings remain unchanged even after identifying the incremental effect of various women directors' attributes and demographics in the models. Independent women directors have a negative association with bank risk, while the leadership indicator shows no evidence of association with bank risk. In contrast, women directors with financial expertise and foreign nationality are both associated with higher bank risk. The findings also indicate that an increase in the proportion of women directors with postgraduate degrees or with accounting and finance qualifications is negatively associated with bank risk. Women who are alumni of foreign universities are positively associated with bank risk.

The investigation using categories of different bank types shows differential effects, but suggests that having a high proportion of women on the board is associated with lower bank risk in both Islamic and conventional banks. The results show a negative association, on average, between gender diversity and bank risk within Islamic banks compared to

conventional banks. Finally, having more women directors significantly enhances risk management for the sampled banks (i.e. a positive association between performance and risks).

This study offers new insights and important policy implications for the global banking industry. The results open up the "black box" of gender diversity within the banking sector indicating that essential women directors' attributes reduce banks' risk. Women directors who are independent, hold higher levels of education (including the study of accounting and finance), have studed in their home country, and have local knowledge tend to be associated with long-term financial stability for their banks. One such implication concerns the optimal structure of boards of directors in banks, particularly in terms of the presence of women board members with these characteristics. It can be inferred that a high educational level gives directors confidence in stating their opinion. Moreover, having more qualified and educated women board members can also help to avoid confusion concerning complex business problems such as those prevalent in the banking industry. The findings call for regulators and legislators to create more comprehensive regulations regarding gender quotas, while also considering different women's characteristics when considering board appointments. The study can also help policymakers in countries operating a dual banking system to develop guidelines for a gender diversity quota by showing the differential impact of the characteristics for the two bank types.

Chapter 7. Concluding Remarks and Implications

7.1 Introduction

The main objective of this thesis has been to investigate the impacts of board diversity on banking outcomes. The thesis has made an attempt to accomplish distinct empirical assessments across three identifiable empirical chapters in order to explore the influence of board diversity and determine the association with bank stability, in addition to a particular focus on studying the effect of gender diversity on stock market valuations and bank risk.

The first objective was to examine the association of boards of directors' diversity in the form of gender, nationality, and education (PhD holders) and bank risk, using an international sample for banks operating dual banking systems. Within this aim, the two bank types were examined, as well as the role of the *Shari'ah* supervisory board (SSB) (i.e. extra governance tier of Islamic banks), controlling for the years of the financial crisis. To the best of my knowledge, theoretical and empirical evidence is rare concerning board diversity from a global banking viewpoint. There is also a specific emphasis in this thesis (i.e. in the last two empirical chapters) on making an additional contribution by concentrating particularly on board gender diversity combined with the unique attributes of women directors with respect to stock market valuations as well as bank risk. Therefore, the next objective focused on the association between gender diversity and women's different attributes and stock market valuations, looking at the two bank types, also taking into account the financial crisis. The third objective focused on exploring gender diversity and women's different attributes and the influence on risk. In exploring this objective, the two bank types were examined and the women directors' effectiveness in risk management was investigated by testing the association between bank profitability and risk. The deliberation of the diverse attributes of women directors in studying bank risk and market valuation in the banking framework is rare.

In general, the entire thesis has concentrated on the banking sector, comparing and contrasting Islamic and conventional banks based on cross-country data and undertaking regression on unbalanced panel data with an instrumental variable methodology. To provide a greater understanding of the key outcomes of this thesis and its implications, the next sections present additional evidence regarding the empirical findings and then the policy implications, followed by the limitations and recommendations for future research.

7.2 Summary and Main Findings

Although there is some evidence in the conventional banking industry concerning the effects of board diversity, such evidence is inconsistent and limited in terms of how the functions differ, particularly regarding how different aspects of diversity relate to monitoring management. Moreover, to the best of my knowledge, no study has yet exhaustively investigated the impact of board diversity in Islamic banks and compared the results to thos for conventional counterparts. This thesis offers the first attempt in the banking literature to assess whether board diversity could exert different effects on bank stability in Islamic and conventional banks, particularly taking into consideration the constricted business function model in Islamic banks. Moreover, this study is the first to identify stock market valuations for board gender diversity based on a range of women directors' attributes, both in the banking sector generally and among Islamic and conventional banks more specifically, also considering the financial crisis period. The study tested several financial indicators related to bank stability, market value, and risk with a view to offering new empirical indications effectively linked to the composition of the board and diversity in the banking industry and aiming to contribute to the existing literature, particularly comparing Islamic and conventional banks. This thesis uniquely documents the association of functional bank attributes and the business model with board diversity, which has not previously been considered in studies. More particularly, the two organizational perspectives (Islamic vs conventional) are of interest in the banking environment, informing current debate and the increasing claims of the impact of different banking types on financial value.

The findings of the first study (chapter 4) suggest that board diversity has differential effects on bank stability, one of the key factors in a bank's capability to survive financial distress and attain better investment prospects, measured by bank risk, financial performance, and efficiency. The three diversity attributes have varying impacts on bank stability. Women directors and PhD holders tend to increase bank stability, while foreign directors are more likely to reduce bank stability. This is in line with the agency, resource, and human capital perspectives, according to which women and PhD holders use their knowledge and networks to provide resources and monitoring skills to their banks. Concerning bank type, gender, nationality, and educational level also have differential impacts on bank stability. In both bank types, women directors reduce risk, but while they reduce performance in Islamic banks, they increase performance in conventional banks. This can be attributed to the complicated Islamic business model. In conventional banks, national diversity increases bank risk and reduces financial performance, which is not the case for Islamic banks. Furthermore, having PhD

holders on the board increases bank stability for both bank types. The overall outcomes indicate the preferential impacts of board diversity on the full sample and the stability of conventional banks, verifying the thesis hypotheses and expectations, except for those relating to nationality for Islamic banks. Finally, additional tests show that women directors are more active in attending board meetings.

The second study (chapter 5) indicated the differences in market values for banks with women directors appointed to the board, based on their directorship attributes. With regard to the full sample, board gender diversity was significantly and positively associated with bank value in the eyes of investors, as was the presence of independent women board members, women directors with a high level of education, and those holding accounting and finance qualifications. This indicates that investors view these directors' attributes as a signal of good monitoring, qualifications, and resources, in line with the theoretical arguments made in Chapter 3. However, while there was no evidence of women's leadership (i.e. role as chair) having an effect on market value, foreign directors and women members who graduated from foreign universities reduced bank value. In Islamic banks, women on the board reduced market value, but the opposite held for conventional banks. Women's different attributes were found to have the opposite impacts in Islamic banks and conventional banks. This indicates that investors have a propensity to respond differently to the appointment of women directors depending on bank type and they are biased to other women directors' attributes. Moreover, women directors and their attributes appear to have enhanced bank value after the financial crisis years. Generally, the "wonder woman" attributes are linked to independent directorships, postgraduate educational level, having studied accounting and finance, and having local understanding and experience of the home country. The banking industry tends to need strong monitoring and control by board members with good resources in the form of connections and abilities, bringing a good reputation in the market. This conclusion implies that investors tend to seek high-quality governance that will improve the valuation of institutions (Terjesen et al., 2016) and this may entail appointing women directors with particular attributes.

Finally, the findings of the third empirical study (chapter 6) indicate that the presence of women directors on boards is significantly negatively associated with bank risk, as are other attributes (i.e. independent directorships, higher levels of education, and those with accounting and finance qualifications). These outcomes are consistent with the study hypotheses, suggesting that these directors' attributes result in better monitoring due to their

resources, skills, and cognitive capacity. The human capital perspective argues the importance of having diverse board members with different characteristics to enable them to fulfil their duties as a team in taking strategic decisions and upper echelons theory illustrates the efficiency of board diversity. However, the findings show that financial expertise, women directors of foreign nationality, and women who graduated from international universities increase bank risk. In Islamic banks, women directors reduce equity risk, but do not have an impact on other types of risk. They do though lead to a decrease in all risk measures in conventional banks. Women's different attributes have the opposite impact in Islamic banks to that in conventional banks, which suggests that different levels of risk in Islamic banks can be expected than in conventional banks, perhaps related to the restricted business model. Furthermore, additional testing of the effectiveness of women directors in risk management, analysed principally by evaluating the interaction between bank performance and risk, showed more positive results for banks having better risk governance. The findings of this estimation show that women directors enhance the effectiveness of bank risk management. This result is in line with upper echelons theory, showing that board diversity improves decision-making strategies and hence enhances banks' financial status (see Table 7.1).

Independent Variables / Empirical Study	Women Directors	Foreign Directors	PhD Holders	Leadership *(Women Chairpersons)*	Independence *(Women Independent Directors)*	Financial Expertise *(Women Directors)*	Foreign *(Women Directors)*	Education at Postgraduate Level (MSc/PhD) *(Women Directors)*	Graduated from Foreign Universities *(Women Directors)*	Accounting and Finance Qualifications *(Women Directors)*
Study1: *Bank Stability*										
Risk	-ve	+ve	-ve							
Performance	+ve	-ve	+ve							
Cost efficiency	+ve	-ve	+ve							
Study 2: *Market valuation*										
Tobin's Q	+ve			Insignificant	+ve	-ve	-ve	+ve	-ve	+ve
Study 3: *Bank Risk*										
Insolvency Risk	-ve			Insignificant	-ve	+ve	+ve	-ve	+ve	-ve
Credit Risk	-ve			Insignificant	-ve	+ve	+ve	-ve	+ve	-ve
Equity Risk	-ve			Insignificant	-ve	+ve	+ve	-ve	+ve	-ve
Operational Risk	-ve			Insignificant	Insignificant	+ve	Insignificant	-ve	+ve	-ve
Asset Risk	-ve			Insignificant	-ve	Insignificant	+ve	-ve	+ve	-ve

Note: The table presents the main results for the three empirical studies. +ve refers to a significant positive association and -ve refers to a significant negative association.

Table 7.1. Summary of hypothesis testing results for the full study

7.3 Policy and Market Implications

The results of this thesis offer several critical academic and real-world implications for researchers, banks, stakeholders, investors, policymakers, and regulators. The findings present new insights into board diversity and bank soundness, with critical policy implications for regulators governing in countries with dual banking systems. In particular. these implications highlight what is required in terms of applying potential governance reforms and improvements and creating financial and corporate governance codes and standards. The findings of this thesis and theoretical framework clarify previous arguments concerning the influence of various board structures and obligations in enhancing corporate governance structures and the influence on a number of important financial aspects. The theoretical arguments suggest academic implications for researchers to undertake further study on improving corporate governance aspects and examining their effects in terms of real-world outcomes, as well as the characteristics of experts who could be recruited as resources to enhance corporate governance and banks' stability and value. Thus, future research on corporate governance may extend development of a particular theoretical framework.

The findings of the first study (chapter 4) provide critical insights and policy implications for a variety of stakeholders participating in worldwide banking systems, suggesting the value and the differential effects of board diversity in improving bank stability. The positive relationship between women directors and bank stability implies that women enhance financial performance through efficient monitoring of risk, as well as based on educational level (i.e. higher educational level). Theoretically, board members with high educational qualifications, such as a PhD, will be proficient in reducing risk and making better strategic decisions that can encourage better financial performance (Berger et al., 2014). Regarding nationality diversity, the findings indicate differing relationships with bank stability, with a negative association with financial performance being more likely due to high communication and social costs resulting from hiring foreign directors. Therefore, the results indicate that some constraints are required on the number of foreign directors appointed to banking boards in certain countries. Moreover, in countries with different banking models, especially dual banking systems, policymakers and regulators can use the results of this thesis to form and guide board structure. In conventional banks, women directors are positively related to financial performance, but there is no such positive association for Islamic banks. Consequently, policymakers might consider increasing the quota of women directors in conventional banks, while there should be caution when it comes to assigning quotas for women directors within Islamic banks, not least because of the conservative vision of

women's role in the Islamic banking culture. The results also suggest that boards with directors holding PhD qualifications are more stable and this applies to both bank types. This finding calls for regulators to considering quotas for appointing highly educated board members. In terms of national diversity, legislators should also be concerned about issuing regulations concerning the percentage of foreign directors in the two bank types.

Furthermore, this thesis presents valuable insights and policy implications by indicating both the importance of different relationships between board gender diversity and market value for a wide set of stakeholders involved in the international banking system. Women directors increase market valuation, suggesting that investors value the appointing of women to the board, recognizing their effective monitoring and resources as enhancing decision making within the banks as a positive reputational signal. The results of this thesis call for legislators to consider allocating more quotas for highly educated and independent women directors. At the same time, they also need to address the value of domestic education for women members as investors do not tend to prize education undertaken in foreign countries, unlike home education, which can be expected to improve bank value. In terms of nationality and financial expertise, policymakers should issue stronger regulations concerning the numbers of foreign women directors and those with financial expertise in the banking industry. The suggestions presented in this thesis could influence policymakers and steer them to regulate the composition of boards of directors in contrasting ways corresponding to the banking styles, especially in countries with dual banking systems. While the relationship between women directors and market value is positive in conventional banks, investors do not value women members highly on boards in Islamic banking. This outcome can be explained by the complex agency conditions, restricted business model, and emergent nature of the Islamic banking industry. Nevertheless, in both bank types, independent women directors and highly educated members are priced positively by investors. This thesis also presents new and important suggestions for legislators in terms of how they might select women directors based on their attributes and qualities rather than a blanket quota. Moreover, the evidence presented in this study promotes worldwide progress in humanity and justice in relation to acknowledging the importance of empowering women in banking.

Moreover, justifying the latest views of policymakers on the subject of gender diversity on the board, the third empirical study in this thesis supports its importance in potentially mitigating banks' comprehensive risks. In particular, regulators should consider the different attributes of women directors, such as independence, foreign nationality, expertise, educational level, and

background. The findings of this study suggest that women on boards generally, as well as independent women directors, those with higher levels of education, and those with accounting and finance qualifications, play an effective monitoring function and enhance strategic decision making by mitigating risk in their banks.

The findings presented in this study call for policymakers to consider the notion of having particular quotas for independent women directors and those with higher educational qualifications. The results also show the need for increased diversity in nationality and financial expertise, albeit bearing in mind that women directors who graduate from foreign universities are positively associated with bank risk. Legislators should publish clear guidelines for the proportion of foreign women directors and those with financial expertise within the banking sector, but also should be aware of the value of women directors with domestic education and experience. Furthermore, the results of this specific study may support policymakers/regulators in taking into account different structures of boards of directors related to the banking type, particularly in countries operating dual banking systems. Although the presence of women directors mitigates bank risk in conventional banks, a high representation of women directors in Islamic banks may not be valued by shareholders because the only risk they mitigate is equity risk. This could be related to the constricted business style and complication of the agency problem in Islamic banking. In addition, policymakers should consider the bank type when establishing corporate governance regulations in relation to board diversity. In essence, the results of this thesis overall could be beneficial for policymakers and expert agencies concerned with Islamic institutions (e.g. the IFSB) in terms of adjusting or improving governance by expanding board diversity within Islamic banks.

Over the past few years, the growing participation of women directors has reflected continuous increasing efforts with respect to ensuring equal opportunities and inclusive representation on boards in various countries. This study also underlines for policymakers the prospective importance of selecting women directors bearing in mind their different attributes and qualifications rather than implementing a blind gender quota. The evidence also offers encouraging signs in terms of the value of empowering women in banking and the progress of society globally regarding this matter. Indeed, this is consistent with the development of the political agendas in many countries aimed at empowering women in leadership positions following the United Nations General Assembly (2015) dissemination of Sustainable Development Goals (SDG 5) 2030, which identified women's equality as one of the essential

aspects of sustainability (SDG 5) (United Nations, 2015). Accordingly, empowering women was a key item on the G20 summit agenda in 2020, illustrating that this has become an important issue politically in many countries, including Saudi Arabia where the summit was held. Indeed, empowering women is one of the main aspects highlighted in the Saudi Vision 2030, as well as being a prime focus in many other countries. Consequently, these movements will lead to enhanced opportunities for women to attain high levels of education and participate in training courses, consistent with the finding in this thesis that education is an important characteristic in boards of directors in general and for women in particular. Indeed, the findings of this study support the benefits of high educational levels for all directors, having a positive impact on bank soundness and stability, as well as appointing highly educated women and those with finance and accounting qualifications.

In terms of the countries in the sample (Middle Eastern and Asian) in which there is a conservative ideology concerning the role of women, change should begin from government and the elite strata of society which lead the economy and media, encouraging society to empower women and believe in their efficacy in leadership positions. Moreover, the attributes of women directors highlighted in this study should be a role model for the image of women directors in these societies. As suggested by Terjesen et al. (2016), elites and celebrities can play a significant role in making changes and fostering new developments. Moreover, the implications highlighted in this study may encourage stakeholders to appoint more women to bank boards, enabling them to attain critical mass, especially in Gulf countries; the majority of banks in such countries have one woman on their boards, mostly as first directorships. Therefore, increasing the number of women on boards needs government legitimization, which potentially encompasses opening up governance training courses to increase in human capital infrastructure and ensure more appointments of directors equally based on their qualifications without gender bias.

Regarding the implications for banks, the findings draw attention to the importance of directors' attributes that can be used as a positive signal to banks' clients and investors. The publication of bank directors' information in annual reports and on websites can be considered a declaration of rich human capital (i.e. board diversity), reflected in effective monitoring and high-quality decision making and strategizing. Moreover, banks can declare on their websites or in marketing brochures that they have a policy of board diversity, can promote gender diversity in appointing board members to ensure the quality of monitoring, and can demonstrate transparency in appointing directors.

7.4 Limitations and Future Research

The thesis also highlights the influence of institutional attributes regarding board diversity and structures of governance, particularly in countries with dual banking systems. The key limitation is linked to the data. The time-limited duration of the PhD and the time invested in hand collecting data meant that I was unable to consider alternative methods of data collection such as surveys/questionnaires, or interviews/case studies. Therefore, further robustness testshave not been conducted using alternative qualitative methods. It is recognized in corporate governance research that it is challenging to collect data, particularly in emerging countries. Accordingly, the corporate governance data utilised were collected and recorded by hand, which could possibly present some difficulties. The data collection criteria resulted in the omission of a number of countries that did not have both conventional and Islamic banks. Furthermore, each bank required at least three consecutive years of data availability. The lack of data availability and accessibility to sample banks, meant that extending the analyses to capture socio-cultural differences among foreign directors was not possible. Moreover, it was not possible to collect data on many board attributes for the full sample, such as the age, number of years working, the university or school attended, and their family's share in the bank. This lack of data availability in the sample banks, especially Islamic banks, meant it was not possible to broaden the evaluations to include more women directors' attributes such as age and busyness. Moreover, critical mass theory could not be applied because the majority of boards had one or two women rather than three or four. Therefore, future research could consider alternative data collection methods in order to obtain further information on board attributes and evaluate the impact of additional board characteristics while examining the presence of critical mass. Furthermore, future researchers might investigate socio-cultural differences between foreign directors based on their particular nationalities. Differences between countries in the interactions between diversity codes and bank market valuations and bank stability could further be a fruitful opportunity for future research. Moreover, future research could encompass cultural attitudes by controlling for different cultural effects in board diversity and bank stability and soundness.

The thesis has mostly concentrated on the attributes of women. To conduct an investigation comparing women with men would be more complex in terms of data collection, the theoretical framework, and justification of the results. It was beyond the scope and context of this thesis, but future studies may wish to compare and contrast the attributes of women and men.

Future research could also carry out surveys, applying questionnaires or interviews with board members that consider their diversity, or could undertake case studies in specific banks before and after appointing directors with different attributes. Moreover, they could obtain different information and do more exhaustive explorations, such as considering the stakeholders' opinions and other aspects of board diversity or identifying the changing effects of board diversity on banks. In addition, the ownership structure could be a beneficial aspect of research in terms of interacting with board diversity in Islamic banks, as has already been done for conventional banks. Moreover, the diversity of *Shari'ah* supervisory boards could be investigated in future research. Also, this thesis only investigates the influence of board diversity on banks in terms of stability (i.e. performance, risk, and efficiency) and market valuation. Potential research could investigate other financial indicators, such as funding and venture capital, risk management, earnings management, dividend policy, accounting conservatism, innovation, and corporate social responsibility, etc. Finally, this thesis focused on specific regions to examine the performance of two banking systems through empirical investigations and many of the desirable data were missing. The study findings could be enhanced by re-examining the impact of corporate governance structure on bank stability, market valuation, and risk employing a worldwide sample.

Appendix A. Variable Definitions

Variable Names	Abbreviations	Definitions
Panel A: DEPENDENT VARIABLES		
Insolvency risk	Log(1/Z-score)	The Z-score is the probability of default, calculated as the sum of the return on assets (ROA) plus the capital assets ratio (CAR) divided by the standard deviation of ROA. The proxy for insolvency risk is Log(1/Z-score) which is the inverse of Z-Score. The higher the log of the (1/ Z-score), the higher the insolvency risk.
Credit risk	LLR/GL	The ratio of loan loss reserves to gross loans. The higher the ratio, the higher the credit risk.
Operational risk	SDROAA	Three years rolling standard deviation of return on average asset to measure operational risk. The higher value the higher operational risk.
Equity risk	ER	Equity risk is the total risk measured by the standard deviation of 60 monthly stock return consecutively with a minimum of 36 months to reflect the Equity risk.
Asset risk	ROAA/SDROAA	ROAA scaled by the standard deviation of ROAA, and the lower the ratio the higher the assets risk.
Return on average assets	ROAA	Net income divided by average total assets.
Return on average equity	ROAE	Net income divided by average total equity.
Cost inefficiency	COST/INCOME	Cost-to-income ratio.
Tobin's Q	LogTobin's Q	Natural logarithm of Tobin's Q ratio, which is measured by the sum of a bank total debt and market value of equity, divided by its book value of total assets. The market value of equity is computed as the number of outstanding shares multiplied by the stock price at the balance sheet date.
Market capitalization	Market Cap	Natural logarithm of the bank's market capitalisation which is calculated by stock price per share multiplied by the number of shares outstanding.
Panel B: MAIN CORPORATE GOVERNANCE VARIABLES		
Women's directorship (Chapter 3)	WOMEN%	Percentage of women directors on the board (%).
Foreign directors (Chapter 3)	FOREIGN%	Percentage of foreign nationals (%).
PhD holders (Chapter 3)	PhD%	Percentage of directors with a PhD (%).
Women's directorship (Chapters 4 and 5)	WOMEN	Ratio of women directors on the board to total board members.
Independent women directors	Indep_ Women	Ratio of independent non-executive women directors to total women directors.
Women chairpersons	Chair_ Women	Dummy variable equal to 1 if the Chairperson is a woman and zero otherwise.
Women directors with financial expertise	Expertise_Women	Ratio of women directors with experience (present or past) as an executive officer (i.e., CEO, CFO and CRO) in a bank or insurance company or academic institution (e.g. professor in finance, accounting, economics, or business) to total women directors.
Foreign women directors	Foreign_Women	Ratio of foreign women directors to total women directors.
Women directors with higher education	PostGrad_Women	Ratio of women directors with a master (MSc/MBA) degree or higher (PhD included) to total women directors.
Women international graduate directors	Inter_Univ_Women	Ratio of women directors who graduated from a foreign university to total women directors.
Women directors with finance and accounting qualification	Acc&Fin_Women	Ratio of women directors with financial/accounting qualification (undergraduate or postgraduate degree in finance, accounting, or Islamic finance) to total women directors.

Blau's index	Blau's index	$$Blau's\ index = 1 - \sum_{i=1}^{2} b_i^2$$
		where b_i is the fraction of men and women on bank boards, and i indicates gender.

Panel C: CONTROL CORPORATE GOVERNANCE VARIABLES

Board size	BODSIZE	Natural logarithm of the total number of board of directors' members.
Board independence (Chapter 3)	Indep%	Percentage of independent non-executive directors on the board of directors (%).
Board independence (Chapters 4 and 5)	Indep	Proportion of independent non-executive directors on the board of directors.
Shari'ah supervisory board size	SSB	Natural logarithm of the total number of Shari'ah supervisory board members.
CEO duality	CEODUAL	Dummy variable equal to 1 if the CEO is also the chairman of the board of directors and zero otherwise.
CEO women	CEO_WOMEN	Dummy variable equal to 1 if the CEO is a woman and zero otherwise.
CEO with a Master's degree or above	CEOQUAL	Dummy variable equal to 1 if the CEO holds a Master's degree or higher and zero otherwise.
CEO foreign	CEOFOR	Dummy variable equal to 1 if the CEO is of foreign nationality and zero otherwise.

Panel C: BANK and COUNTRY LEVEL CONTROL VARIABLES

CAPEX/TA	LOG(CAPEX/TA)	Natural logarithm of the ratio of capital expenditures to assets
Bank leverage	LEVERAGE	Total liabilities divided by book value of equity.
Equity/total assets	EQ/TA	Ratio of equity to total assets as a proxy for bank capitalization.
Capital adequacy ratio	CAR	Ratio of Tier 1 and Tier 2 capital to the risk-weighted assets.
Bank size	LogTA	Natural logarithm of total assets of a bank at the end of the fiscal year.
Bank age	AGE	The difference between the sample current year and the establishment bank's year.
Log bank age	LogAGE	Natural logarithm of the difference between the sample current year and the establishment bank's year.
Listed bank	LISTED	Dummy variable equal to 1 if the bank is listed on a stock market and zero otherwise.
Islamic bank	IB	Dummy variable equal to 1 if the bank is Islamic and zero otherwise.
Islamic window	WINDOW	Dummy variable equal to 1 if the conventional bank has an Islamic window and zero otherwise.
BIG4	BIG4	Dummy variable equal to 1 if the bank is audited by a Big4 company and zero otherwise.
Herfindahl–Hirschman index	HHI	The Herfindahl–Hirschman index, calculated by the square of the sum of the ratio of total assets of each bank-year-country to total assets of all banks each year in each country. It takes a value between zero and 1. A higher HHI shows higher bank concentration.
GDP growth rate	GDP	Annual gross domestic product growth rate.
Control of corruption	CORR	The index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance; higher values infer better control of corruption. Used to capture the quality of national governance (Source: World Bank).
Rule of law	Rule of law	The index ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance; it reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract

		enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. This indicates that higher values suggest a stronger rule of law. (Source: World Bank).
Governance Index	Governance_Index	This index calculated by the average of six governance measures (the regulatory quality, rule of law, control of corruption, political stability, governance effectiveness, and the voice and accountability). Each index of the governance measure ranges from approximately -2.5 (weak) to 2.5 (strong) for governance performance; higher values infer better governance. Used to capture the quality of national governance (Source: World Bank).
Year crisis dummy	CRISIS	Dummy variable equal to 1 if the year = 2007–2009 and zero otherwise.
Large board	Large Board	Board with membership that is greater in size than 9 members (i.e. median number of members).
Small board	Small Board	Board with membership that is equal or below in size than 9 members (i.e. median number of members).
Attendance problems	Attendance Problem	Percentage of board members who fail to attend 75% of board meetings in each bank and in each year.
Board meetings	# Board Meetings	Total number of board meetings in one year in each bank.

Note: This table shows definitions and measurements for all variables in the models used in the thesis.

Table A1. Study variable definitions

Appendix B. Average Values for the Three Measures of Board Diversity, Separated by Board Size

Variable	Large Board		Small Board	
	N	Mean	N	Mean
WOMEN%	607	8.409	715	7.679
FOREIGN%	607	23.478	706	14.946
PhD%	606	11.597	710	6.790

Note: This table shows the average values for the three measures of diversity, separated into large and small board size for full sample from 2007 to 2017 for the Study 1.

Table B1. Average values for the three measures of board diversity by board size (Study 1)

Appendix C. Logistic Regressions for the ROAA Model Adopting the BOARD_DIVERSITY_Index and Further Details of the Matched Samples

BOARD_DIVERSITY_Index	Coefficient
BODSIZE	2.065***
	(0.320)
Indep	0.816
	(0.671)
CEODUAL	-0.242
	(0.204)
Insolvency Risk	-0.077
	(0.061)
LogTA	-0.071***
	(0.022)
LEVERAGE	0.034
	(0.027)
AGE	0.371***
	(0.104)
IB	0.848***
	(0.191)
WINDOW	0.623***
	(0.173)
LISTED	-0.775***
	(0.203)
CORR	0.221
	(0.141)
GDP	0.019
	(0.020)
Constant	-5.745***
	(0.954)
Observations	984
Pseudo R2	0.075

Note: The table shows the logistic regressions for the ROAA model adopting BOARD_DIVERSITY in the sample from 2007 to 2017. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses. Heteroscedasticity-robust standard errors are in parentheses.

Table C1. Logistic regressions for the ROAA model adopting BOARD_DIVERSITY in the sample from 2007 to 2017 (Study 1)

Comparison tests between the treatment and control groups in the matched sample

Variable					
ROAA					
Sample	Treated	Controls	Difference	SE	*t*-stat
Unmatched	1.279	1.346	-0.067	0.084	-0.790
Matched	1.279	1.468	-0.188	0.116	-1.630
Covariate balance summary					
Number of observations		Unmatched		Matched	
Number of obs		984		828	
Treated obs		414		414	
Control obs		570		414	

Table C2. Comparison between the treatment and control groups in the matched sample for the PSM ROAA model (Study 1)

	Matched Sample		
Variable	Treated	Control	t-test
BODSIZE	2.310	2.324	-0.960
Indep	0.288	0.283	0.550
CEODUAL	0.138	0.121	0.720
Insolvency Risk	-3.955	-3.869	-0.960
LogTA	14.128	13.931	0.810
LEVERAGE	8.600	8.850	-1.270
LogAGE	3.523	3.468	1.140
IB	0.261	0.232	0.970
WINDOW	0.263	0.291	-0.850
LISTED	0.797	0.848	-1.910*
CORR	-0.070	-0.120	1.230
GDP	1.500	2.535	-4.180***

Note: The above table shows the differences and comparison between treatment group and control group for controls variables that are used in the ROAA main model. Matched sample analysis is carried out using the PSM procedure for the treatment group (if the board diversity index is higher than or equal to the sample mean of the board diversity index) and the control group (if the board diversity index is lower than the sample mean of the board diversity index or zero). The number of obesvations in the matched sample (control group) is 414 (414).

Table C3. Comparison between the treatment and control groups for the control variables in the ROAA main model (Study 1)
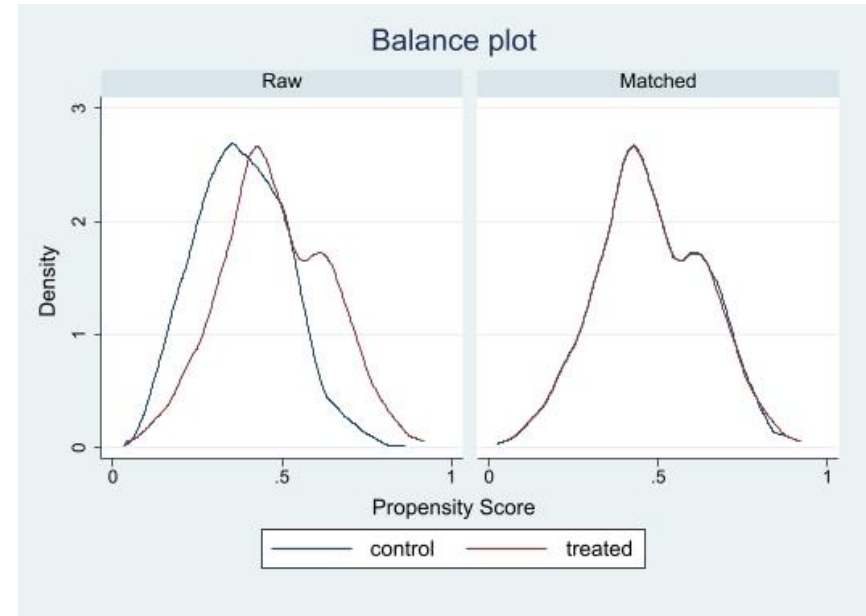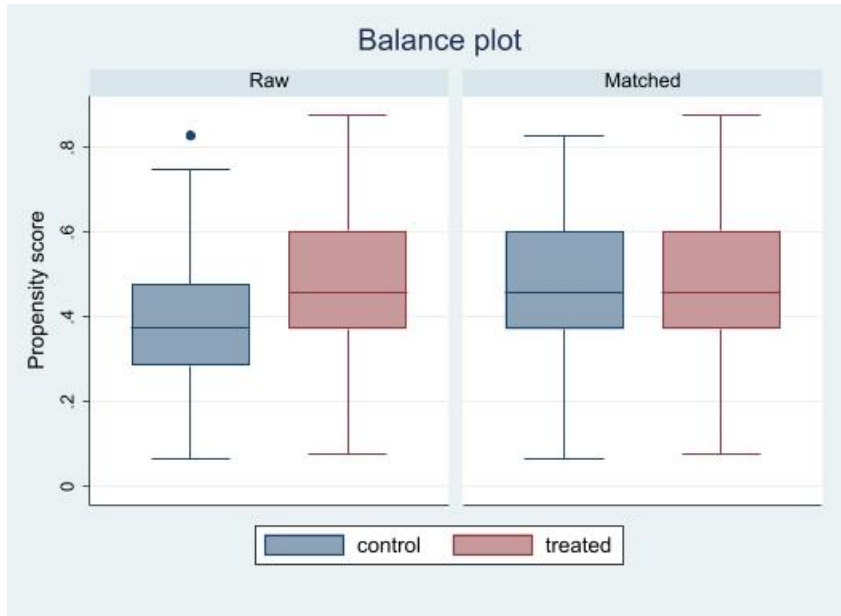
Note: Balancing test for the PSM. These figures report the performance of the balancing test between high-gender diversity banks (treated group) and low-gender diversity (control group) banks for the sample before matching (Raw) and after matching (Matched).

Figure C1. Balancing test for the PSM ROAA model (Study 1)

Appendix D. Logistic Regressions for the COST/INCOME Model Adopting the BOARD_DIVERSITY_Index and Further Details of the Matched Samples

BOARD_DIVERSITY_Index	Coefficient
BODSIZE	2.235***
	(0.330)
Indep	0.950
	(0.691)
CEODUAL	-0.330
	(0.209)
Insolvency Risk	-0.112*
	(0.062)
LogTA	-0.097***
	(0.023)
LEVERAGE	0.041
	(0.028)
AGE	0.384***
	(0.106)
IB	0.837***
	(0.196)
WINDOW	0.608***
	(0.175)
LISTED	-0.777***
	(0.209)
CORR	0.215
	(0.144)
GDP	0.030
	(0.020)
Constant	-5.997***
	(0.982)
Observations	959
Pseudo R2	0.084

Note: The above table shows the logistic regressions for COST/INCOME model adoption of BOARD_DIVERSITY in the sample from 2007 to 2017. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively and p-values are shown in parentheses. Heteroscedasticity-robust standard errors are in parentheses.

Table D1. Logistic regressions for the COST/INCOME model adopting BOARD_DIVERSITY in the sample from 2007 to 2017 (Study 1)

Comparison tests between the treatment and control groups in the matched sample

Variable					
COST/INCOME					
Sample	Treated	Controls	Difference	SE	*t*-stat
Unmatched	50.397	47.773	2.625	1.185	2.220
Matched	50.397	46.430	3.967	1.811	2.190
Covariate balance summary					
Number of observations		Unmatched		Matched	
Number of obs		959		816	
Treated obs		408		408	
Control obs		551		408	

Table D2. Comparison between the treatment and control groups in the matched sample for the COST/INCOME model (Study 1)

	Matched Sample		
Variable	Treated	Control	*t*-test
BODSIZE	2.312	2.344	-1.680*
Indep	0.285	0.266	2.260***
CEODUAL	0.137	0.127	0.410
Insolvency Risk	-3.968	-3.820	-1.660*
LogTA	14.218	14.300	-0.350
LEVERAGE	8.586	8.790	-0.940
LogAGE	3.520	3.492	0.600
IB	0.252	0.289	-1.180
WINDOW	0.267	0.284	-0.550
LISTED	0.799	0.879	-3.160***
CORR	-0.066	-0.128	1.470
GDP	1.507	1.628	-0.450

Note: The above table shows the differences and comparison between treatment group and control group for the control variables used in the COST/INCOME main model. Matched sample analysis is carried out using the PSM procedure for the treatment group (if the board diversity index is higher than or equal to the sample mean of the board diversity index) and the control group (if the board diversity index is lower than the sample mean of the board diversity index or zero). Number of observations for the matched sample (408) and control group (408).

Table D3. Comparison between the treatment and control groups for the control variables used in the COST/INCOME model (Study 1)
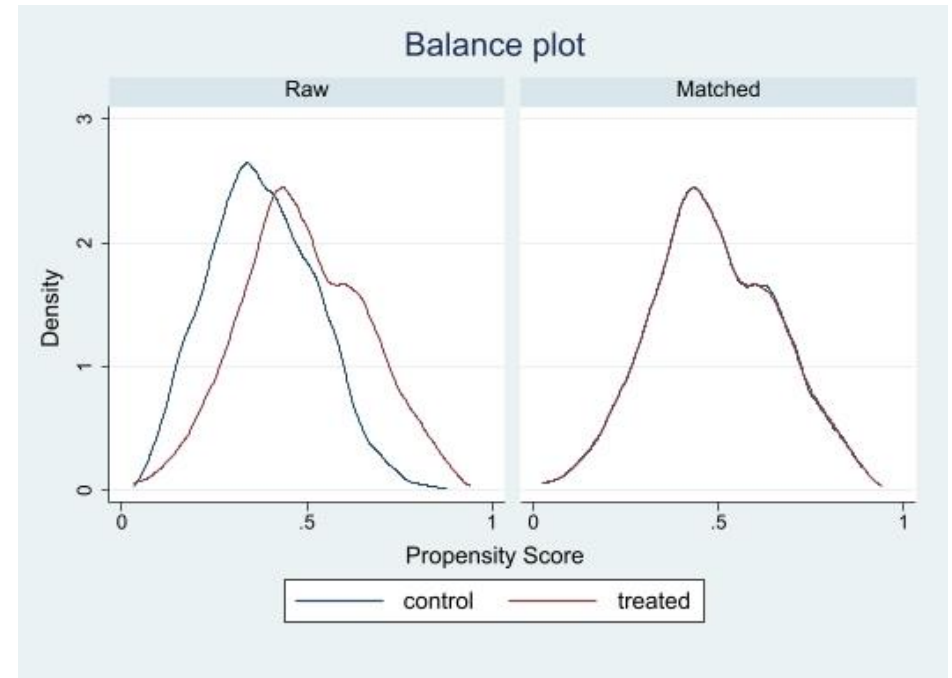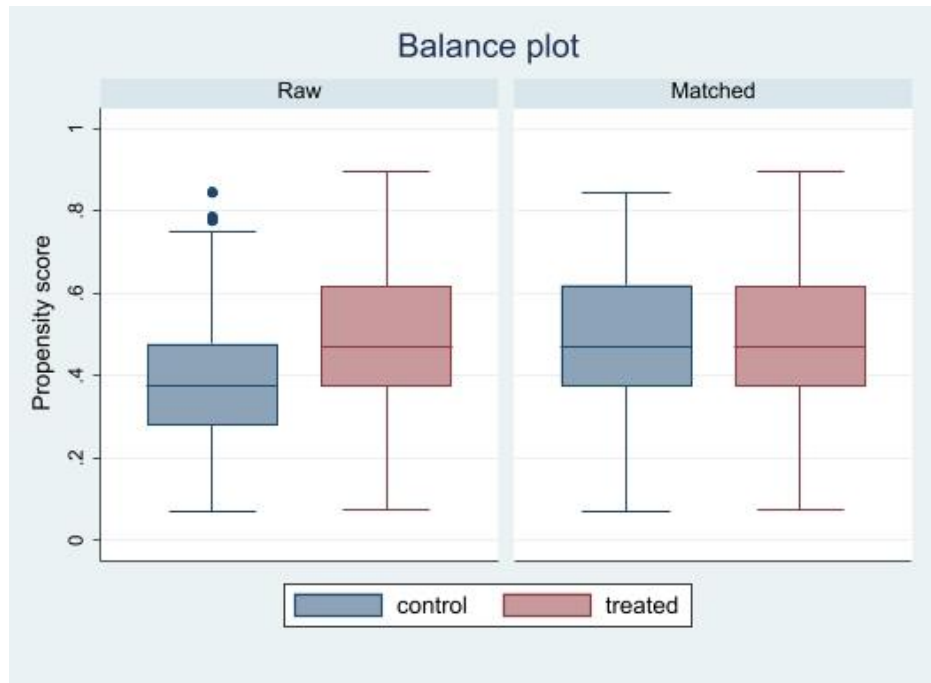
Note: The above figures show the balancing test for the PSM. These figures report the performance of the balancing test between high-gender diversity banks (treated group) and low-gender diversity (control group) banks for the sample before matching (Raw) and after matching (Matched).

Figure D1. Balancing test for the PSM COST/INCOME model (Study 1)

Appendix E. Logistic Regressions for Market Value LogTobin's Q Model Adopting the Dummy for Women Directors and Further Details of the Matched Samples

Women dummy	Coefficient
BODSIZE	3.319***
	(0.535)
Indep	1.200**
	(0.847)
CEODUAL	1.281***
	(0.274)
CEO_Women	2.820***
	(0.557)
LOG(CAPEX/TA)	-0.497
	(0.341)
BIG4	-0.779***
	(0.288)
LogAGE	0.696***
	(0.172)
LEVERAGE	0.038
	(0.046)
LogTA	-0.048
	(0.064)
WINDOW	-0.159
	(0.254)
IB	-0.684**
	(0.312)
GDP	0.112***
	(0.034)
Governance_Index	-0.328
	(0.203)
HHI	-0.189
	(0.872)
Constant	-10.070***
	(1.679)
Observations	639
Pseudo R2	0.268

Note: The above table shows the logistic regressions for the LogTobin's Q model adopting the women dummy variable (at least 1 woman director) in the sample from 2007 to 2017. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively. Heteroscedasticity-robust standard errors are in parentheses.

Table E1. Logistic regressions for the LogTobin's Q model adopting the women dummy variable (Study 2)

| Comparison tests between the treatment and control groups of the matched sample					
Variable					
LogTobin's Q					
Sample	Treated	Controls	Difference	SE	*t*-stat
Unmatched	0.130	0.162	-0.032	0.007	-4.550
Matched	0.130	0.141	-0.011	0.014	-0.780
Covariate balance summary					

Number of observations	Unmatched	Matched
Number of obs	639	522
Treated obs	261	261
Control obs	378	261

Table E2. Comparison between the treatment and control groups in the matched sample for the LogTobin's Q model (Study 2)

Matched Sample			
Variable	Treated	Control	t-test
BODSIZE	2.436	2.376	3.080***
CEODUAL	0.241	0.245	-0.101
Indep	0.292	0.292	0.020
CEO_Women	0.088	0.176	-2.990***
LOG(CAPEX/TA)	0.221	0.184	0.830
BIG4	0.575	0.697	-2.930***
LogTA	14.700	15.100	-1.560
LEVERAGE	8.600	8.510	0.170
LogAGE	3.600	3.800	-3.090***
IB	0.100	0.120	-0.580
WINDOW	0.234	0.184	1.400
HHI	0.200	0.213	-1.560
Governance_Index	-0.700	-0.420	-3.390***
GDP	2.700	2.200	1.79**

Note: Table shows the comparison between the treatment and control groups for the control variables used in the LogTobin's Q main model. Matched sample analysis is carried out using the PSM procedure, with a treatment group (banks with at least one female director) and control group (banks with only male directors). PSM yields a matched sample including 522 observations: 261 treatment observations (banks with at least one female director) and 261 control observations (banks with only male directors). Models are tested for the period 2007–2017.

Table E3. Comparison between the treatment and control groups for the control variables used in the LogTobin's Q model (Study 2)
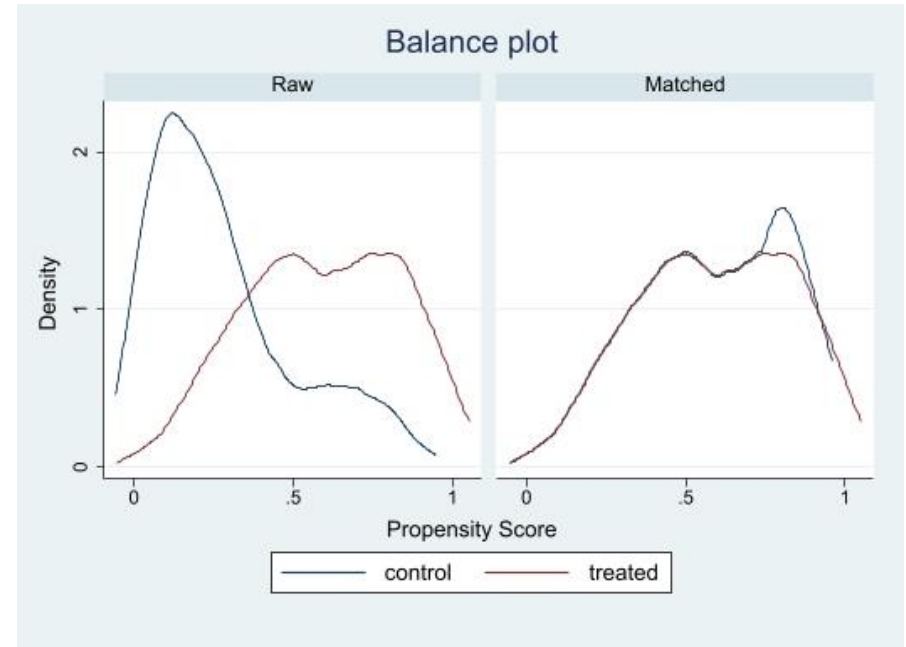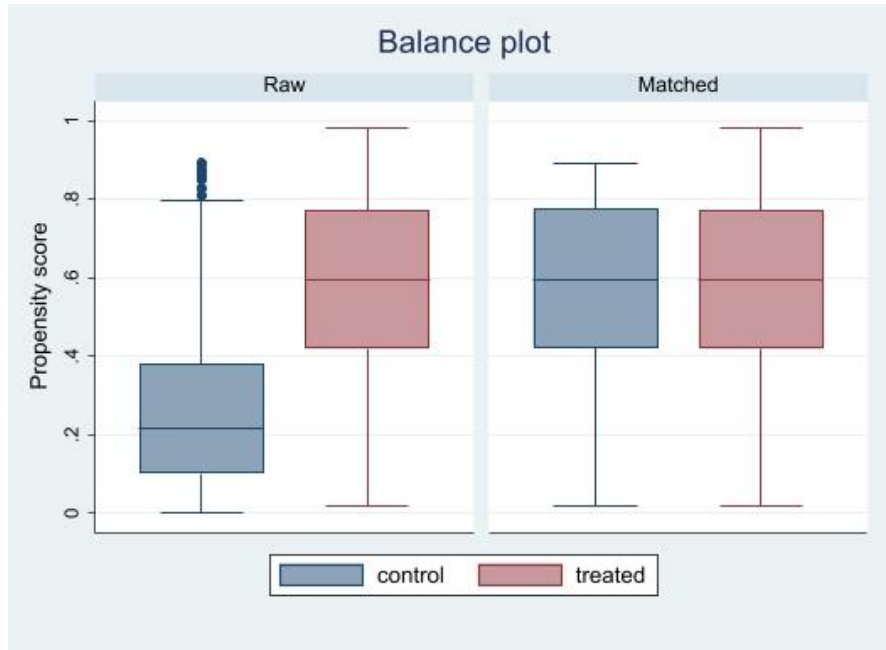
Note: The above figures show the balancing test for the PSM. These figures report the performance of the balancing test between banks with at least one female director (treated group) and banks with only male directors (control group) banks for the sample before matching (Raw) and after matching (Matched).

Figure E1. Balancing test for the PSM LogTobin's Q model (Study 2)

Appendix F. Logistic Regressions for the Insolvency Risk Model Adopting the Women Dummy Variable and Details of the Matched Samples

Women dummy	Coefficient
BODSIZE	4.150***
	(0.553)
Indep	2.022**
	(0.893)
CEODUAL	1.252***
	(0.276)
CEO_Women	2.898***
	(0.533)
LOG(CAPEX/TA)	-0.869***
	(0.337)
LogTobin's Q	1.315
	(1.390)
EQ/TA	-0.037
	(0.050)
LogAGE	0.654***
	(0.167)
LEVERAGE	0.083*
	(0.042)
LogTA	-0.156**
	(0.064)
IB	-0.894***
	(0.312)
WINDOW	-0.447*
	(0.245)
GDP	0.127***
	(0.035)
Governance_Index	-0.292
	(0.343)
HHI	-1.171
	(0.956)
Constant	-11.217***
	(1.879)
Observations	677
Pseudo R2	0.252

Note: The table shows the logistic regressions for the insolvency risk model adopting the women dummy variable (at least one woman director) in the sample from 2010 to 2017. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively. Heteroscedasticity-robust standard errors are in parentheses.

Table F1. Logistic regressions for the insolvency risk model adopting the women dummy variable (Study 3)

Comparison tests between the treatment and control groups of the matched sample					

Variable

Insolvency risk log(1/Z-score)

Sample	Treated	Controls	Difference	SE	t-stat
Unmatched	-3.887	-3.980	0.093	0.093	0.990
Matched	-3.887	-3.854	-0.033	0.193	-0.170
Covariate balance summary					

Number of observations	Unmatched	Matched
Number of obs	677	532
Treated obs	266	266
Control obs	411	266

Table F2. Comparison between the treatment and control groups in the matched sample for the insolvency risk model (Study 3)

	Matched Sample		
Variable	Treated	Control	t-test
BODSIZE	2.439	2.352	4.520***
CEODUAL	0.200	0.263	-1.750
Indep	0. 304	0.320	-1.300
CEO_Women	0. 120	0.150	-0.890
LOG(CAPEX/TA)	0.220	0.240	-0.370
LogTobin's Q	0.130	0.142	-2.010**
EQ/TA	11.382	11.567	-0.570
LogTA	14.615	14.630	-0.150
LEVERAGE	8.600	8.566	0.060
LogAGE	3.600	3.800	-4.660***
IB	0.090	0.100	-0.150
WINDOW	0.220	0.191	0.750
HHI	0.200	0.210	-1.020
Governance_Index	-0.322	-0.334	0.340
GDP	2.450	2.200	0.930

Note: The table shows the comparison between the treatment and control groups for the control variables used in the insolvency risk log (1/Z-score) main model. Matched sample analysis was carried out using the PSM procedure for a treatment group (banks with at least one female director) and control group (banks with only male directors). The matched sample comprised 490 cases: 266 treatment cases and 266 control cases. The models are tested for the period 2010–2017.

Table F3. Comparison between the treatment and control groups for the control variables used in the insolvency risk model (Study 3)
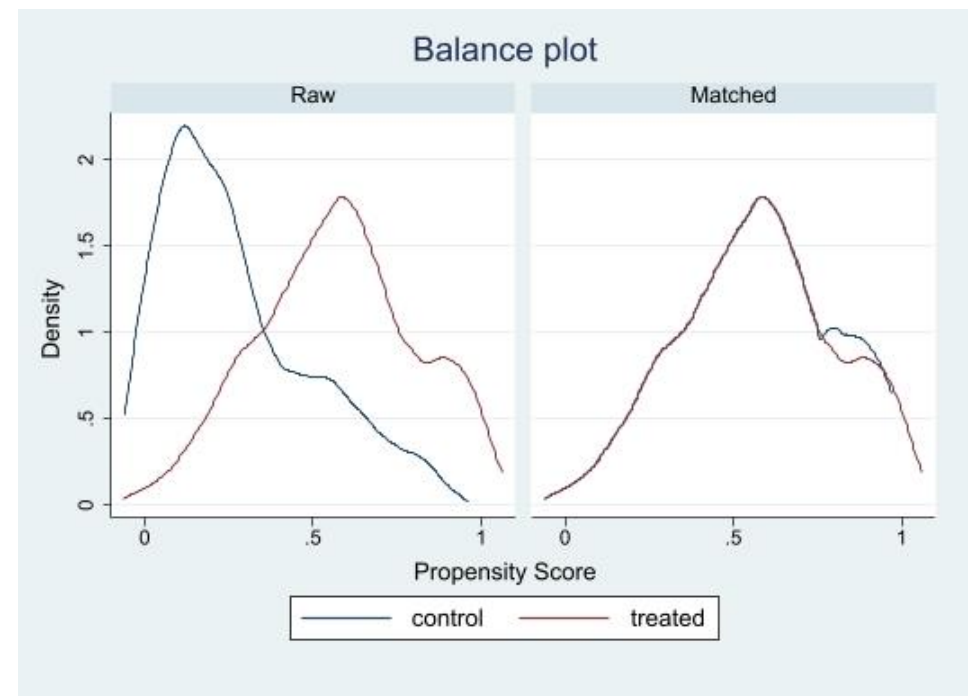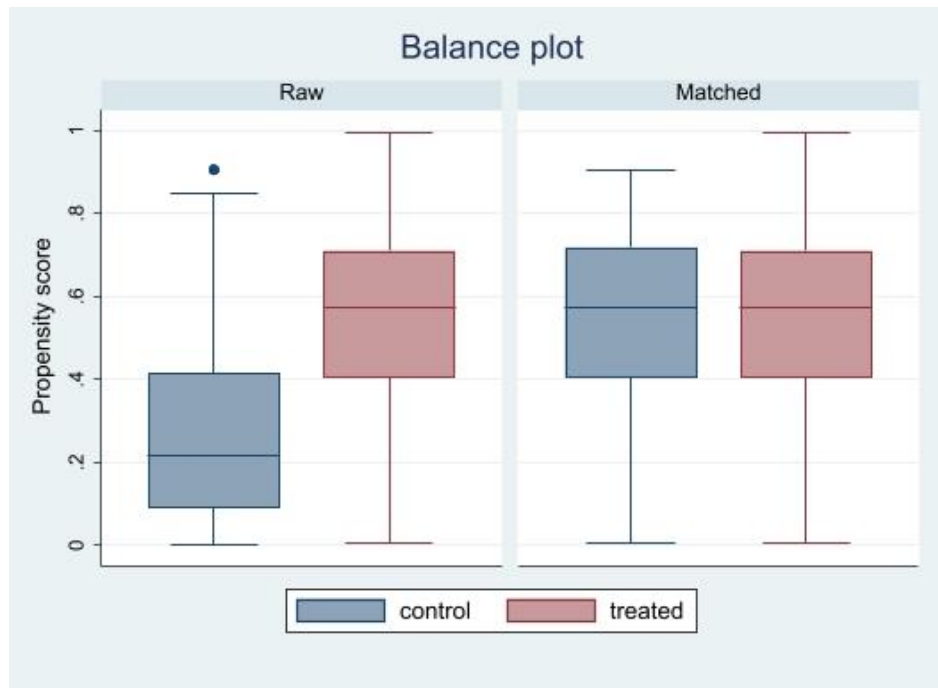
Note: The figures show the balancing test for the PSM. These figures report the performance of the balancing test between banks with at least one female director (treated group) and banks with only male directors (control group) for the sample before matching (Raw) and after matching (Matched).

Figure F1. Balancing test for the PSM insolvency risk model (Study 3)

Appendix G. Logistic Regressions for the Credit Risk Model Adopting the Women Dummy Variable and Details of the Matched Samples

Women dummy	Coefficient
BODSIZE	3.986***
	(0.547)
Indep	1.845**
	(0.871)
CEODUAL	1.243***
	(0.274)
CEO_Women	2.886***
	(0.533)
LOG(CAPEX/TA)	-0.793**
	(0.332)
LogTobin's Q	0.805
	(1.344)
EQ/TA	-0.017
	(0.047)
LogAGE	0.687***
	(0.171)
LEVERAGE	0.088**
	(0.042)
LogTA	-0.134**
	(0.063)
IB	-0.967***
	(0.318)
WINDOW	-0.468*
	(0.247)
GDP	0.130***
	(0.034)
Governance_Index	-0.231
	(0.332)
HHI	-0.913
	(0.936)
Constant	-11.489***
	(1.869)
Observations	684
Pseudo R2	0.248

Note: The table shows the logistic regressions for the credit risk model adopting the women dummy variable (at least one woman director) in the sample from 2010 to 2017. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively. Heteroscedasticity-robust standard errors are in parentheses.

Table G1. Logistic regressions for the credit risk model adopting the women dummy variable (Study 3)

Comparison tests between the treatment and control groups of the matched sample

Variable					
Credit risk LLR/GL					
Sample	Treated	Controls	Difference	SE	*t*-stat
Unmatched	1.559	1.522	0.037	0.093	0.930
Matched	1.559	1.692	-0.133	0.090	-1.480
Covariate balance summary					
Number of observations		Unmatched		Matched	
Number of obs		684		524	
Treated obs		262		262	
Control obs		422		262	

Table G2. Comparison between the treatment and control groups in the matched sample for the credit risk model (Study 3)

	Matched Sample		
Variable	Treated	Control	*t*-test
BODSIZE	2.433	2.353	4.250***
CEODUAL	0.202	0.209	-0.220
Indep	0. 306	0.299	0.560
CEO_Women	0. 122	0.179	-1.830*
LOG(CAPEX/TA)	0.223	0.139	2.000**
LogTobin's Q	0.130	0.132	-0.240
EQ/TA	11.705	11.571	0.400
LogTA	14.649	15.260	-2.550**
LEVERAGE	8.468	8.997	-1.810*
LogAGE	3.604	3.730	-2.750***
IB	0.076	0.992	-0.930
WINDOW	0.210	0.214	-0.110
HHI	0.204	0.205	-0.150
Governance_Index	-0.296	-0.300	0.120
GDP	2.329	2.319	0.030

Note: The table shows the comparison between the treatment and control groups for the control variables used in the credit risk LLR/GL main model. Matched sample analysis was carried out using the PSM procedure for a treatment group (banks with at least 1 female director) and control group (banks with only male directors). The matched sample comprised 490 cases: 262 treatment cases and 262 control cases. The models are tested for the period 2010–2017.

Table G3. Comparison between the treatment and control groups for the control variables used in the credit risk model (Study 3)
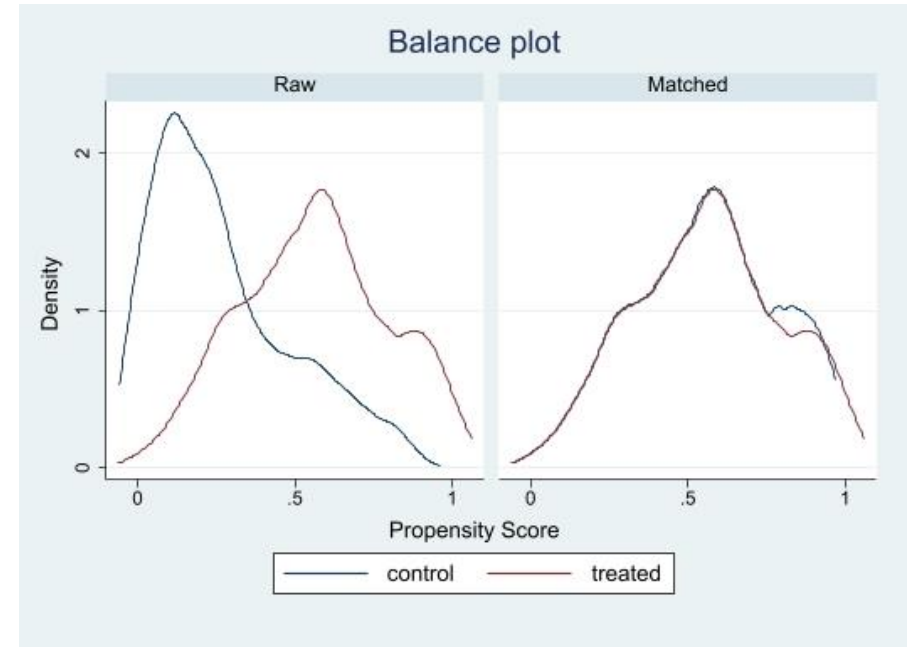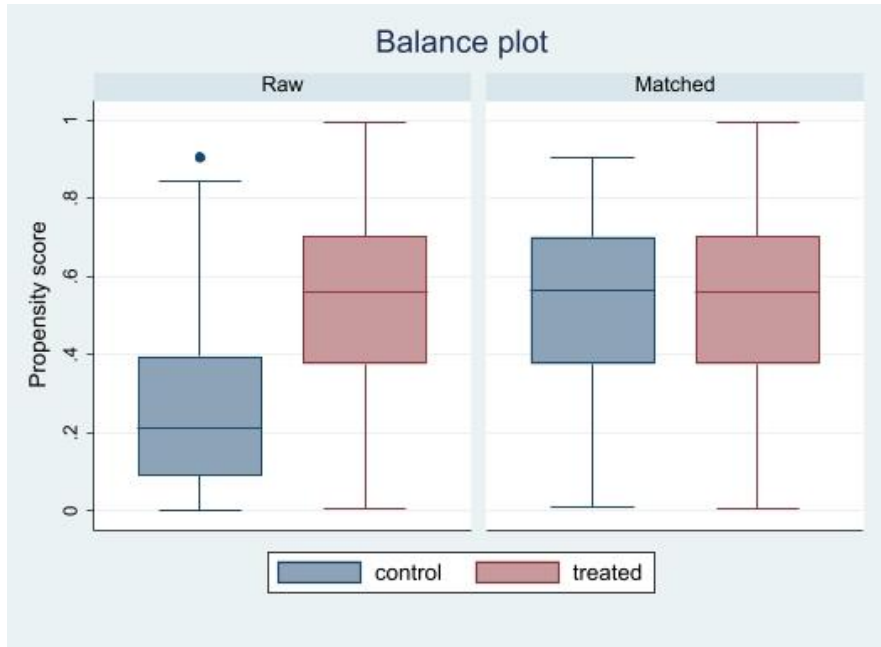
Note: The figures show the balancing test for the PSM. These figures report the performance of the balancing test between banks with at least one female director (treated group) and banks with only male directors (control group) banks for the sample before matching (Raw) and after matching (Matched).

Figure G1. Balancing test for the PSM credit risk model (Study 3)

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