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# Board Gender Diversity, Risk-taking and Performance: Evidence from Dual Banking Systems

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**Abstract.** This paper investigates whether and how differently performance of Islamic banks is affected when female directors sit in the board. We study a unique sample of 1,528 observations on 71 Islamic banks and 120 conventional banks operating in eleven Muslim countries over 2010-2017 period. We find that Islamic banks with more female directors have a lower credit risk and inefficiency relative to conventional banks. However, we find no significant relationship for other performance indicators such as net interest margin and profitability. Overall, the analysis shows that the performance of Islamic banks is not adversely affected by the appointment of females in the board. The results have implications for promotion of gender equality and inclusive corporate culture in countries with dual banking systems.

**Keywords:** Bank performance, Female directorship, Gender diversity, Islamic banking

**JEL classification code:** G21, G30, G34

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## 1. Introduction

Gender diversity in the boardroom is an ongoing debate in academia and empirical findings are inconclusive. Adams and Ferreira (2009) study US non-financial corporations and show that boards with more female directors monitor more strongly, whereas Berger, Kick and Schaeck (2014) claim that boards with a higher proportion of female directors increase portfolio risk. Sila, Gonzalez and Hagendorff (2016) find no evidence that female directors influence equity risk. Yet, corporations are under social and legislative pressures to increase female members of their board and regulators in several countries have set a quota legislation for female directors<sup>1</sup>. Gender-diversity is more controversial for Islamic banks than their conventional counterparts and in this paper, our objective is to explore the relationship between presence of female members in the board and performance of Islamic banks.

Islamic banking was incepted based on an orthodox view of Islam (Abedifar, 2017). Several Islamic banks have established special branches for women (See for instance, Women-only bank branches in UAE and Saudi Arabia). However, we observe that female directors are appointed in the board of Islamic banks, which might look controversial in a sense that this trend is somewhat contradict with orthodox view of Islam. It is interesting to explore how differently performance of Islamic banks is affected by gender diversity in the board of directors compared to that of their conventional counterparts.

The studies on conventional corporations show that board members' monitoring and advising are more effective when they can obtain firm-specific information from CEOs, who are generally reluctant to share such information with the board to avoid more intensive monitoring (Adams and Ferriera, 2007). Female directors can better conduct their responsibilities because

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<sup>1</sup>For instance in Norway, Spain and France, at least 40% of the board must be allocated to female directors (Nekhili and Gatfaoui, 2013). Moreover, Norway (46.7%), France (34%), and Sweden (33.6%) had the highest percentages of females on their boards (Catalyst Census, 2016).

they are more effective in building mutual trust (Beck, Behr and Guettler, 2012) and hence can obtain more proprietary information from CEOs. Moreover, presence of women in the boardroom can represent the inclusive corporate culture, and such corporations might benefit from a broader talent pool in their management (Higgs, 2003).

However, there are some countervailing arguments that cast doubt on the positive impact of presence of female directors on the performance of Islamic banks. Firstly, on the one hand, recent studies show that women are more risk averse than men (Faccio, Marchica and Mura, 2016; Perryman, Fernando and Tripathy, 2016). On the other hand, the literature shows that religious people are also more risk averse (Miller and Hoffmann, 1995; Osoba, 2003). Moreover, Shari'ah supervision boards (SSBs) are a significant feature of Islamic banks and are considered as the "Supra Authority" and represent an additional layer of governance (Choudhury and Hoque, 2006) and might further restrain management. Hence, presence of women in the boardroom of Islamic banks might persuade the management to adopt too conservative strategy, and thereby make the Islamic banks less competitive. This is in line with Adams and Ferreira (2009) who study US non-financial firms and claim that the boards with more female directors monitor more strongly, which can adversely affect well-governed corporations.

Secondly, gender diversity may represent less religiosity of the Islamic banks to the eyes of Muslims with orthodox view of Islam, and this may adversely affect performance of Islamic banks. Using social role theory, Chizema, Kamuriwo and Shinozawa (2015) find that countries with higher levels of religiosity are more likely to have fewer female board appointments. These factors might hinder equity-holders of Islamic banks to appoint female directors.

We study a unique and hand-collect sample of 1,528 observations on 71 Islamic banks and 120 conventional banks operating in eleven Muslim countries over 2010-2017 period. The data

shows that the share of females in the board has significantly increased from 3% in 2010 to 7% in 2017, which is far below the quota legislation introduced in a number of advanced economies. This underscores the necessity of further actions for promotion of gender equality. Islamic banks have on average slightly lower female directors in their boards compared to their conventional counterparts. Our analysis shows that presence of female directors in the board does not adversely affect the performance of Islamic banks, relative to conventional banks. In fact higher board gender diversity in Islamic banks is associated with higher loan quality and lower cost inefficiency compared to their conventional counterparts. However, we find no significant relationship for other performance indicators such as net interest margin and profitability. The results have implications for policy-makers and investors for further promotion gender equality and inclusive corporate culture in countries with dual banking systems.

This study contributes to the literature on banking in several ways. First, it extends the large literature on Islamic banking, by showing that Islamic banks are not adversely affected by gender diversity in their board. The previous studies show that Islamic banks are different from conventional banks in various aspects, such as credit risk (Abedifar, Molyneux and Tarazi 2013), insolvency risk (Cihak and Hesse 2010), efficiency (Al-Jarrah and Molyneux 2005), corporate social responsibility (Malin et al. 2014), systemic risk (Abedifar, Giudici and Hashem 2017), and market power (Weill 2011). Second, this study contributes to the literature on the influence of religion on economic activities. For instance, Dyreng, Mayew and Williams (2010) show that religiosity significantly influences financial reporting decisions.

The rest of the paper is organized as follows. Section 2 presents the methodology and econometric specifications. Section 3 provides the construction of the sample and defines the major variables of interest. Section 4 describes the empirical results. Section 5 concludes.

## 2. Econometric Specifications and Methodology

Our objective is to examine whether the relationship between presence of females in the board and performance is significantly different for Islamic banks vis-a-vis conventional banks. This enables us to understand to what extent corporate culture of Islamic banks is affected by Shari'ah. To this end, we use difference-in-difference method that has been introduced by Heckman, Ichimura and Todd (1997). The method compares a treatment group to a control group. We consider conventional banks as the control group and Islamic banks as the treatment group. We follow Berger, Kick and Schaeck (2014) and Schaeck, et.al. (2012) and use the following panel specifications:

$$Y_{i,j,t} = \beta_0 + \beta_1 \text{Islamic\_Dummy}_{i,j,t} + \beta_2 \text{Female\_Ratio}_{i,j,t} + \beta_3 \text{Female\_Ratio}_{i,j,t} \times \text{Islamic\_Dummy}_{i,j,t} + \beta_4 \text{Board\_Control}_{i,j,t} + \beta_5 \text{Bank\_Control}_{i,j,t} + \beta_6 \text{Country\_Control}_{j,t} + \varepsilon_{i,j,t} \quad (1)$$

Where  $Y_{i,j,t}$  represents bank performance and risk taking for bank (i) in country (j) at time (t).

We follow the literature and use *Loan Loss Provisions* and *Non-performing Loans* as measures of loan quality or credit risk (Sila et al., 2016; Berger and DeYoung, 1997) and *Cost to Income Ratio* for inefficiency (Owen and Temesvary, 2018; Beccalli, Casu and Girardone, 2006; Al-Jarrah and Molyneux 2005; Fries and Taci, 2005). Moreover, the overall performance indicators are *Net Interest Margin* (King, 2013; Memmel and Schertler, 2013; Carbo and Rodriguez, 2007; Angbazo, 1997), and *Profitability* measured by risk-adjusted return (Tan, 2016; McShane and Sharpe, 1985).

*Islamic Dummy* $_{i,j,t}$  is a dummy variable that takes the value one if bank type is commercial Islamic bank and zero otherwise. It controls for the difference in performance between Islamic and conventional banks.

*Female Ratio*<sub>*i,j,t*</sub> represents the share of female directors in the board (Sila et al., 2016; Levi, Li and Zhang, 2014). The slope parameter  $\beta_2$  captures the relationship between the ratio of female directors and performance for conventional banks.

*Female Ratio*<sub>*i,j,t*</sub>  $\times$  *Islamic Dummy*<sub>*i,j,t*</sub> is the interaction term and our variable of interest. The coefficient  $\beta_3$  shows whether the relationship between the presence of female directors and performance is significantly different for Islamic banks compared to their conventional counterparts.

To dig deeper, we make two extensions in our model:

First, we replace *Female Ratio* and its interaction term with *Monitoring Role* and its interaction term with *Islamic Dummy*. This enables us to investigate whether presence of female directors in the monitoring role has a significantly different effect on performance of Islamic banks. Second, in order to explore the impact of presence of female directors as chairman/CEO role, we then replace *Monitoring Role* and its interaction term with *Islamic Dummy* with *Chairman Role* and its interaction term with *Islamic Dummy*.

*Board Control*<sub>*i,j,t*</sub> captures the variations in the board. We control for *Board Size*, *Auditing Committee Independence* and *Risk Management Committee*.

*Bank Controls*<sub>*i,j,t*</sub> include *Bank Size*, *Capital Ratio*, and ownership dummies such as *Foreign*, *Private* and *State-owned*. Ownership dummies are important to control for, because ownership can determine both presence of female on the board and at the same time performance of banks (Palvia, Vähämaa and Vähämaa, 2015; Bianco, Ciavarella and Signoretti, 2015).

*Country Control*<sub>*j,t*</sub> represents the market structure (Agoraki, Delis and Pasiouras, 2011; Beck, Demirguc-Kunt and Levine, 2006), *Creditor Rights* (Anginer, Demirguc-Kunt and Zhu, 2014; Angeloni and Faia, 2013; Houston, Lin, Lin and Ma, 2010 ), *Religiosity* (Adhikari and Agrawal,

2016; Chizema et al., 2015; ) and *GDP Per Capita* (Chaibi and Ftiti, 2015; Borio and Zhu, 2012).

Finally, we consider the random-effect GLS technique (see Baltagi and Wu, 1999 and Mollah and Zaman, 2015) in this study due to several reasons. First, simple OLS ignores the panel structure of the data (Gambin, 2004). Second, our variable of interest, i.e. *Islamic Dummy*, is time-invariant and hence its coefficient cannot be estimated with fixed-effects technique. Third, the board structure variables do not vary much over time and hence applying fixed-effects estimations would lead to massive loss of the degrees of freedom (Baltagi 2005: 14; Wooldridge 2002: 286).

### **3. Data and Descriptive Statistics**

#### *3.1. Construction of the Sample*

We use a sample of commercial Islamic banks and conventional banks operating in 11 Muslim countries<sup>2</sup> with dual banking systems where Islamic and their conventional counterparts operate alongside each other. We cross checked the BankScope classification for Islamic banks with their websites to ensure accuracy.

To conduct our empirical investigation, we combine data from several sources. We obtain bank-level financial statements data from the BankScope Financials data file and board structure data from BankScope Directors data file. We also hand-collect data on board structure from the web-sites of the banks, OneSource, LinkedIn, Google and Facebook and we attempt to capture even variations of the variables over time.

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<sup>2</sup>It consists of Bahrain, Bangladesh, Kuwait, Lebanon, Malaysia, Pakistan, Qatar, Saudi Arabia, Turkey, United Arab Emirates, and Yemen.



The bank level data are linked to various country level databases that contain information on the regulatory framework variable such as creditor rights, macroeconomic variables and religiosity. We employ data from the Bank Regulation and Supervision database<sup>3</sup> compiled by the World Bank (Barth et al., 2012) for bank regulatory framework variable that is creditor rights. Moreover, data on bank regulatory framework variable for remaining years (2013 to 2107) is obtained from the World Development Indicators and the Doing Business database.

Data on macro-economic variable are collected from the World Bank website. Data on religiosity (the share of Muslim population in each country) is obtained from the websites of The Global Economy and Pew Research Center (2015). The definitions of the variables and the database from which they are collected can be found in Appendix A.

We apply a number of selection criteria to arrive at our final sample. Initially, we start data collection for the period of 2008 through 2017. Since risk-adjusted return, the measure of *Profitability* is computed as current return on average total assets (ROAA) divided by standard deviation of ROAA over the last three years, we limit the sample period to 2010-2017. Moreover, we also delete banks that report information for fewer than three consecutive years for the standard deviation of ROAA. All variables are winsorized at a 1% tail to mitigate the problem of outliers. Filtering the bank level database and matching it with the country level databases yields a sample of 191 banks with 1,528 observations in 11 Muslim countries. See Appendix B for countries included in the sample with number of selected banks over the period from 2010 to 2017.

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<sup>3</sup>The three regulatory measures we use are pre-constructed indices. The construction of the indices as well as the underlying survey questions are described in detail in the book ‘Rethinking Bank Regulation: Till Angels Govern’ by Barth et al. (2006).

### 3.2. Sample Description

Our sample comprises of 71 Islamic commercial banks and 120 conventional commercial banks. In our sample countries, both Islamic and conventional banks operate alongside each other. The largest number of observations is from Malaysia and Lebanon and the lowest from Yemen and Kuwait. Approximately, 37% of the total observations are for Islamic banks and the remaining 63% relate to conventional banks (see Appendix B for details).

Table I presents the descriptive statistics regarding performance indicators for both Islamic and conventional banks. The data shows that Islamic banks are, on average, more capitalized than conventional counterparts, however, they have lower *Loan Loss Provision* and *Non-performing Loans*. Similarly, *Net Interest Margin* of conventional banks appears to be significantly lower from that of Islamic banks. In contrast, Islamic banks have a higher *Cost to Income Ratio* than conventional banks. In terms of *Profitability*, the findings show that Islamic banks exhibit a lower level of profitability than their conventional counterparts.

The data shows that Islamic banks, on average, have significant and slightly lower female ratio and their female directors involve more in monitoring role. We find that females are less likely to be appointed as the chairman of an Islamic bank.

In case of board level controls, *Audit Committee* is more independent and *Board Size* is on average larger in conventional banks, whereas *Risk Management Committee* is appeared to be larger for Islamic banks. In terms of ownership structure, we find that about 65% of Islamic banks are privately owned. Foreigners and Governments have, on average, 18% and 17% weights in the ownership of Islamic banks. However, merely 43% of conventional banks are privately owned, whereas 31% and 26% of conventional banks owned by States and foreigners, respectively.

Figures I to V illustrate the characteristics of our data on female directors. From the Figure (I) we can see that female directors range from 0 to 6 over the sample period. The majority of banks, however, have no or only one female director. Figure (II) exhibits the average number of female directors during the study period. It shows that the average number of female directors increases from 3% in 2010 to 7% in 2017 suggesting a significant improvement in gender diversity in the recent years. Yet it is far below the quota legislation introduced by a number of advanced economies such as France and Norway. Figure (III) illustrates that the mean ratio of female directors is slightly higher in conventional banks than Islamic banks. For the former is 5% and for the latter is 4%. Figure (IV) depicts average female ratio across banks with different ownership structure. It shows the ratio of females in the board is, on average, 7%, for foreign-owned banks, which is the highest figure. State-owned banks are the second largest group of banks in terms of gender diversity with 5% and slightly higher than privately-owned banks with 4% share of females in the board. Finally, Figure (V) presents the average female ratios of Islamic and conventional banks across 11 countries in our sample. The figure shows that Bangladesh has the largest number of female ratio for conventional banks while Malaysia has the largest female ratio for Islamic banks. The figure also presents that Kuwait and Qatar do not have any female director for conventional banks, whereas Qatar, Saudi Arabia and Yemen have no female directors for Islamic banks.

Moreover, weak correlation is observed among explanatory variables using correlation matrix and variance inflation factor. We do not report the results of these two tests for the purpose of brevity.

[TABLE I]

## 4. Empirical Results

### 4.1. Loan Quality

Table II presents the results for loan quality/credit risk where we use *Loan Loss Provision* and *Non-performing Loans* as the credit risk proxies. In column (1), *Loan Loss Provision* is regressed on *Islamic Dummy* variable, *Female Ratio* and control variables. The result exhibits that the coefficient of *Islamic Dummy* is significant and negative suggesting that Islamic banks face lower credit risk than their conventional counter-parts. The result also shows that the coefficient of *Female Ratio* is insignificant, implying that the presence of females on boards have no impact on loan quality. Among control variables, *Board Size*, *Bank Size* and *Creditor Rights* have positive and significant relationship with loan quality, while *Audit Committee Independence* and *Religiosity* have negative and significant coefficients. In column(2), *Female Ratio*×*Islamic Dummy* is added to the model. The coefficient of interaction term *Female Ratio*×*Islamic Dummy* is significant and negative which shows that the presence of female directors in the board is associated with a decrease in credit risk of Islamic banks as compared to conventional banks.

In column (3), we replace *Female Ratio* and its interaction term with *Monitoring Role* and its interaction term with *Islamic Dummy*. This enables us to investigate whether presence of female directors in the monitoring role has a significantly different effect on credit risk of Islamic banks. The coefficients of *Monitoring Role* and its interaction term are not significantly different from zero. It shows that presence of female directors in the monitoring committees has no different impact on credit risk for Islamic and conventional banks. In column (4), we replace *Monitoring Role* and its interaction term with *Islamic Dummy* with *Chairman Role* and its interaction term with *Islamic Dummy*. This captures the difference in the impact of female directors in the chairman role on loan quality for Islamic and conventional banks. We do not find

a significant result for chairman role and its interaction with *Islamic Dummy*. It shows that female directors with chairman role have no impact on loan quality for Islamic and conventional banks.

In columns (5) to (8) we repeat the regressions as in the first four columns using *Non-performing Loans* as the dependent variable. Overall, the result of columns (5) to (7) confirms the findings in columns (1) to (3). However, in column (8) the coefficient of *Chairman Role* is significant and negative. It shows that female directors having chairman role decreases the credit risk.

In sum, the findings show that Islamic banks with female directors have on average lower credit risk than their conventional counterparts, assuming that all other things being equal. Our results are consistent with the literature that shows firms run by female directors face less risk than similar firms run by male counter-parts (see Faccio et al., 2016; Perryman et al., 2016; Nekby et al., 2015, among others).

#### [TABLE II]

#### 4.2. Inefficiency

Table III presents the results for cost inefficiency where we use *Cost to Income Ratio* as the inefficiency measure. In column (1), *Cost to Income Ratio* is regressed on Islamic bank dummy variable, *Female Ratio* and control variables. We find that *Islamic Dummy* is significant and positive suggesting that Islamic banks are more cost inefficient as compared to their conventional counter-parts. The result also shows that the coefficient of *Female Ratio* is insignificant. It shows that the presence of female directors on the boards of conventional banks do not influence the inefficiency. Moreover, control variables such as *Board Size*, *Risk Management Committee*, *Bank Size*, *Creditor Rights and Religiosity* have negative relationship with bank inefficiency, while *State Ownership* and *Market Concentration* are positively

correlated with inefficiency. In column (2), *Female Ratio*×*Islamic Dummy* is added to the model. Its coefficient is significant and negative and shows that the presence of female directors in the board is associated with a decrease in *Cost Inefficiency* of Islamic banks as compared to conventional banks.

In column (3), we replace *Female Ratio* and its interaction term with *Monitoring Role* and its interaction term with *Islamic Dummy*. The coefficient of *Monitoring Role* is significant and positive that means that banks with female directors having monitoring roles are more cost inefficient. However, the significant and negative coefficient of interaction term shows that cost inefficiency decreases when female directors have monitoring role in Islamic banks. In column (4), we replace *Monitoring Role* and its interaction term with *Islamic Dummy* with *Chairman Role* and its interaction term with *Islamic Dummy*. We find no significant impact of female directors charged with chairman role on cost inefficiency for both conventional and Islamic banks.

[TABLE III]

#### 4.3. Overall Performance Indicators

So far we find that presence of female directors on the board of Islamic banks is associated with a lower credit risk and inefficiency. In this sub-section, our objective is to explore whether the impact is substantial enough to affect overall performance indicators. We consider net interest margin, because the literature shows that Net Interest Margin, among other factors, is a function of credit risk and inefficiency (see, Claeys and Vander-Vennet, 2008; Carbo and Rodriguez, 2007; Saunders and Schumacher, 2000; Angbazo, 1997). Hence we would like to examine whether Islamic banks with female directors have a lower *Net Interest Margin*. We also

use *Profitability* and explore whether presence of females in the board of Islamic banks is associated with a higher profitability as compared to conventional banks.

The results are presented in table IV. In column (1), *Net Interest Margin* is used as the dependent variable in Equation (1) and is regressed on *Islamic Dummy* variable, *Female Ratio* and control variables. The result shows that *Islamic Dummy* is insignificant, which means there is no difference between Islamic and conventional banks regarding net interest margin. The result also shows that the coefficient of female ratio is insignificant. Among control variables, *Board Size*, *Capital Adequacy Ratio* and *Creditor Rights* have positive and significant effect on *Net Interest Margin*, whereas *Audit Committee Independence* and *Log Per Capita* have negative coefficients.

In column (2) *Female Ratio* × *Islamic Dummy* is added to the model. Its coefficient is insignificant which shows that the presence of female directors in the board has no different impact on *Net Interest Margin* of Islamic banks relative to their conventional counter-parts. In column (3), we replace *Female Ratio* and its interaction term with *Monitoring Role* and its interaction term with *Islamic Dummy*. The coefficients of both *Monitoring Role* and interaction term are not significantly different from zero. It shows that presence of female directors in the monitoring committees has no significant relationship with *Net Interest Margin* of Islamic and conventional banks. In column (4), we replace *Monitoring Role* and its interaction term with *Islamic Dummy* with *Chairman Role* and its interaction term with *Islamic Dummy*. We do not find significant results for *Chairman Role* and its interaction. The result shows that presence of female directors with *Chairman Role* in either Islamic or conventional banks has no significant relationship with *Net Interest Margin*.

In columns (5) to (8) we repeat the regressions as in the first four columns using profitability as the dependent variable. Column (5) shows that the coefficient of *Islamic Dummy* is significantly negative merely at 10% level. In column (6), the coefficient of *Female Ratio* is significant and negative, while its interaction with *Islamic Dummy* is insignificant, suggesting that, relative to conventional banks, the link between presence of female directors in the boards and profitability is not significantly different for Islamic banks vis-à-vis their conventional counterparts. In column (7), the coefficients of the interaction term is significantly negative merely at 10%. Finally, in column (8), we find insignificant relationship between presence of female directors in CEO/chairman role and profitability for both groups of banks.

[TABLE IV]

## 5. Concluding Remarks

Over the recent years, gender diversity has received increasing attentions from both academia and market participants. Surprisingly, little attention has been paid to Islamic banks, despite the fact that the debate is somehow controversial for this group of banks.

This paper investigates whether and how differently performance of Islamic banks is affected when female directors sit in the board. There are several factors that may suggest adverse effects of board gender diversity on the performance of Islamic banks, for instance it may persuade the management to adopt too conservative strategy. Gender diversity may represent less religiosity of the Islamic banks to the eyes of Muslims with orthodox view of Islam, and this can adversely affect the performance of Islamic banks. Alternatively, it can show inclusive culture and represents the policy of the shareholders to benefit from a broader talent pool in the management.



We study a unique sample of 1,528 observations on 71 Islamic banks and 120 conventional banks operating in eleven Muslim countries over 2010-2017 period. The data shows that the average number of female directors increases significantly in the recent years. Yet it is far below the quota legislation introduced by several advanced economies such as France and Norway, which highlights the necessity of further actions for promotion of gender equality. Islamic banks have on average slightly lower female directors with females involving more in monitoring role in their boards compared to their conventional counterparts. However, we find females are less likely to be appointed as the chairman of Islamic banks as compared to conventional banks. Moreover, we do not find consistent results that presence of female directors in the board has a different impact on the performance of Islamic banks. In fact higher board gender diversity in Islamic banks is associated with a higher loan quality and a lower inefficiency relative to conventional banks. However, we find no significant relationship for other performance indicators such as net interest margin and profitability. Overall, the analysis shows that the performance of Islamic banks is not adversely affected by the appointment of females in the board. The results have implications for promotion of gender equality and inclusive corporate culture in countries with dual banking systems.

**Table I. Descriptive statistics**

This table reports general descriptive statistics and performance measure variables of Islamic and conventional banks over 2010–2017. T-Stat. of mean equality test describes the mean difference in the performance between Islamic and conventional banks. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. See Appendix A for variable definitions.

Variable	Islamic Banks					Conventional Banks					T-test
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	
Total Assets	568	13590.50	65896.90	26.00	57123.00	960	34108.97	22174.65	892.00	25281.00	2.15**
Capital Asset Ratio	568	24.88	12.70	1.90	81.50	960	14.58	5.42	-29.08	50.00	-21.9***
Loan Loss Provision	568	5.51	9.61	-2.90	87.00	960	14.37	30.74	-31.64	248.88	6.68***
Non-performing Loans	568	5.34	6.56	0.00	37.41	960	6.53	8.07	0.00	56.85	2.99***
ROAA	568	0.98	2.45	-26.06	9.97	960	1.33	1.04	-7.49	12.20	3.84***
ROAE	568	8.07	21.45	-436.90	30.71	960	12.26	12.48	-259.94	47.80	4.82***
Cost Inefficiency	568	0.62	0.51	0.00	7.23	960	0.47	0.19	0.05	3.21	-7.68***
Net Interest Margin	568	4.05	3.7	-2.75	28.79	960	3.34	1.55	-2.1	16.33	-5.87***
Profitability	568	6.20	10.13	-17.45	102.00	960	12.59	20.22	-2.40	222.00	7.02***
Female Ratio	568	0.04	0.08	0.00	0.38	960	0.05	0.09	0.00	0.80	2.47**
Monitoring Role	568	0.26	0.43	0.00	1.00	960	0.25	0.42	0.00	1.00	2.62**
Chairman Role	568	0.08	0.27	0.00	1.00	960	0.12	0.33	0.00	1.00	2.44**
Board Size	568	9.76	3.22	0.00	21.00	960	10.13	2.64	4.00	22.00	2.4**
Audit Committee	568	0.50	0.50	0.00	1.00	960	0.57	0.49	0.00	1.00	2.85**
Risk Management	568	0.71	0.46	0.00	1.00	960	0.68	0.47	0.00	1.00	-1.01
Foreign Banks	568	0.18	0.39	0.00	1.00	960	0.26	0.44	0.00	1.00	3.38***
State Owned Banks	568	0.17	0.38	0.00	1.00	960	0.31	0.46	0.00	1.00	6.13***
Private Banks	568	0.65	0.48	0.00	1.00	960	0.43	0.50	0.00	1.00	-8.32***

**Table II. Loan quality model**

This table exhibits the estimation of the loan quality models. In columns (1)–(4) we use *Loan Loss Provisions* as the dependent variable. In columns (5)–(8) we use *Non-performing Loans* as the dependent variable. We apply random effect technique with robust standard errors for our estimations. Robust standard-errors are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. See Appendix A for variable definitions.

Variables	Loan Loss Provisions				Non-performing Loans				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Islamic Dummy	-2.846** (13.127)	-2.892** (13.147)	-2.358** (13.132)	-2.932** (13.110)	-	0.865** (4.019)	-0.901* (4.019)	-0.818** (4.039)	-0.826** (4.033)
Female Ratio	4.650 (5.299)	7.788 (7.641)			2.625 (2.340)	3.470 (2.778)			
Female Ratio × Islamic Dummy		-7.981** (8.525)				-2.317** (4.020)			
Monitoring Role			3.638 (3.127)				0.674 (0.508)		
Monitoring × Islamic Dummy			-3.005 (3.303)				-0.435 (0.798)		
Chairman Role				-0.035 (0.922)					-1.068** (0.524)
Chairman Role × Islamic Dummy				0.390 (1.178)					-0.180 (0.861)
Board Size	0.313** (0.320)	0.329** (0.317)	0.238** (0.366)	0.336** (0.310)	-0.091 (0.079)	-0.088 (0.078)	-0.100 (0.084)		-0.094 (0.078)
Audit Committee Independence	-0.352** (1.608)	-0.429** (1.592)	-0.499** (1.544)	-0.340** (1.638)	-0.083* (0.337)	-0.092* (0.334)	-0.084* (0.342)		-0.104* (0.342)
Risk Management Committee	0.810 (1.675)	0.736 (1.667)	0.499 (1.557)	0.737 (1.658)	0.008 (0.358)	0.000 (0.357)	-0.053 (0.357)		-0.011 (0.353)
Size	2.150** (0.889)	2.163** (0.890)	2.179** (0.885)	2.153** (0.898)	-0.170 (0.211)	-0.171 (0.212)	-0.174 (0.212)		-0.153 (0.210)
CAR	0.002 (0.055)	0.007 (0.054)	0.023 (0.055)	0.009 (0.055)	-0.080 (0.058)	-0.079 (0.058)	-0.075 (0.055)		-0.075 (0.054)
Foreign Bank Dummy	0.396 (4.175)	-0.065 (4.320)	0.323 (4.298)	0.203 (4.235)	-0.200 (1.152)	-0.323 (1.179)	-0.257 (1.171)		-0.087 (1.182)
State Owned Dummy	1.160 (3.471)	1.181 (3.473)	1.516 (3.382)	1.172 (3.474)	-1.139 (0.809)	-1.141 (0.811)	-1.088 (0.818)		-1.177 (0.811)
Subsidiary Dummy	-2.244 (3.938)	-1.849 (3.920)	-1.976 (3.898)	-1.994 (3.918)	-0.322 (1.058)	-0.216 (1.100)	-0.207 (1.110)		-0.331 (1.084)
HHI	12.134 (7.840)	12.461 (7.846)	12.652 (7.864)	12.505 (7.809)	1.871 (1.796)	1.881 (1.796)	1.953 (1.801)		1.723 (1.784)
Creditor Rights	14.084** (5.592)	14.213** (5.616)	14.585** (5.836)	14.035** (5.570)	-2.055 (1.509)	-2.024 (1.511)	-1.988 (1.523)		-2.049 (1.523)
Log Per Capita	14.284 (13.877)	14.019 (14.003)	15.172 (14.746)	13.661 (13.867)	8.696** (3.703)	8.789** (3.718)	8.963** (3.758)		8.713** (3.675)
Religiosity	-1.615** (0.915)	-1.822** (0.916)	-1.942** (0.937)	-1.752* (0.914)	-0.300 (0.229)	-0.304 (0.229)	-0.304 (0.228)		-0.320 (0.228)
Constant	91.281 (104.718)	111.290 (104.833)	118.767 (104.386)	105.896 (106.184)	24.911 (25.883)	24.920 (25.885)	24.297 (25.800)		26.587 (25.691)
Observations	1526	1526	1526	1526	1528	1528	1528		1528
Number of Banks	191	191	191	191	191	191	191		191
R-Squared	.192	.192	.195	.192	.376	.376	.377		.375

**Table III. Inefficiency**

This table presents the estimation of cost inefficiency models. In columns (1)–(4), we use *Cost to Income Ratio* as the cost inefficiency proxy. We apply random effect technique with robust standard errors for our estimations. Robust standard-errors are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. See Appendix A for variable definitions.

Variables	Cost Inefficiency			
	(1)	(2)	(3)	(4)
Islamic Dummy	0.299**	0.291***	0.285**	0.295**
	(0.196)	(0.196)	(0.196)	(0.196)
Female Ratio	0.117	0.209**		
	(0.076)	(0.086)		
Female Ratio × Islamic Dummy		-0.268**		
		(0.146)		
Monitoring Role			0.036*	
			(0.016)	
Monitoring × Islamic Dummy			-0.067**	
			(0.034)	
Chairman Role				0.023
				(0.017)
Chairman Role × Islamic Dummy				-0.038
				(0.036)
Board Size	-0.013**	-0.013**	-0.013**	-0.013**
	(0.005)	(0.005)	(0.005)	(0.005)
Audit Committee Independence	0.009	0.008	0.010	0.010
	(0.021)	(0.021)	(0.021)	(0.021)
Risk Management Committee	-0.047*	-0.047*	-0.049*	-0.048*
	(0.026)	(0.026)	(0.026)	(0.026)
Size	-0.031**	-0.031**	-0.031**	-0.031**
	(0.010)	(0.009)	(0.010)	(0.009)
CAR	0.000	0.000	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)
Foreign Bank Dummy	-0.006	-0.020	-0.025	-0.016
	(0.067)	(0.065)	(0.065)	(0.065)
State Owned Dummy	0.054*	0.055*	0.053**	0.055*
	(0.032)	(0.032)	(0.032)	(0.032)
Subsidiary Dummy	0.031	0.043	0.051	0.044
	(0.065)	(0.063)	(0.064)	(0.065)
HHI	0.463**	0.464**	0.466**	0.464**
	(0.187)	(0.187)	(0.186)	(0.187)
Creditor Rights	-0.309***	-0.312***	-0.313***	-0.307***
	(0.065)	(0.065)	(0.066)	(0.065)
Log Per Capita	0.278	0.288	0.294	0.281
	(0.214)	(0.213)	(0.214)	(0.214)
Religiosity	-0.043**	-0.043*	-0.043*	-0.042*
	(0.022)	(0.022)	(0.022)	(0.022)
Constant	4.021	4.004	3.956	3.893
	(2.629)	(2.624)	(2.635)	(2.627)
Observations	1528	1528	1528	1528
Number of Banks	191	191	191	191
R-Squared	.239	.240	.243	.240

**Table IV. Overall performance indicators**

This table presents the estimation of the overall performance indicator models. In columns (1)–(4), we use *Net Interest Margin* as the dependent variable. In columns (5)–(8) we use *Profitability* as the dependent variable. We use risk-adjusted return as the profitability proxy. We apply random effect technique with robust standard errors for our estimations. Robust standard-errors are reported in parentheses. \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. See Appendix A for variable definitions.

Variables	Net Interest Margin				Profitability			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Islamic Dummy	-1.031 (1.874)	-1.023 (1.876)	-1.012 (1.873)	-1.013 (1.875)	-5.154* (9.237)	-5.617* (9.298)	-6.888** (9.378)	-5.188* (9.333)
Female Ratio	-0.397 (0.652)	-0.720 (0.793)			-21.593*** (5.693)	-25.252*** (7.243)		
Female Ratio × Islamic Dummy		0.887 (1.177)				11.472 (9.785)		
Monitoring Role			0.001 (0.119)				-4.430** (2.235)	
Monitoring × Islamic Dummy			0.158 (0.181)				-4.007* (2.978)	
Chairman Role				-0.066 (0.133)				-4.002 (3.760)
Chairman Role × Islamic Dummy				0.070 (0.208)				-1.355 (3.980)
Board Size	0.067** (0.030)	0.065** (0.030)	0.064** (0.030)	0.066** (0.030)	0.667*** (0.233)	0.652*** (0.235)	0.740*** (0.229)	0.697*** (0.219)
Audit Committee Independence	-0.287** (0.120)	-0.284** (0.120)	-0.295** (0.122)	0.290** (0.121)	2.020** (1.017)	2.049** (1.016)	1.991** (1.028)	1.952** (0.981)
Risk Management Committee	-0.039 (0.142)	-0.036 (0.143)	-0.036 (0.146)	-0.035 (0.143)	-0.103 (1.111)	-0.094 (1.113)	0.022 (1.119)	-0.056 (1.107)
Size	-0.004 (0.072)	-0.003 (0.072)	0.000 (0.072)	-0.003 (0.072)	1.353** (0.389)	1.346*** (0.387)	1.330** (0.391)	1.322** (0.406)
CAR	0.029** (0.015)	0.029** (0.014)	0.028* (0.014)	0.028 (0.014)	0.101 (0.066)	0.095 (0.067)	0.076 (0.065)	0.083 (0.064)
Foreign Bank Dummy	0.344 (0.407)	0.392 (0.404)	0.426 (0.405)	0.368 (0.411)	3.561* (2.040)	4.176* (1.938)	4.659* (2.016)	3.097 (1.933)
State Owned Dummy	0.073 (0.265)	0.074 (0.266)	0.073 (0.266)	0.077 (0.265)	-4.156** (1.691)	-4.193** (1.692)	-3.935** (1.682)	-4.105** (1.622)
Subsidiary Dummy	-0.572 (0.436)	-0.612 (0.426)	-0.658 (0.431)	-0.604 (0.439)	-3.174* (1.911)	-3.690* (1.831)	-4.614* (1.997)	-3.313* (1.820)
HHI	-0.643 (0.623)	-0.646 (0.622)	-0.651 (0.623)	-0.644 (0.621)	-1.675 (7.160)	-1.707 (7.146)	-2.277 (7.038)	-1.163 (7.234)
Creditor Rights	0.023* (0.428)	0.011* (0.430)	0.023** (0.435)	0.025** (0.430)	2.424* (8.413)	1.530** (8.419)	2.551** (8.433)	3.256** (8.395)
Log Per Capita	-4.008*** (1.066)	-4.043*** (1.069)	-4.025** (1.083)	-4.017 (1.071)	-23.384 (19.075)	-23.735 (19.096)	-24.639 (19.159)	-22.933 (19.122)
Religiosity	-0.101 (0.068)	-0.099 (0.068)	-0.107 (0.067)	-0.104 (0.067)	-0.519 (1.093)	-0.516 (1.093)	-0.612 (1.084)	-0.580 (1.062)
Constant	27.129*** (7.371)	27.131*** (7.369)	27.759*** (7.230)	27.443 (7.332)	119.685 (97.012)	121.042 (97.158)	133.777 (97.215)	124.114 (95.873)
Observations	1528	1528	1528	1528	1528	1528	1528	1528
Number of Banks	191	191	191	191	191	191	191	191
R-Squared	.197	.196	.196	.197	.179	.180	.181	.180

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## Appendix A. Variables, definitions, units and data source.

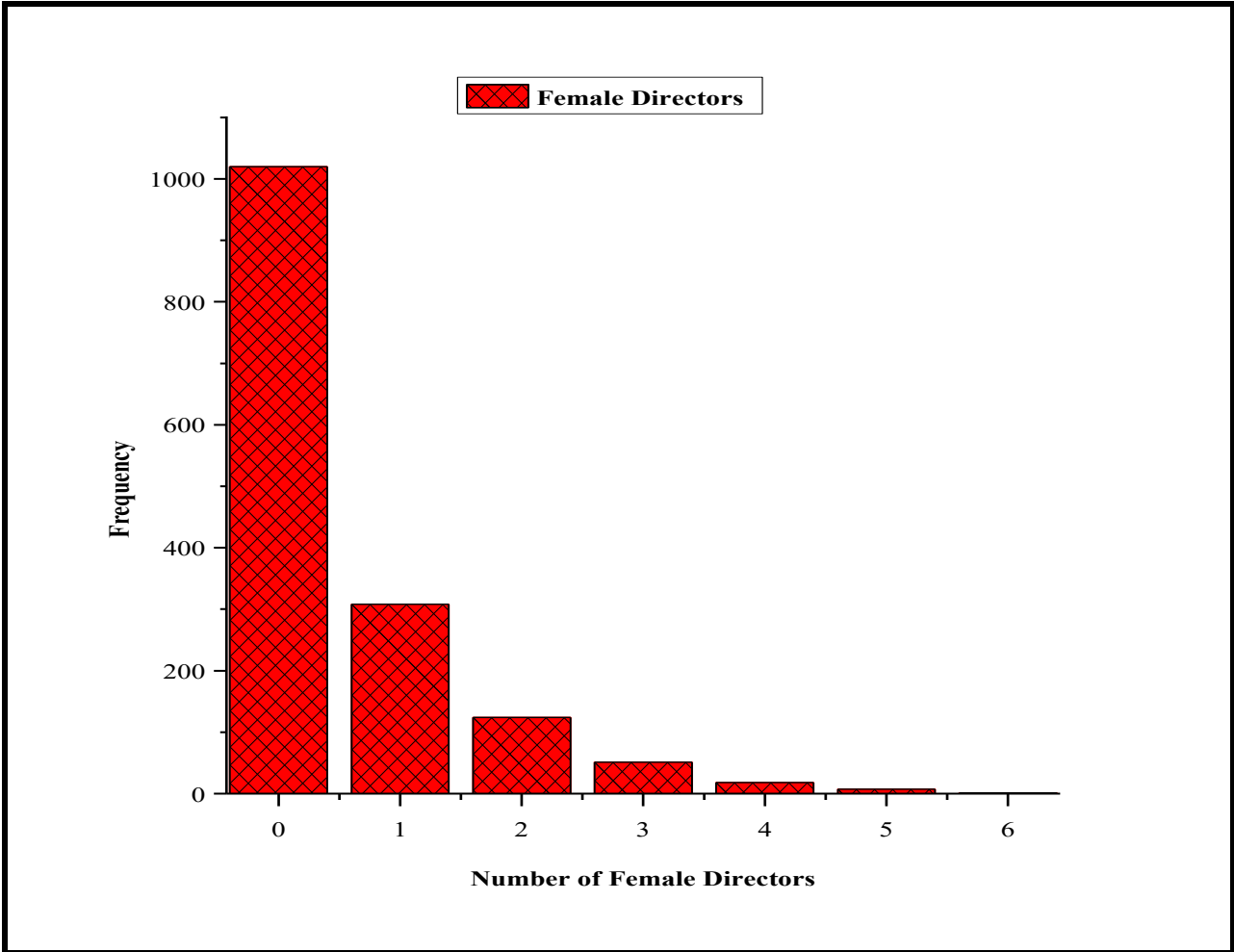
Variables	Definition	Units	Source
<b>A. Dependent variables</b>			
Credit risk proxies			
<i>Loan Loss Provision</i>	The ratio of loan loss provision to average gross loans. Loan loss provision is the incurred cost to banks of adjusting the loan loss reserve or writing off a loan. Hence, Loan Loss Reserve and Impaired Loans are stocks while Loan Loss Provision is a flow and is stipulated in the income statement. It is possible to have a negative loan loss provision in one period, when the required loan loss reserve is lower than the current reserve.	Percentage	BankScope
<i>Non-performing Loans</i>	The ratio of impaired loans to gross loans. Impaired loans increase when a bank classifies a specific loan or a part of a loan portfolio as bad. It decreases when either a bank re-assesses a problem loan or part of a portfolio or when a bank writes off a loan or a part of loan portfolio.	Percentage	BankScope
Overall performance proxies			
<i>Net Interest Margin</i>	(Interest Income – Interest Expense) / Average Earning assets.	Percentage	BankScope
<i>Profitability</i>	Risk-adjusted return, which is equal to current ROAA divided by standard deviation of ROAA over the last three years.	Ratio	BankScope
Inefficiency proxy			
<i>Cost Inefficiency</i>	Cost to income ratio.	Ratio	BankScope
<b>B. Governance and ownership indicators</b>			
<i>Female Ratio</i>	Number of female directors divided by total number of directors.	Ratio	Authors' calculation BankScope and annual reports
<i>Monitoring Role</i>	A dummy variable that takes value "1" if she is the member of any of the three committees (i.e. executive committee, audit committee and risk management committee) and "0" otherwise.	Dummy	BankScope and annual reports
<i>Chairman/ CEO Role</i>	A dummy variable that takes value "1" if she has the role of Chairman and "0" otherwise.	Dummy	BankScope and annual reports
<i>Board Size</i>	Number of directors on board.	Logarithm	BankScope and annual reports
<i>Audit Committee Independence</i>	A dummy variable that takes value "1" if audit committee comprised solely of independent outsiders and "0" otherwise.	Dummy	BankScope and annual reports
<i>Risk Management Committee</i>	A dummy variable that takes value "1" if risk management committee exists and "0" otherwise.	Dummy	BankScope and annual reports
<i>State Bank Dummy</i>	State-owned bank dummy that takes the value of one if the bank is state-owned, and zero otherwise.	Dummy	BankScope and annual reports
<i>Private Bank Dummy</i>	A dummy that takes the value of one if the bank is private, and zero otherwise.	Dummy	BankScope and annual reports
<i>Foreign Bank Dummy</i>	Dummy which is 1 if bank is foreign owned and zero if domestically owned.	Dummy	BankScope Bank Ownership Database (De Nederlandsche Bank)

C. Bank Characteristics			
<i>Bank Size</i>	Natural logarithm of the total assets.	Logarithm	BankScope
<i>Capital Adequacy</i>	Measured as equity capital to total assets.	Percentage	BankScope
D. Country Characteristics			
<i>Market Structure/ Concentration</i>	Hirschman–Herfindahl index (HHI) is a proxy for market concentration: $HHI_{c,t} = \frac{\sum_{i=1}^n (TotalAssets_{i,t,c} / \sum_{i=1}^n TotalAssets_{i,t,c})^2}{\sum_{i=1}^n TotalAssets_{i,t,c}}$ . It has a value between zero and one. Higher values show that the market is more concentrated.		Authors' calculation BankScope
<i>Creditor Rights</i>	Creditor rights index equal to the sum of four binary indicator variables. A score of one is assigned if there is no automatic stay on assets ( <i>No Automatic Stay</i> ), if secured creditors are paid first as opposed to government or workers ( <i>Secured Creditor Paid First</i> ), if there are restrictions, such as creditor consent or minimum dividends, for a debtor to file for reorganization ( <i>Restrictions on Reorganization</i> ), and if management does not retain administration of its property pending the resolution of the reorganization ( <i>No Management Stay</i> ), respectively and zero otherwise. This index ranges from 0 ( <i>weak creditor rights</i> ) to 4 ( <i>strong creditor rights</i> ).		Bank Regulation and Supervision Database, World Bank Surveys by Barth et al., 2001, 2006, 2008 and 2012.
<i>GDP Per Capita</i>	GDP per capita in US\$.	Thousands \$	World Bank
<i>Religiosity</i>	Religiosity is measured as the share of Muslims in total population of a country	Percentage	The global economy.com, The Cline Center for Democracy

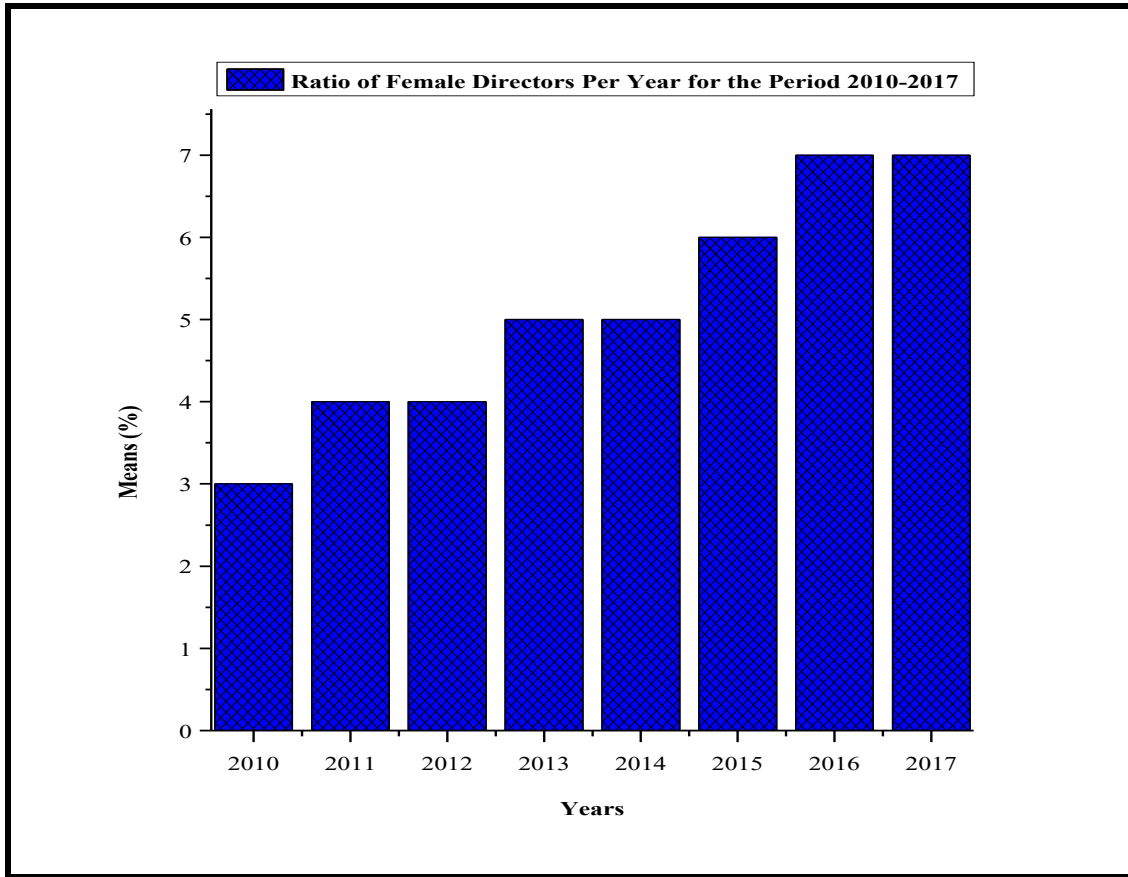
Appendix B. Countries included in the sample with number of selected of Islamic and conventional banks across 11 Muslim countries, over 2010–2017

Country	Country code	Islamic Banks		Conventional Banks		Total	
		Banks	Observations	Banks	Observations	Banks	Observations
Bahrain	BHR	7	56	6	48	13	104
Bangladesh	BGD	8	64	19	152	27	216
Kuwait	KWT	4	32	3	24	7	56
Lebanon	LBN	2	16	19	152	21	168
Malaysia	MYS	15	120	14	112	29	232
Pakistan	PAK	10	80	14	112	24	192
Qatar	QAT	3	24	6	48	9	72
Saudi Arabia	SAU	4	32	6	48	10	80
Turkey	TUR	6	48	17	136	23	184
UAE	ARE	9	72	12	96	21	168
Yemen	YEM	3	24	4	32	7	56
<b>Total</b>		<b>71</b>	<b>568</b>	<b>120</b>	<b>960</b>	<b>191</b>	<b>1,528</b>

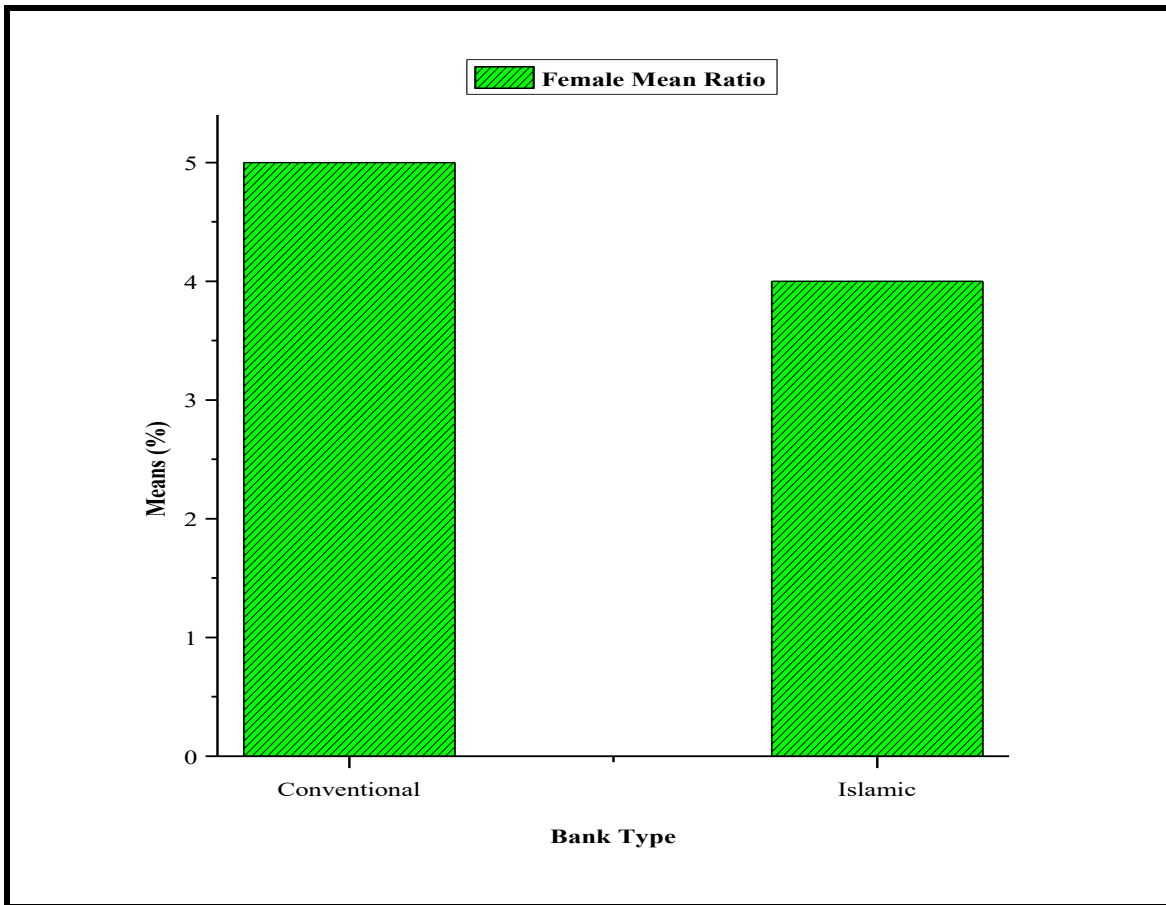
Appendix C. Figures used in this study



**Figure I:** This figure exhibits the frequency of female directors in overall sample from 2010 to 2017. The vertical axes shows the frequency of female directors, and the horizontal axes depicts number of female directors.

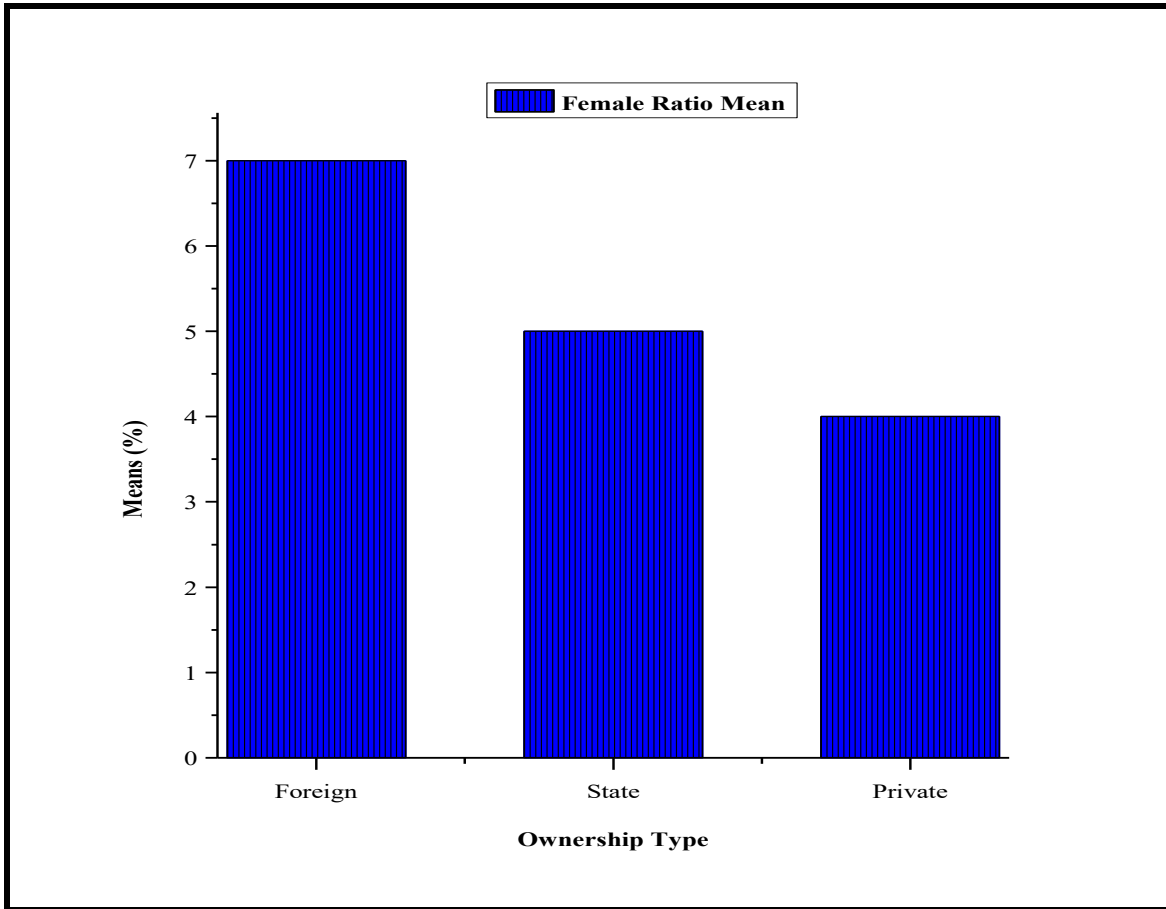


**Figure II:** This figure presents the mean ratio of female directors per year from 2010 to 2017. The vertical axes exhibits the mean ratio of female directors, and the horizontal axes shows the sample period over 2010-2017.

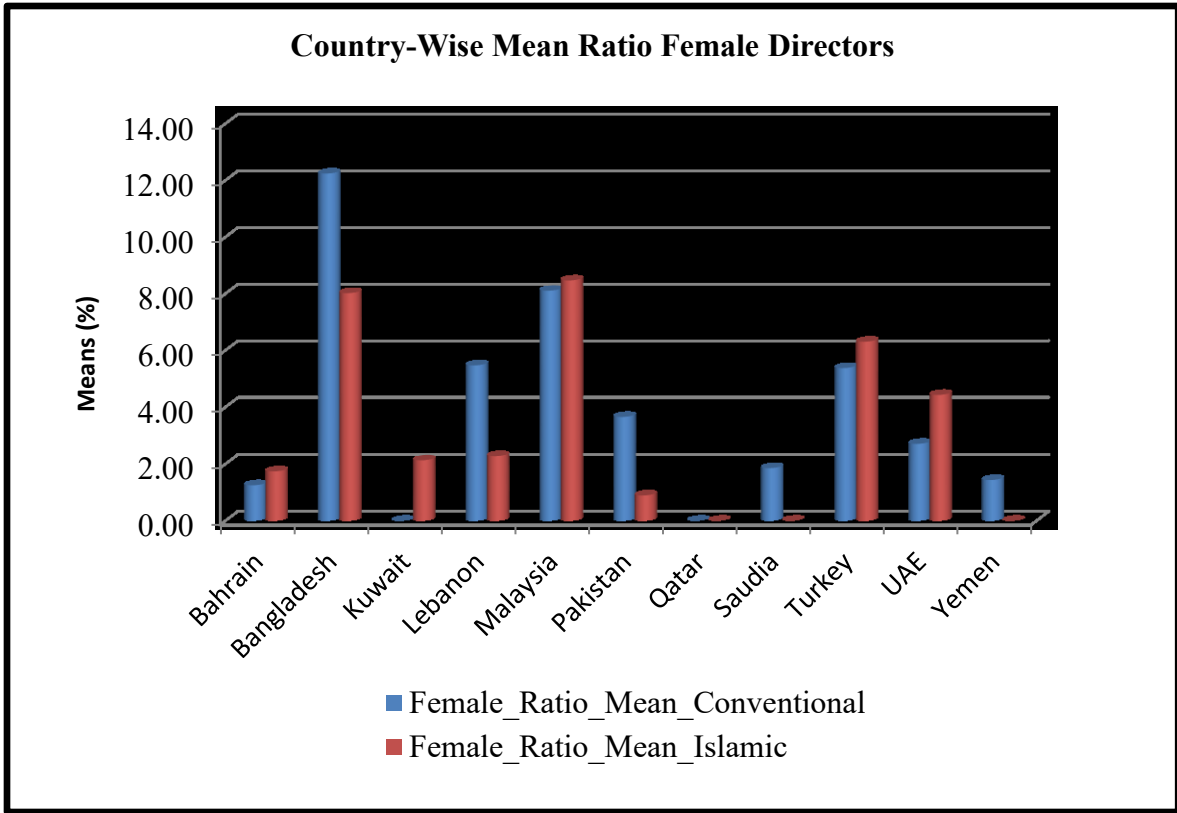


**Figure III:** This figure depicts the mean ratio of female directors for conventional and Islamic banks over the sample period. The vertical axes exhibits the mean ratio of female directors, and the horizontal axes shows the bank type.





**Figure IV:** This figure shows the mean ratio of female directors across different ownership structure, e.g. Foreign, State and Private, over the sample period. The vertical axes presents the mean ratio of female directors, and the horizontal axes depicts the ownership type.



**Figure V:** This figure presents the country-wise mean ratio of female directors for conventional and Islamic banks over the sample period. The vertical axes exhibits the mean ratio of female directors for both banking systems, and the horizontal axes depicts the selected countries.



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