The governance, risk-taking, and performance of Islamic banks

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Abstract We examine whether the difference in governance structures influences the risk taking and performance of Islamic banks compared to conventional banks. Using a sample of 52 Islamic banks and 104 conventional banks in 14 countries for the period from 2005 to 2013, we conclude that the governance structure in Islamic banks plays a crucial role in risk taking as well as financial performance that is distinct from conventional banks. Particularly, we show that the governance structure in Islamic banks allows them to take higher risks and achieve better performance because of product complexities and transaction mechanisms. However, Islamic banks maintain a higher capitalization compared to conventional banks. These results support the research on Islamic investment and risk taking. Our results add a new dimension to the governance research that could be a valuable source of knowledge for policy makers and regulators in the financial services sector.

Keywords Corporate governance · Risk-taking · Firm performance · Islamic banks

JEL Classification G34 · Y90 · G01

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1 Introduction

In the field of banking and finance, the world has experienced in the last few decades the evolution of the Islamic mode of banking and its rapid growth in Muslim countries. In particular, Muslim countries contain more than a quarter of the world’s population. In addition, Islamic finance has seen substantial expansion in non-Muslim countries in terms of global financial assets and market share. The financial assets of the Islamic financial sector totalled US$1.7 trillion in 2013 and grew 50% faster than the overall banking sector with an average annual growth of 17.6% from 2008 to 2012 (Ernst and Young 2012). Further, Islamic bank assets are expected to reach US$3.4 trillion by 2018 (Ernst and Young 2013) and US$6.5 trillion by 2020 (IFSB 2010; Cihak and Hesse 2010). Despite the progress made by Islamic banks, the Islamic banking industry should not be viewed in isolation. The specific codes of behavior in the Muslim religion (see, e.g., Abedifar et al. 2013) and the distinctive character of Islamic banking have led to increasingly unique differences between Islamic and conventional banks.

The difference between Islamic and conventional banking is that Islamic banking discards the conventional interest-based financial system and follows the principles of Islamic law promoting property rights, profit-risk sharing, and the sanctity of contracts (Zaher and Hassan 2001; Iqbal and Llewellyn 2002). The prohibition of interest or usury (riba) in Islam does not mean that credit is prohibited, capital is not rewarded, or that risk is not priced. By developing a Shari’ah-compliant alternative, Islamic banks offer a distinct business model from the conventional banks. Unlike their conventional counterparts, Islamic banks have developed specific forms of financial contracts to replace the interest rate mechanisms in financial transactions.

Furthermore, due to Shari’ah supervision on risk taking, Islamic banks are not equally exposed to external shocks. Hence, these banks are less susceptible to insolvency because of the nature of Islamic financial contracts that have a wider range of arrangements for risk and liability sharing between the bank and their clients compared with conventional banks. These differences provide for social, ethical, and moral financial solutions to economic problems in transactions through conformity with Shari’ah principles. Moreover, while conventional banks provide financial intermediation services on the basis of a rate of interest on assets and liabilities, Islamic banks can act as both an intermediary of funds and as an entrepreneur and financier of real business activities in their own right.

What distinguishes Islamic banks from their conventional counterparts is not only the replacement of interest but also the significant monitoring role that Shari’ah law plays in the governance structure as opposed to conventional banks (Mollah and Zaman 2015). In Islamic

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1 In 2014, Muslim population was 2038.04 million, which was 28.26% of the total world population of 7151.51 million. Muslim countries in Asia and Africa had 27.56% Muslim population (i.e., 1971.08 million), while non-Muslim counties in North America, Europe, Oceania, and South America had 0.7% (i.e., 66.96 million) (see http://muslimpopulation.com/World).

2 Islamic banking offers a two-tiered business model: mark-up financing (murabaha) and profit-sharing financing (mudaraba and musharaka). Overtime, the former became the dominant mode of financing in Islamic banks given that there are some inherent problems in applying the latter in practice, such as moral hazard.

3 Islamic banks are neither exposed to toxic securities nor offered products like CDOs or MBS due to the prohibition by the Shari’ah (Ahmed 2009). The derivative products like CDS are prohibited under Islamic law due to the existence of risky or hazardous sale. In fact, Islamic law prohibits any transactions involving unnecessary uncertainty (gharar) and gambling (maysir), which includes short selling, arbitrage, betting and speculation (Aziz et al. 2009).
banks, while the customary board of directors performs the executive role, they also enforce the authority of the Shari’ah board to perform either supervisory or advisory roles, or both. Chowdhury and Hoque (2006) consider the Shari’ah board as a supra authority that is an integral part of Islamic banks’ governance. Further, in a study covering Islamic banks in 25 countries, Mollah and Zaman (2015) find a positive impact of the Shari’ah board’s supervisory role on the performance of Islamic banks.

The key question of this paper is: how strong is the governance structure of Islamic banks? We argue that the natures, qualities, and commitments of the regular board of directors in Islamic banks and in conventional banks are different. This is because the former is charged with adhering to Islamic doctrine, which demands that specific codes of behavior be followed and reflected in financial arrangements and transactions. Thus, the governance structure in Islamic banking is unique because of the Shari’ah board’s supervision.

Accordingly, there is an open empirical research question as to whether the different governance structure explains the risk taking and performance in Islamic banks. Therefore, given the distinctions between Islamic banks and conventional banks, this study examines whether their governance structure influences risk taking and performance differently. By using a sample of 52 Islamic banks and 104 conventional banks in 14 countries over the period from 2005 to 2013, we conclude that the governance structure in Islamic banks plays a crucial role in increased risk taking as well as enhanced financial performance, which is different from conventional banks.

This study contributes to the literature on banking in several ways. First, this is the first cross-country study that examines the influence of the governance structure on the risk taking and financial performance of Islamic banks. By simultaneously analyzing both Islamic banks and conventional banks, we complement the works of Cihak and Hesse (2010), Hasan and Dridi (2010), Abedifar et al. (2013), Beck et al. (2013), and Mollah and Zaman (2015). These studies provide comparative analyses on financial stability, risk management, performance, and efficiency between these two types of banks.

Second, this study constructs a unique database by using 12 hand-collected governance items, which has not been done in previous banking governance research. This data set captures a wider spectrum of measures of board and CEO structures, board competence, and board diversity for both Islamic banks and conventional banks. Therefore, this study provides a new governance dimension to the banking literature.

Finally, in examining the effect of governance on risk taking and performance, this study also extends pooled sample estimations by splitting the sample into big and small banks, Gulf Cooperation Council (GCC) and non-GCC banks, Muslim majority population and non-Muslim majority population banks, and high Islamicity and low Islamicity banks. In a cross-country environment, these extended analyses capture some interesting findings. In particular, the governance-performance relations for small Islamic banks, Islamic banks in GCC countries, and the low Islamicity and non-Muslim majority regions. These results provide additional valuable insights into the nature and role of Islamic banks’ governance structure in performance and risk taking.

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4 Although the governance structure of conventional banks in some countries like Germany or Austria includes a supervisory board, the monitoring mechanism of the Shari’ah Supervisory Board (SSB) is much more effective (Mollah and Zaman 2015).

5 We take the definition of Islamicity from Rehman and Askari (2010).
The paper is organized as follows: Section 2 presents the theory and hypotheses of the study. The data and method are described in section 3. Section 4 presents the empirical results, and section 5 concludes the study.

2 Theoretical motivation and hypotheses development

The corporate governance and bank risk-taking literature emphasizes shareholder and manager incentives. Similar to other corporations, bank shareholders have a preference for excessive risk taking due to the moral hazard problem, limited liability, and convex pay-off systems (Galai and Masulis 1976; Jensen and Meckling 1976; John et al. 1991). However, due to the higher level of information asymmetry in banks, dispersed and unsophisticated debt holders cannot prevent the shareholders from excessive risk taking by initiating complete debt contracts on an ex-ante basis (Dewatripon and Tirole 1994). Therefore, bank shareholders have strong incentives to undertake excessive risky investments to maximize their benefits at the expense of deposit insurers and taxpayers. In addition, John et al. (1991) conclude that risk-adjusted deposit insurance premiums and risk-adjusted capital requirements fail to mitigate the moral hazard problem and fully control banks’ risk-taking incentives. In such a context, the bank managers’ opportunistic behavior depends on the governance structure. Akhigbe and Martin (2008) and Pathan (2009) highlight the disclosure, governance, and risk-taking practices of U.S. banks surrounding the Sarbanes-Oxley Act of 2002.

The studies by Sierra et al. (2006), Andres and Vallelado (2008), Adams and Mehran (2012), Aebi et al. (2012), Francis et al. (2012), Wintoki et al. (2012), and Pathan and Faff (2013) investigate the governance mechanism and its effect on firms’ performance and value. Sierra et al. (2006) suggest that a strong board can improve a bank’s performance. Adams and Mehran (2012) produce similar results for the board’s size, but they fail to identify any relation between performance and independent directors. Andres and Vallelado (2008), on the other hand, show a positive but concave effect for both banks’ boards and independent directors on performance. Furthermore, Wintoki et al. (2012) report no relation between a board’s size or independence and the firm’s performance, but Francis et al. (2012) show that better governed firms perform well during financial crises. Despite the well-known governance literature in the context of the banking industry, there is a relative lack of research on the relation between governance and risk taking in Islamic banks.

The literature often separates the examination of issues pertaining to Islamic and conventional banks into the differences between their respective business models (Beck et al. 2013). Islamic banks differ from conventional banks through the imposition of certain religious principles on the products offered, which are free from the establishment of interest (riba) (see, e.g., Obaidullah 2005) and excessive uncertainty (gharar) (Abedifar et al. 2013). Accordingly, Islamic banks have developed different operational mechanisms such as profit-loss sharing (Mudaraba) and nonprofit-loss sharing (Murabaha and Ijara) (Khan and Ahmed 2001) as alternatives to time deposits, debt financing, and lease financing in conventional banks. The Shari’ah board, which ensures banking operations and products are compliant with Islamic principles, is an important part of Islamic banks’ governance.

The prohibition of receipts and payments of interest is the center of the Islamic financial system and is supported by other principles of Islamic doctrine that advocate for risk sharing, property rights, and the sanctity of contracts (Zaher and Hassan 2001). While conventional banks typically apply the concept of interest as a return on capital, Islamic banks rely on more
sales-type products and services. These products and services are based on profit-loss sharing, mark-up financing and leasing, and relationship-type banking. The interest-free financial system has attracted considerable attention from corporations, policy makers, and other stakeholders. Beck et al. (2013) find few significant differences between the business models of Islamic banks. They find evidence that Islamic banks are less cost effective but have a higher intermediation ratio, higher asset quality, and better capitalization. Cihak and Hesse (2010) find that the risk management of Islamic banks, compared to conventional banks, depends on the size of the banks. Abedifar et al. (2013) extend this finding by examining the relation between investor religiosity and a bank’s size.

The religious convictions of the depositors and the operational mechanisms for profit-loss sharing can help Islamic banks maintain pro-cyclical protection and reduce the risk of withdrawal because of loyalty to the banks in times of adverse conditions. However, Islamic banking practices can also increase investors’ risk aversion due to the banks’ relatively limited access to wholesale funding (Abedifar et al. 2013). Thus, there is no universal argument defining the risk and return behavior of Islamic banks compared with those of conventional banks.

Some features can make Islamic banks less vulnerable to risk than conventional banks. For example, Islamic banks are better able to pass negative shocks on the asset side (e.g., loss sharing) through to the investment depositors (a profit sharing arrangement). The risk-sharing arrangements on the deposit side provide another layer of protection for the Islamic bank beyond its book capital (Abedifar et al. 2013). In addition, Islamic requirements that limit negligence or misconduct (operational risk) and difficulty in accessing liquidity put pressures on Islamic banks to be more conservative. This pressure results in less moral hazard and risk taking (Cihak and Hesse 2010). Furthermore, because investors (depositors) share in the risks and typically do not have deposit insurance, they have better incentives to exercise tight oversight of a bank’s management. Finally, Islamic banks have traditionally held a comparatively larger proportion of their assets in reserve accounts with central banks or in correspondent accounts than commercial banks (Cihak and Hesse 2010).

The complexities associated with the administration of Shari‘ah compliance represent an additional risk faced by Islamic banks. In addition, the profit-loss sharing mode of financing does not require any collateral or guarantees, which can increase credit risk for Islamic financial institutions. On the other hand, lower leverage and higher solvency through reserved liquid assets can allow Islamic banks to meet stronger demand for credit and maintain a stable external rating (Hasan and Dridi 2010). So, even if Islamic investments are more risky than conventional investments due to the complexities of the products and the transaction mechanisms involved (Abedifar et al. 2013; Olson and Zoubi 2008), the question arises as to whether the higher risks are compensated for by higher returns. Thus, the research is not sufficient to address whether the risk-taking behavior of Islamic banks depends on their governance. This study brings new evidence to the Islamic banking literature.

Islamic banks exhibit diverse operations and relations among depositors, banks, and investors. The large number of depositors and investors in Islamic banks are particularly concerned that their funds are invested in a Shari‘ah-compliant manner (Chapra and Ahmed 2002). In general, the agency problems in conventional banks arise when managers deviate from their obligation to maximize shareholders’ wealth. In the case of Islamic banks, there is an additional potential source of agency problems pertaining to whether all transactions and products properly conform to Shari‘ah requirements, in particular profit-sharing contracts.
The operations of Islamic banks suggest that the Islamic principles underlying the contracts result in unique agency relations (Safieddine 2009). Additionally, profit-loss sharing mechanisms use equity financing and risk sharing, as compared to conventional banks that use debt financing (Beck et al. 2013) and risk transfer (Hasan and Dridi 2010). Relationship banking in Islamic banks can also act to reduce adverse selection and moral hazard problems through monitoring by depositors. Although these problems are expected to occur more often in the profit-sharing paradigm, an argument can be made that there is a higher level of trust between Islamic banks and their clients and, hence, the moral hazard risks are less. In conventional banks, relationship banking is confined to private banking services for prime clients, but in Islamic banking a close relationship between the bank and the client comes from shared values, trust, and mutual respect. Thus, some of the risks of Islamic banks can be mitigated by reducing transaction costs and mitigating agency conflicts through monitoring by depositors rather than government intervention, such as deposit insurance (Beck et al. 2013). Alman (2012) elaborates that Shari’ah supervision mitigates risk taking. However, the empirical evidence shows that more studies in this area are needed in order to establish the relation between risk taking and the governance structure (Aggarwal and Yousef 2000; Khan 2010). Accordingly, we first test the difference in governance structures between Islamic and conventional banks and its impact on risk taking in Hypothesis 1.

**Hypothesis 1** Governance and risk taking in Islamic banks

\[ H_{01}: \text{The difference in governance structures between Islamic and conventional banks does not distinguish risk taking between these bank types.} \]

A rejection of \( H_{01} \) implies that the distinct characteristics of Islamic banks’ governance structure, driven by differences in the financial contracts offered by the banks and the establishment of the Shari’ah supervisory board, affect their risk-taking behavior.

The foundation of Islamic banking stems from Islamic Shari’ah (Islamic Common Law), and Islamic banks comply with the basic principle that exploitative contracts based on interest, uncertainty, or contracts that involve risk or speculation are unenforceable. Financial transactions under these guidelines call for operations and financial products that yield fair, legitimate profits and economic social ‘added-value’ (Siddiqi 1999). Safieddine (2009) stresses that the governance structure in Islamic banking is unique because it also must ensure that all operations adhere to ethics and morality as outlined by Shari’ah (Abu–Tapanjeh 2009; Chowdhury and Hoque 2006). Mollah and Zaman (2015) address the role of the Shari’ah board and its impact on the performance of Islamic banks compared to conventional banks and report that performance increases in the presence of the Shari’ah board’s supervisory role. Accordingly, we further investigate the role that corporate governance plays in affecting performance in Islamic banks in Hypothesis 2.

**Hypothesis 2** Governance and performance in Islamic banks

\[ H_{02}: \text{The difference in governance structures between Islamic and conventional banks does not influence the performance of these bank types.} \]
The rejection of $H_{02}$ implies that the governance structures in Islamic banks that drive differences in risk taking also affect their performance.

The current banking governance literature tends to separate the examination of performance between Islamic and conventional banking institutions. In addition, the literature pertaining to the impact of Islamic banks’ governance and its impact on risk taking and performance remains relatively sparse, and the empirical relations remain unclear. While the establishment of Shari’ah principles is often intended to reduce the use of unfair and risky financial products and, thus, the operating risk of Islamic banks, the risks associated with the establishment of the Shari’ah board, limited access to wholesale capital, and credit risk stemming from exclusive Islamic financial contracts make the theoretical relation between Islamic banks’ governance structure and risk taking and performance unclear. Thus, our study extends the literature on Islamic banks’ governance structure and the risk-return relation.

3 Data and method

We use Bankscope’s database to form our primary sample for all Islamic banks during the period from 2005 to 2013. We find data for 169 Islamic banks and filter them by keeping only those having codes C1, C2, and C* because banks with these codes publish consolidated financial statements. We then filter the remaining banks with an independence indicator defined by Bureau van Dijk (BvD) as equal to A or B.7 Next, by following Beck et al. (2013), we filter the remaining banks based on three principles: (1) countries having both Islamic and conventional banks; (2) countries with at least four banks; and (3) banks with at least 3 years of data. After the filtering process, the final sample has 52 Islamic banks and 104 conventional banks in 14 countries. The banks in our sample come from Bahrain, Bangladesh, Jordan, Kuwait, Lebanon, Malaysia, Pakistan, Qatar, Saudi Arabia, Sudan, Syria, Turkey, Yemen and the United Arab Emirates. Table 1 reports the country-wise distribution of the sample.

3.1 Measures of dependent and explanatory variables

We investigate the link between risk taking, performance, and the governance structure of Islamic banks. The risk-taking variable is the log of the Z-score (Log_Z), and the bank’s performance is measured by the return on assets (ROA).

To capture the governance structure, we construct a composite corporate governance index (CGI) based on 12 governance variables listed in Table 6 of the

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6 Bankscope database offers six accounting consolidation codes: C1, C2, U1, U2, C*, and U*. Banks having accounting consolidation codes C1, C2 and C* indicate that the financial statements of the parent bank is consolidated with its subsidiaries, but the financial statements of the parent bank are not consolidated with its subsidiaries for the codes U1, U2, and U*. Thus, un-consolidated statements do not offer a complete financial picture of those banks.

7 This independence indicator consists of five categories. The categories A and B include companies where the main shareholder holds less than 50% of the total ownership of a company. We made this choice because in non-independent banks the governance mechanisms are influenced by the parent bank.
appendix. The other explanatory variables include firm and country-specific variables. The full descriptions of the variables are in Table 2.

To test hypotheses (H01–H02), we use the following models (1) – (2):

For risk-taking, we use:

\[
Risk \, Taking_{b,c,t} = \alpha_0 + \alpha_1 *Islamic + \beta_1 CGI_{b,c,t-1} + \beta_2 Islamic*CGI_{b,c,t-1} + \gamma *X_{b,c,t-1} + \delta *ME_c + \varepsilon_{b,c,t}
\]  \hspace{1cm} (1)

For firm performance, we use:

\[
Performance_{b,c,t} = \alpha_0 + \alpha_1 *Islamic + \beta_1 CGI_{b,c,t-1} + \beta_2 Islamic*CGI_{b,c,t-1} + \gamma *X_{b,c,t-1} + \delta *ME_c + \varepsilon_{b,c,t}
\]  \hspace{1cm} (2)

The variables for all of the models are:

- \(Risk \, Taking_{b,c,t}\) is the risk taking of bank b in country c at time t.
- \(Performance_{b,c,t}\) is the performance of bank b in country c at time t.
- \(CGI_{b,c,t-1}\) is the lag of the corporate governance index of bank b in country c at time t.
- \(X_{b,c,t-1}\) is a matrix of the lag of firm-level variables.
- \(ME_c\) is a matrix of country-level macroeconomic and supervisory variables.
- \(\varepsilon_{b,c,t}\) is the error term; \(\alpha_0\) is the constant; and \(\alpha, \beta, \gamma, \) and \(\delta\) are the vectors of coefficient estimates.
Table 2  Description of the variables. This table presents the descriptions of the governance and other firm- and country-specific variables and includes the calculation procedure for each variable

| Name                        | Abbreviation | Calculation procedure |
|-----------------------------|--------------|-----------------------|
| Default risk                | Log_Z        | The Z-score is the distance to default estimated as the average ROA plus capital to asset ratio divided by the standard deviation of the ROA. Source: Beltratti and Stulz (2012), Fu et al. (2014), Laeven and Levine (2009) and Pathan (2009). The higher the value of the z-score, the lower the risk taking of the banks. We use the log of the Z-score as a proxy for the insolvency risk. Source: Authors’ estimation |
| Firm performance            | ROA          | Net income divided by average total assets. Source: Bankscope |
| Corporate governance index  | CGI          | The corporate governance index is constructed based on 12 boardroom characteristics. The characteristics are: (1) Board Size: Is the board size of this bank smaller than the median board size of the sample? If yes, then one, otherwise zero. (2) Independent Directors: Is the value of board’s independence larger than median of the sample? If yes then one, otherwise zero. (3) Female Director: Is there any female director on the board? If yes then one, otherwise zero. (4) Board Meeting: Are the number of board meetings larger than the median board meetings of the sample? If yes, then one, otherwise zero. (5) Board Attendance: Are the percent of board attendance larger than 75 %? If yes, then one, otherwise zero. (6) Board Committees: Are the number of board committees larger than the median board committees of the sample? If yes, then one, otherwise zero. (7) Chair Independence: Is the chairman independent? If yes then one, otherwise zero. (8) Chair/CEO Split: Are the roles of Chair/CEO split? If yes, then one, otherwise zero. (9) Internal CEO: If the CEO is not internally recruited, then one, otherwise zero. (10) CEO Qualification: MA or higher then one, otherwise zero. (11) CEO Banking Experience: If the CEO has more than the median years of experience in the sample, then one, otherwise zero. (12) CEO Tenure: If the CEO has more than the median tenure in the sample then one, otherwise zero. The descriptive statistics for all 12 board characteristics are in Table 6 of the appendix. Source: Hand Collected |
| Asset size                  | Log_TA       | Log of total assets. Source: Bankscope |
| TIER 1 capital              | Tier1        | Tier 1 capital. Source: Bankscope |
| Leverage                    | Lev          | Customers’ Term Deposit/Equity. Source: Bankscope |
| STD Of Returns              | Std roa      | Standard deviation of ROA. |
| Loans                       | Loans        | Loans/Total Assets (Loan). Loan is a liquidity ratio. This liquidity ratio indicates what percentage of the assets of the bank is tied up in loans. The higher this ratio is the less liquid the bank is. Source: Bankscope |
| Bank concentration          | HHI          | Hirschman-Herfindahl Index (HHI) is a proxy for bank concentration. $HHI_{c,t} = \frac{1}{n} \sum_{i=1}^{n} \left( \frac{Total\ Assets_{i,c}}{\sum_{i=1}^{n} Total\ Assets_{i,c}} \right)^2$. The HHI has a value between zero and one. The higher the value, the more the concentration. Authors calculation |
| Legal system                | Legal        | This a dummy variable for the legal system in the country. We use the value of zero if the country does not have Shari’ah law in
3.2 Estimation method

We use a random-effects GLS method for the regression analyses. We apply this technique, developed by Baltagi and Wu (1999) for several reasons. First, an OLS ignores the panel structure of the data (Gambin 2004). Second, a time-invariant parameter cannot be estimated with fixed-effect methods. Third, the CGI does not vary much over time, so the fixed-effect estimation could be inappropriate (Wooldridge 2002, p. 286) and could lead to a loss in degrees of freedom (Baltagi 2005, p. 14). Recent studies such as Pathan (2009) and Mollah and Zaman (2015) also use the random-effect GLS technique in their studies. Further, for a robustness check of our findings, we also use a two-step GMM method.

3.3 Description of the data

Table 3 presents the descriptive statistics of the variables. The mean values of the log Z-score are 2.480 and 3.097 with standard deviations of 1.090 and 0.804 for Islamic and conventional banks respectively. The ROAs are 1.5 and 1.6 % for the Islamic and conventional banks respectively. The t-tests offer comparisons between the means of the two samples. The
Table 3  Descriptive statistics. This table presents the descriptive statistics for the variables used in the models for both Islamic and conventional banks. We report the paired sample mean difference (T-test) in column 14. See Table 2 for the definitions of the variables.

| Variable           | Islamic banks | Conventional banks | Paired T-test (Islamic Vs. Conventional) |
|--------------------|---------------|-------------------|----------------------------------------|
|                    | Observations | Mean | Std. | Median | Skewness | Kurtosis | Observations | Mean | Std. | Median | Skewness | Kurtosis |                  |
| Log_Z              | 347          | 2.480 | 1.090 | 2.510  | −0.660   | 5.190    | 869         | 3.097 | 0.804 | 3.098  | −0.384   | 3.468    | −10.940***       |
| ROA                | 349          | 0.015 | 0.060 | 0.010  | −2.130   | 17.640   | 871         | 0.016 | 0.038 | 0.014  | −9.656   | 291.885  | −0.149            |
| Islamic            | 468          | 1.000 | 0.000 | 1.000  | 0        | 0        | 936         | 0     | 0     | 0      | −        | −        | −                  |
| CGI                | 346          | 0.475 | 0.157 | 0.417  | −0.026   | 2.737    | 769         | 0.385 | 0.179 | 0.417  | −0.145   | 2.419    | 8.007***          |
| Log_TA             | 349          | 14.788| 1.899 | 14.618 | 1.297    | 6.585    | 872         | 22.487| 1.653 | 22.712 | −3.808   | 2.481    | −70.409***        |
| Tier1              | 307          | 22.784| 17.819| 17.400 | 3.671    | 23.690   | 700         | 15.258| 6.782 | 13.930 | 2.455    | 14.459   | 9.109***          |
| Lev                | 337          | 4.830 | 3.711 | 4.229  | 1.057    | 4.451    | 858         | 7.056 | 4.992 | 6.284  | 8.331    | 147.218  | −7.042***         |
| Stdroa             | 351          | 3.886 | 4.984 | 1.454  | 1.494    | 3.851    | 871         | 1.141 | 3.033 | 0.605  | 7.825    | 66.756   | 11.733***         |
| Loans              | 337          | 0.483 | 0.252 | 0.561  | −0.419   | 1.966    | 856         | 0.537 | 0.168 | 0.577  | −0.818   | 3.249    | −4.387***         |
| HHI                | 468          | 0.243 | 0.120 | 0.190  | 0.643    | 2.248    | 936         | 0.245 | 0.131 | 0.180  | 0.823    | 2.394    | −                  |
| Legal              | 468          | 0.731 | 0.486 | 1.000  | −0.524   | 2.455    | 936         | 0.711 | 0.599 | 1.000  | 0.215    | 2.400    | −                  |
| GDP_growth         | 440          | 4.892 | 4.776 | 4.520  | −0.017   | 7.153    | 881         | 5.304 | 4.454 | 5.585  | 0.379    | 8.916    | −                  |
| Muslim_population  | 468          | 81.154| 10.613| 81.000 | −0.247   | 2.633    | 936         | 82.173| 13.061| 81.000 | −0.365   | 1.973    | −                  |
| Islamicity         | 468          | 81.066| 33.114| 60.000 | 0.917    | 2.863    | 936         | 86.868| 32.150| 85.000 | 0.737    | 2.572    | −                  |
| Inflation_rate     | 468          | 60.637| 34.963| 59.000 | 0.080    | 1.942    | 936         | 60.053| 35.868| 60.000 | 0.067    | 1.837    | −                  |
| Dinsur             | 306          | 0.252 | 0.208 | 0.286  | 0.013    | 1.668    | 675         | 0.266 | 0.214 | 0.285  | −0.001   | 1.565    | −                  |
| Bank Supervision   | 306          | 0.811 | 0.118 | 0.857  | −0.495   | 1.697    | 675         | 0.837 | 0.118 | 0.857  | −0.614   | 1.948    | −                  |
| Bank Regulatory Restriction | 306 | 0.471 | 0.107 | 0.400  | 0.032    | 2.118    | 675         | 0.472 | 0.133 | 0.400  | −0.561   | 2.287    | −                  |
| Bank Private Monitoring | 306 | 0.661 | 0.217 | 0.750  | −1.659   | 5.821    | 675         | 0.606 | 0.268 | 0.750  | −0.716   | 2.981    | −                  |
| Bank Capital Oversight | 306 | 0.549 | 0.168 | 0.556  | −0.104   | 2.161    | 675         | 0.496 | 0.156 | 0.444  | 0.340    | 2.613    | −                  |

The ***, **, and * represent p-values of 0.01, 0.05, and 0.10.
conventional banks preserve a significantly higher level of financial stability, even though their mean ROA is nonsignificantly different between the two bank types.

The CGI for the Islamic banks (the conventional banks) is 0.475 (0.385), respectively. The t-test statistics indicate that the Islamic banks attain significantly better CGI as compared to the conventional banks. These primary results indicate that the governance structures in the Islamic banks are relatively better than those of the conventional banks.

Table 3 also reports the firm and county-level control variables. The descriptive statistics for asset size (Log_TA) indicate that a conventional bank’s size is significantly larger than that of an Islamic bank. The Islamic banks maintain 22.784 % regulatory capital, while the conventional banks maintain 15.258 %. This difference is significant. However, the conventional banks are highly leveraged compared to the Islamic banks (7.056 % vs. 4.830 %), which is significant. The conventional banks also hold more loans, compared to Islamic banks (53.7 % vs. 48.3 %), which is also significant. Furthermore, the return volatility (STDROA) is higher for Islamic banks compared to conventional banks (3.886 vs. 1.141). Nevertheless, there are country-level variations in the macroeconomic variables, banking regulation, and supervision but these differences are theoretically nonsignificant across bank types.

4 Empirical results

4.1 The impact of corporate governance on risk taking

We present the regression results from investigating the impact of the CGI on risk taking as measured by the log Z-score. Our particular variable of interest is the interaction term between an Islamic bank dummy and the governance index variable (Islamic*CGI_{t-1}). For some explanatory variables, including the corporate governance index (CGI_{t-1}), we test the lagged effects by restricting the contemporaneous effects. Also, different classes of control variables, such as bank-level characteristics and macroeconomic and country-level indicators are included in different specifications denoted by R-squared, which improves the explanatory power of our models. We also control for year and country fixed effects by using year and country dummies. Table 4 shows the results for the baseline estimations of Islamic and conventional banks (models 1–5),8 big versus small banks (models 7 and 8), GCC versus non-GCC (models 9 and 10), Muslim majority population versus non-Muslim majority population (models 11 and 12), and high Islamicity vs. low Islamicity (models 13 and 14). We test the crisis impact by using a difference-in-difference specification (i.e., by adding the Islamic and crisis dummies and the interaction term ‘Islamic*CGI*crisis’) (see model 15).

Models 1–5 show that, reflecting the Shari’ah-supervised governance structure, Islamic banks tend to be more risk-adaptive than conventional banks, irrespective of year and country fixed effects. The sign of the interaction variable (Islamic*CGI_{t-1}) is consistently negative and significant at the 5 % level. These findings reject the null hypothesis H₀₁ (governance difference between Islamic banks and conventional banks does not influence the risk taking by Islamic banks). However, both the Islamic bank dummy and the CGI variables individually

8 We discuss model 6 (GMM) in subsection 4.3
Table 4  Difference in governance between Islamic and conventional banks and its impact on risk taking. This table presents the regression results for the governance difference between conventional and Islamic banks and its impact on risk taking. The risk-taking proxy is Log Z. We use a corporate governance index (CGI) as the proxy for governance. See Table 2 for definitions of the other bank-specific and country-specific variables. Robust standard errors are reported in the parentheses.

| Variables               | Baseline estimation | Robustness check | Big vs. small | GCC Vs. non-GCC |
|-------------------------|---------------------|------------------|---------------|-----------------|
|                         | Random effect       | Random effect    | GMM model     | Big Small GCC   |
| Islamic                 | 0.446 (0.346)       | 0.289 (0.361)    | 0.106 (0.269) | 0.567*** (0.142) |
| CGIt-1                  | 0.082* (0.047)      | 0.105* (0.057)   | 0.224* (0.118) | 0.159*** (0.066) |
| Islamic*CGIt-1          | -0.808*** (0.343)   | -0.473** (0.192) | -0.198* (0.101) | 0.127 (0.125)   |
| Log_TA_t-1              | -0.018 (0.031)      | -0.016 (0.031)   | -0.115 (0.140) | 0.127 (0.338)   |
| Tier1_t-1               | 0.016*** (0.003)    | 0.015*** (0.003) | 0.019*** (0.005) | 0.024*** (0.004) |
| Lev_t-1                 | -0.002 (0.001)      | -0.002 (0.002)   | 0.001 (0.01)   | 0.003 (0.002)   |
| Stdroa_t                 | -0.252*** (0.045)   | -0.232*** (0.046) | -0.142*** (0.042) | -0.798*** (0.104) |
| Loans_t-1               | -0.132 (0.228)      | -0.041 (0.234)   | -0.286 (0.132) | 0.252 (0.320)   |
| HHI                     | -0.240 (0.569)      | -0.145 (0.602)   | -0.481 (0.761) | 0.382 (0.874)   |
| Legal                   | 0.262 (0.374)       | 7.801*** (3.051)  | -3.770** (1.651) | 2.291 (3.231)   |
| GDP_growth              | 0.001 (0.004)       | 0.001 (0.004)    | -0.002 (0.001)  | 0.000 (0.009)   |
| Muslim_population       | -0.019 (0.016)      | -0.274*** (0.165) | -0.005 (0.006)  | -0.008 (0.009)  |
| Islamity                | 0.002 (0.006)       | 0.106*** (0.044)  | 0.004 (0.010)   | -0.090*** (0.021) |
| Inflation_rate          | -0.001*** (3.47e-02) | -0.001*** (3.526e-02) | -3.75e-2 (4.55e-2) | -0.001 (0.001)   |
| Dinsur                  | 1.055* (0.626)      | 6.351* (3.497)   | -0.643 (1.976) | 6.587 (4.582)   |
| Bank supervision        | -9.415*** (3.216)   | -12.581*** (5.002) | -1.919 (4.262) | 1.286 (0.965)   |
| Bank private monitoring | 3.524 (4.260)       | 6.316 (5.086)    | -7.522*** (2.389) | 0.873 (0.764)   |
| Bank capital oversight  | 3.252 (3.137)       | 3.144 (1.898)    | 2.110 (1.908)  | 1.445 (1.371)   |
| Bank regulatory restriction | 2.126** (0.892)    | 3.749 (4.101)    | 9.615*** (4.230) | 2.091* (1.252)   |
| Crisis                  |                      |                  |               |                 |
| Islamic*Crisis*CGIt-1   |                      |                  |               |                 |
| Log_Z_t-1               |                      |                  |               | 0.676*** (0.048) |

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Table 4 (continued)

| Variables | Baseline estimation | Robustness check | Big vs. small | GCC Vs. non-GCC |
|-----------|---------------------|------------------|---------------|-----------------|
|           | (1) Random effect   | (2) Random effect| (3) Random effect | (4) Random effect | (5) Random effect | (6) GMM model | (7) Big | (8) Small | (9) GCC |
| Constant  | 2.726* (0.406)      | 4.540*** (0.134) | 13.319*** (0.881) | 7.269*** (0.457) | 22.784*** (0.175) | 0.377*** (0.109) | 6.235*** (0.682) | 3.160*** (0.368) | 1.038*** (0.510) |
| Chi2      | 143.32***           | 103.88***        | 154.96***      | 124.39***       | 170.60***         | 99.47***        | 60.71***         | 141.33***       | 83.41***         |
| Observations | 904               | 415              | 415            | 415             | 415              | 341             | 279              | 136             | 161              |
| Overall R2 | 0.363             | 0.502            | 0.545          | 0.526           | 0.526            | 0.377*** (0.109) | 0.534            | 0.555           | 0.397            |
| Year FE   | NO                 | NO               | NO             | YES             | YES              | YES             | YES              | YES             | YES              |
| Country FE| NO                 | NO               | NO             | NO              | YES              | YES             | YES              | YES             | YES              |
| AR(1)-p-value |                 | 0.009            |                |                 |                 | 0.626           |                  |                 |                 |
| AR(2)-p-value |                 |                  |                |                 |                 | 0.938           |                  |                 |                 |
| Hansen-J-p-value |            |                  |                |                 |                 |                 |                  |                 |                 |
| GCC Vs. non-GCC |          |                  |                |                 |                 |                 |                  |                 |                 |
| Variables | (10) Non-GCC | (11) +90 % Muslim | (12) −90 % Muslim | (13) High Islamicity vs. low Islamicity | (14) Crisis impact |
| Islamic    | 0.184 (0.334) | 0.525* (0.288) | −0.078 (0.567) | 1.362*** (0.429) | −2.464** (1.110) | 0.016 (0.269) |
| CGLt-1     | 0.102 (0.064) | 0.073 (0.064) | 0.157 (0.107) | 0.118 (0.146) | 0.177* (0.106) | 0.080 (0.060) |
| Islamic*CGLt-1 | 0.362 (0.382) | −0.168 (0.350) | −0.591 (0.375) | −2.067*** (0.907) | −0.369 (0.338) |                  |
| Log_TAt-1  | 0.001 (0.028) | 0.021 (0.037) | −0.049 (0.048) | −0.010 (0.021) | −0.404*** (0.079) | −0.025 (0.027) |
| Tier1t-1   | 0.002 (0.004) | 0.009* (0.005) | 0.017*** (0.005) | −0.013 (0.014) | 0.024*** (0.004) | 0.016*** (0.003) |
| Levt-1     | −0.026*** (0.008) | −0.046*** (0.011) | 0.000 (0.003) | −0.058*** (0.011) | 0.003 (0.002) | −0.002 (0.002) |
| Sdroat-1   | −1.207*** (0.139) | −0.781*** (0.106) | −0.201*** (0.041) | −1.351*** (0.124) | −0.231*** (0.058) | −0.253*** (0.034) |
| Loanst-1   | −0.182 (0.257) | −0.116 (0.282) | −0.057 (0.277) | −0.557 (0.466) | −0.165 (0.275) | −0.016 (0.163) |
| HHI        | −0.591 (0.884) | 0.382 (0.807) | −0.749 (0.970) | 0.866 (2.613) | 0.382 (0.874) | −0.085 (0.611) |
| Variables                | GCC Vs. non-GCC | Muslim maj. vs. non-Muslim maj | High Islamicity vs. low Islamicity | Crisis impact |
|-------------------------|----------------|-------------------------------|-----------------------------------|---------------|
|                         | (10)           | (11)                         | (12)                             | (13)         |
|                         | Non-GCC        | −90 % Muslim                  | −90 % Muslim                      | High Islamicity | Low Islamicity | Random effect |
| Legal                   | −2.482*** (0.482) | 0.056 (0.447)                | 0.761 (0.478)                    | 2.499 (2.091) | 0.841 (4.302) | 7.622** (3.358) |
| GDP growth              | 0.003 (0.004)  | 0.003 (0.005)                | −0.000 (0.005)                   | −0.005 (0.036) | 0.008 (0.007) | 1.40e-02 (0.004) |
| Muslim population       | 0.124*** (0.025) | 0.030* (0.017)               | 0.028 (0.019)                    | 0.040*** (0.008) | −0.044 (0.278) | −0.273 (0.167) |
| Islamicity              | −0.046*** (0.009) | 0.004 (0.009)               | 0.047*** (0.014)                 | 0.007 (0.005) | 0.248 (0.305) | 0.104** (0.049) |
| Inflation rate          | −0.001* (4.00e-02) | 4.41e-03 (3.83e-02)          | −0.001** (0.001)                 | 0.000 (0.001) | −0.001 (0.001) | −0.001** (0.000) |
| Dinsur                  | −0.381 (0.952)  | 1.699 (2.133)                | 0.649* (0.391)                   | 1.257 (0.956) | 2.338* (1.381) | 5.949** (3.018) |
| Bank supervision        | 2.470*** (0.662) | −1.093 (1.278)             | 0.281 (1.288)                    | −2.951 (3.144) | −0.875 (1.005) | −9.105** (3.585) |
| Bank private monitoring | −2.920*** (0.901) | 1.105 (1.091)               | 2.994 (2.031)                    | 3.630 (2.791) | 6.593** (3.199) | 3.549 (3.199) |
| Bank capital oversight  | 2.498 (2.098)  | −0.085 (0.539)               | −1.805 (1.765)                   | 1.025 (0.996) | 3.073 (2.973) | 2.966 (2.605) |
| Bank regulatory         | 2.346 (1.681)  | 1.009 (0.820)                | 3.179 (1.592)                    | 4.279* (2.547) | 4.449 (3.129) | 1.278 (0.947) |
| restriction             | Crisis         | Islamic*Crisis*CGIt-1       | Log Zc1                          | −0.028 (0.021) |
|                         |                |                               |                                  | 0.058 (0.132) |
| Constant                | 11.099*** (0.701) | 4.148*** (0.298)            | 6.014*** (0.710)                 | 2.993*** (0.602) | 3.009*** (0.408) | 13.658*** (0.612) |
| Chi2                    | 73.09***       | 56.46***                    | 43.26***                         | 50.83***      | 48.16***      | 143.84***      |
| Observations            | 254            | 218                         | 197                              | 88            | 161           | 415            |
| Overall R2              | 0.518          | 0.540                       | 0.548                            | 0.542         | 0.397         | 0.537          |
| Year FE                 | YES            | YES                         | YES                              | YES           | YES           | NO             |
| Country FE              | YES            | YES                         | YES                              | YES           | YES           | YES            |
| AR(1)-p-value           |                |                              |                                  | 0.058 (0.132) |
| AR(2)-p-value           |                |                              |                                  |               |
| Hansen-J-P-value        |                |                              |                                  |               |

The ***., **., and * represent p-values of 0.01, 0.05, and 0.10.
indicate a positive effect on the Z-scores that suggest the Islamic banks have a lower insolvency risk compared to conventional banks, which is consistent with Cihak and Hesse (2010). While the governance features of Islamic banks encourage risk-taking, they still have lower insolvency risk than their conventional counterparts. Aligned with a distinct governance style, such risk-taking behavior as well as lower insolvency risk for Islamic banks are generally supported by a number of controlling factors, such as capital adequacy, deposit insurance, profit volatility, country-level bank supervision, and the inflation rate.

The control variables generally have the expected signs. Specifically, capital adequacy (Tier1t-1) tends to have higher Z-scores because the coefficients are persistently positive across all specifications. Similarly, deposit insurance (Dinsur) has a positive link to the Z-scores, albeit weak in some specifications. These results indicate that, with a strong capital base and deposit insurance in place, Islamic banks can comfortably accept higher risks. Again, the Z-scores tend to decrease with profit volatility (Stdroa t-1), size (Log_TA t-1), country-level supervision, and the inflation rate, as expected. These factors might encourage Islamic banks to take higher risks.

In models 7 and 8, we report substantial differences between large and small Islamic banks. Both the Islamic bank dummy and CGI variables are positive and significantly associated with big banks only, which means they are well equipped to keep risk taking under control, which is not the case for small banks. The interaction term (Islamic*CGI t-1) shows no significant relation in either big or small banks; however, the sign is different, that is, positive with big banks and negative with small banks. Unlike big banks, the negative sign of the corporate governance index (CGI t-1) and the interactive term (Islamic*CGI t-1) in small banks suggests that small Islamic banks are more prone to risk taking. These findings make sense, considering the resource constraints and lack of economies of scale faced by small Islamic banks.

In the regression analysis that splits the sample based on GCC and non-GCC, we find more risk exposure in GCC countries than non-GCC. Given that governance systems are not quite as strong in GCC countries, Islamic banks are potentially more prone to high risk taking. A similar comparison is made between Muslim majority population (i.e., >90 % Muslim) and non-Muslim majority population samples (models 11 and 12) and high Islamicity and low Islamicity samples (models 13 and 14), and we confirm no notable difference in models 11 and 12. However, in models 13 and 14, high Islamicity Islamic banks display more risk taking. This is consistent with our baseline findings that these banks have strong and distinct governance structures that could lead them to take more risks. Finally, we analyze the crisis’ impact (model 15) and find no effect on the Islamic banks’ risk taking. This lack of an effect signifies that these banks are resilient in a crisis as compared to their conventional counterparts because of their higher capitalization.

4.2 The impact of governance on financial performance

We follow a similar process in investigating the impact of the CGI on financial performance as measured by ROA. First, we test the lagged effects of the firm-level independent variables and different classes of control variables denoted with R-squared. This test improves the explanatory power of our models, Table 5 presents the results. In models 1–5,9 we find that across the

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9 See footnote 8 for model 6.
Table 5 Difference in governance between Islamic and conventional banks and its impact on financial performance. This table presents the regression results for the governance difference between conventional and Islamic banks and its impact on financial performance. The performance proxy is ROA. We use a corporate governance index (CGI) as the proxy for governance. See Table 2 for definitions of the other bank-specific and country-specific variables. Robust standard errors are reported in the parentheses.

| Variables          | Baseline estimation | Robustness check | Big vs. small |
|--------------------|---------------------|------------------|---------------|
|                    | Random Effect       | Random Effect    | GMM Model     | Big | Small |
| Islamic            | -0.021** (0.009)    | -0.029** (0.014) | -0.027** (0.013) | -0.026** (0.013) | -0.018** (0.009) | 0.009 (0.017) | -0.056 (0.045) |
| CGI\_t-1           | -0.004 (0.009)      | -0.002 (0.008)   | -0.001 (0.008) | -2.97e-02 (0.008) | -0.002 (0.010) | 0.001 (0.002) | -0.008 (0.029) |
| Islamic*CGI\_t-1   | 0.064*** (0.019)    | 0.066*** (0.026) | 0.066*** (0.027) | 0.066*** (0.027) | 0.206** (0.082) | -0.016 (0.039) | 0.103* (0.059) |
| Log_TA\_t-1        | 0.002* (0.001)      | 0.002* (0.001)   | 0.002* (0.001) | 0.002* (0.001)   | 0.009* (0.005) | 0.001 (0.001) | 0.001 (0.005)  |
| Tier1\_t-1         | 6.07e-02* (3.16e-02)| 0.001* (3.19e-02)| 0.001* (3.16e-02) | 0.001* (3.16e-02) | 0.003 (4.23e-02) | 4.87e-03 (1.17e-02) | 0.001 (0.001) |
| Lev\_t-1           | 1.94e-02 (2.75e-02) | 1.96e-02 (2.81e-02) | 1.74e-02 (2.87e-02) | 4.67e-02 (2.17e-02) | -0.016 (0.039) | 0.103* (0.059) |
| Siroa\_t           | 0.314*** (0.045)    | 0.309*** (0.045) | 0.303*** (0.045) | 0.288*** (0.046) | 0.368*** (0.147) | 0.014** (0.006) | 0.101*** (0.034) |
| Loan\_t-1          | 0.056*** (0.011)    | 0.072*** (0.014) | 0.074*** (0.014) | 0.071*** (0.014) | 0.021*** (0.007) | 0.03 (0.027)  | -0.001 (0.322)  |
| HHI                 | 0.105** (0.042)     | 0.012 (0.096)    | 0.027 (0.104)   | 0.030 (0.104)    | 0.033 (0.098)   | 0.015 (0.027) | -0.001 (0.322)  |
| Legal               | 0.033** (0.017)     | 0.223** (0.098)  | 0.194* (0.106)  | 0.157 (0.130)    | 0.09 (0.056)    | 0.07** (0.035) | 0.033 (0.175)   |
| GDP\_growth         | 9.73e-02* (5.45e-02)| 0.001* (0.001)   | 3.59e-03 (0.001) | 1.59e-03 (0.001) | 0.001 (0.001)  | 2.98e-02* (1.51e-02) | 0.003 (0.002) |
| Muslim\_population  | -0.002** (8.48e-02) | -0.010** (0.004) | -0.009** (0.004) | -0.008* (0.005) | -0.007** (0.003) | -0.003* (0.002) | -0.001 (0.005) |
| Islamicity          | 0.001** (3.05e-02)  | 0.003** (0.001)  | 0.003** (0.001) | 0.003 (0.002)    | 3.0e-02 (0.003) | 0.001** (4.78e-02) | 3.2e-02 (0.002) |
| Inflation\_rate     | -5.90e-06 (4.86e-03)| -2.53e-08 (5.36e-03) | -7.45e-03 (6.63e-03) | -7.39e-03 (6.03e-03) | -3.35e-06 (9.09e-03) | -2.78e-03* (1.55e-03) | -2.88e-03 (1.66e-02) |
| Dinsur              | -0.022 (0.015)      | 0.009 (0.090)    | 0.010 (0.050)   | -0.022 (0.060)   | -0.074* (0.037) | 0.019 (0.029) | -0.032 (0.300)  |
| Bank supervision    | -0.256* (0.145)     | -0.154 (0.185)   | -0.154 (0.185)  | -0.154 (0.185)   | -0.079* (0.047) | -0.071 (0.356) | -0.071 (0.356)  |
| Bank regulatory restriction | -0.085 (0.041) | -0.105 (0.097) | 0.017 (0.030)   | 0.029 (0.342)    | 0.044 (0.033)  | -0.019 (0.128) | 0.013 (0.022)   |
| Bank private monitoring | 0.173* (0.096) | 0.169 (0.110) | 0.169 (0.110)   | 0.169 (0.110)   | 0.013 (0.022)  | 0.017 (0.200) |
| Bank capital oversight | -0.014 (0.067) | -0.019 (0.063) | -0.019 (0.063)  | -0.019 (0.063)   | -0.019 (0.063) | -0.019 (0.063) | -0.019 (0.063) |
| Crisis              | Islamic*Crisis*CGI\_t-1 |          |               |               |               |               |               |
| ROA\_t-1           | 1.014*** (0.004)    | 1.021*** (0.040) | 0.377*** (0.025) | 0.334*** (0.024) | 1.323*** (0.236) | 3.002*** (0.162) | 0.109*** (0.004) | 0.297*** (0.147) |
| Chi2               | 17.83***           | 158.83***       | 163.15***      | 176.64***       | 184.73***      | 141.85***      | 54.89***       | 55.48***        |
| Observations       | 906                | 417             | 417            | 417             | 345            | 279            | 138            |
| Overall R2         | 0.026              | 0.284           | 0.291          | 0.311           | 0.322          | 0.577          | 0.306          |
### Table 5 (continued)

| Variables | Baseline estimation | Robustness check | Big vs. small |
|-----------|---------------------|------------------|---------------|
|           | Random Effect | Random Effect | Random Effect | Random Effect | GMM Model | Big | Small |
| Year FE   | NO               | NO              | NO            | YES           | YES       | YES | YES  |
| Country FE| NO               | NO              | NO            | NO            | YES       | YES | YES  |
| AR(1)-p-value | 0.033          |                 |               |               |           |     |      |
| AR(2)-p-value | 0.381          |                 |               |               |           |     |      |
| Hansen-J-P-value | 0.879          |                 |               |               |           |     |      |

| GCC vs. non-GCC | Muslim maj. vs. non-Muslim maj | High Islamicity vs. low Islamicity | Crisis impact |
|-----------------|-------------------------------|----------------------------------|---------------|
|                 | Variables | GCC | Non-GCC | +90 % Muslim | −90 % Muslim | High Islamicity | Low Islamicity | Random Effect |
| Islamic         | −0.096*** (0.045) | −0.004 (0.005) | 0.012* (0.007) | −0.120*** (0.054) | 0.001 (0.009) | −0.086** (0.043) | 0.013 (0.008) |
| CGI_t-1         | −0.011 (0.024) | 0.003 (0.002) | 0.003 (0.003) | −0.002 (0.018) | 0.006 (0.004) | −0.018 (0.024) | 0.004 (0.008) |
| Islamic*CGI_t-1 | 0.165*** (0.061) | 0.009 (0.010) | −0.011 (0.013) | 0.134** (0.055) | −0.002 (0.020) | 0.133** (0.060) |               |
| Log_TA_t-1      | −0.005 (0.004) | 2.59e-02 (3.27e-02) | 0.001* (4.26e-02) | −0.002 (0.004) | −4.04e-02 (4.02e-02) | −0.002 (0.004) | 0.002 (0.001) |
| Tier1_t-1       | 0.001 (0.001) | −4.61e-03 (8.98e-03) | −1.33e-02 (1.19e-02) | 0.001* (0.001) | 0.011** (2.84e-02) | 0.001 (0.001) | 0.001 (3.12e-02) |
| Lev1_t-1        | 6.94e-03 (5.29e-03) | 1.35e-02 (1.37e-02) | −1.19e-02 (2.12e-02) | 1.97e-02 (4.55e-02) | 1.57e-02 (2.29e-02) | −4.96e-03 (0.001) | 1.50e-02 (2.82e-02) |
| Stdroa_t-1      | 0.262*** (0.076) | 0.616*** (0.032) | 0.485*** (0.039) | 0.262*** (0.070) | 0.679*** (0.052) | 0.270*** (0.077) | 0.275*** (0.045) |
| Loans_t-1       | 0.122*** (0.030) | −0.004 (0.005) | 0.005 (0.007) | 0.099*** (0.024) | −0.002 (0.011) | 0.126*** (0.030) | 0.076*** (0.014) |
| HHI             | 0.019 (0.198) | 0.035 (0.025) | 0.014 (0.035) | −0.038 (0.196) | 0.085 (0.066) | −0.008 (0.020) | 0.017 (0.102) |
| Legal           | 0.038 (0.108) | 0.012* (0.007) | 0.012 (0.012) | 0.193 (0.231) | 0.219* (0.117) | −0.002 (0.081) | 0.187 (0.128) |
| GDP_growth      | 0.002 (0.001) | 2.24e-02 (1.33e-02) | −8.40e-06 (2.50e-02) | −0.001 (0.001) | 9.23e-03 (0.001) | 0.001 (0.001) | −0.000 (0.001) |
| Muslim_population | −0.002 (0.007) | −0.001 (4.38e-02) | −4.52e-02 (0.001) | 0.001 (0.002) | −1.32e-02 (1.72e-02) | 4.43e-02 (0.005) | −0.009* (0.005) |
| Islamicity      | 0.003 (0.007) | 2.26e-02 (1.61e-02) | 1.85e-02 (2.49e-02) | 0.001 (0.001) | −8.51e-03 (9.63e-03) | −0.001 (0.005) | 0.063* (0.002) |
| Inflation_rate  | −5.73e-03 (1.71e-02) | 5.08e-06 (1.06e-03) | −1.49e-03 (1.65e-03) | −2.20e-02 (1.49e-02) | 3.75e-03 (3.47e-03) | −3.91e-03 (1.72e-02) | −0.000 (0.000) |
| Dinsur          | 0.012 (0.038) | −0.021 (0.073) | 0.069 (0.074) | −0.031 (0.049) | −0.097 (0.071) | −0.112* (0.066) | −0.011 (0.059) |
| Bank supervision | −0.093 (0.438) | 0.012 (0.010) | −0.129 (0.294) | −0.198 (0.138) | −0.211 (0.561) | −0.102 (0.281) | −0.203 (0.182) |
| Bank regulatory restriction | 0.004 (0.391) | 0.113 (0.185) | 0.081 (0.213) | 0.044 (0.147) | 0.160 (0.233) | 0.129 (0.310) | −0.089 (0.096) |
| Bank private monitoring | 0.119 (0.337) | 0.006 (0.008) | 0.010 (0.016) | 0.213* (0.128) | 0.207 (0.182) | 0.206 (0.371) | 0.185* (0.108) |
Table 5 (continued)

| Variables                     | GCC vs. non-GCC | Muslim maj. vs. non-Muslim maj | High Islamicity vs. low Islamicity | Crisis impact |
|-------------------------------|-----------------|--------------------------------|-----------------------------------|---------------|
|                               | (9)             | (10)                           | (11)                              | (12)          | (13)                       | (14)                        | (15)                        |
| Bank capital oversight        | 0.019 (0.096)   | −0.026 (0.329)                  | 0.027 (0.147)                     | 0.091 (0.192) | 0.116* (0.006)             | 0.216* (0.127)              | 0.000 (0.000)               |
| Crisis                        | −0.017** (0.020) | −0.800*** (0.020)              | 0.080*** (0.020)                  |               |                            |                             |                            |
| Islamic*Crisis*CGIt-1         |                 |                                |                                   |               |                            |                             |                            |
| ROA<sub>-1</sub>              |                 |                                |                                   |               |                            |                             |                            |
| Constant                      | 1.198*** (0.421)| 1.009*** (0.012)               | 0.954*** (0.067)                  | 0.261*** (0.077)| 1.016** (0.409)          | 1.056** (0.528)             | 0.378 (0.233)               |
| Chi2                          | 35.11***        | 43.07***                       | 26.48***                          | 33.86***      | 27.76***                   | 25.30***                    | 33.91***                   |
| Observations                  | 163             | 254                            | 218                               | 199           | 88                         | 163                         | 417                         |
| Overall R2                    | 0.343           | 0.727                          | 0.737                             | 0.337         | 0.886                      | 0.316                       | 0.345                       |
| Year FE                       | YES             | YES                            | YES                               | YES           | YES                        | YES                         | NO                          |
| Country FE                    | YES             | YES                            | YES                               | YES           | YES                        | YES                         | YES                         |
| AR(1)-p-value                 |                 |                                |                                   |               |                            |                             |                            |
| AR(2)-p-value                 |                 |                                |                                   |               |                            |                             |                            |
| Hansen-J-P-value              |                 |                                |                                   |               |                            |                             |                            |

The ***, **, and * represent p-values of 0.01, 0.05, and 0.10
models, the distinct governance structure of Islamic banks has a significantly positive
effect on performance. Individually, the ROA is negatively and significantly associated
with the Islamic bank dummy and negatively but insignificantly related to the CGI.
Interestingly their joint effects have a positive and significant relation with the ROA.
This finding corresponds to our main result in Table 4 that Islamic banks’ governance
structures allow them to embrace high risk taking on one hand and enhance financial
performance on the other. The sign of the interactive variable \((\text{Islamic} \times \text{CGI}_{t-1})\) is
consistently positive and significant at either the 1 or 5 % levels in models 1–5.
These findings reject the null hypothesis \(H_0\) (the governance difference between
Islamic banks and conventional banks does not influence the financial performance
of Islamic banks).

For the control variables, both loans and profit volatility \((\text{STDROA}_{t-1})\) show a strong
positive effect on ROA that indicates high risk taking enhances financial performance. On the
other hand, while size, capital adequacy, legal, and Islamicity indicate a weak and positive
relation with ROA, Muslim majority population has a negative performance effect; and
leverage, bank concentration, GDP growth, inflation, deposit insurance appear to have no
significant impact.

As to the other specifications, the governance in small Islamic banks has a positive effect on
performance, albeit weak, despite having an insignificant and opposite sign on the Islamic
bank dummy and CGI variables. The governance in big Islamic banks shows no effect on
performance. Similarly, in models 9 and 10, the GCC tends to be positively associated with
ROA, rather than the non-GCC, despite having a negative relation between ROA and the
Islamic bank dummy. Again, in models 11 and 12 and models 13 and 14, we find a similar
trend where a non-Muslim majority population and low Islamicity indicate a positive impact
on ROA. These results are generally consistent with our baseline findings that the distinct
governance structure of Islamic banks in each specification tends to cause better financial
performance. Finally, we test the crisis’ impact on performance by using a difference-in-
difference specification in model 15. We show a negative effect from the crisis on perfor-
mance, although risk taking remains unaffected.

Overall, the key results in Tables 4 and 5 show that the governance structure of Islamic
banks plays a crucial role in higher risk taking and enhanced financial performance, which
differs from the conventional banks.

4.3 Robustness checks

4.3.1 Two-step GMM regression analysis

We use the two-step GMM approach adopted by Arellano and Bover (1995) and
Blundell and Bond (1998) for endogeneity tests of the regression Eqs. 1 and 2. This
approach allows us to treat all of the explanatory variables as endogenous by
orthogonally using their past values as instruments. It also creates a matching equation
of the first differences for all of the variables. The GMM estimates the model by
using the lagged values of the right-hand-side variables. The first difference eliminates
the unobserved heterogeneity and omitted variable bias. This approach means that we
treat all of the bank characteristics as endogenous covariates, while treating the
country and macro controls as strictly exogenous. The GMM estimates are obtained
using Roodman’s (2009) xtabond2 module in Stata.
The regression results for governance and risk taking are reported in column 6 of Table 4, and the regression results for governance and performance are reported in column 6 of Table 5. The results show that the models are well-fitted with statistically insignificant test statistics for both the second-order autocorrelation in the second differences (AR(2)) and the Hansen J-statistics of over identifying restrictions. The residuals in the first difference should be serially correlated (AR(1)) by way of construction but the residuals in the second difference should not be serially correlated (AR(2)). Accordingly, the model fit and diagnostics section in column 6 in Tables 4 and 5 show the desirable statistically significant AR(1) and statistically insignificant AR(2) coefficients. Likewise, the Hansen J-statistics of over-identifying restrictions tests the null of the instrument’s validity, and the statistically insignificant Hansen J-statistics indicate that the instruments are valid in the two-step GMM estimation. Overall, the GMM estimates in Tables 4 and 5 are consistent with the main results reported in Tables 4 and 5 (columns 1–5), even after controlling for unobserved heterogeneity, simultaneity, and dynamic endogeneity.

5 Conclusions

The purpose of this study is to test whether the difference in governance structures affect the risk taking and performance of Islamic and conventional banks. By using a sample of 52 Islamic banks and 104 conventional banks in 14 countries for the period from 2005 to 2013, we conclude that the governance structure in Islamic banks plays a crucial role in higher risk taking and enhanced performance, which is distinct from conventional banks. Our results add a new dimension to the governance research on Islamic banks. Despite cross-country variations and a general perception of a conservative approach to risk taking, we provide evidence that the governance structures of Islamic banks help them undertake higher risks and achieve better performance. However, they maintain better capitalization compared to the conventional banks.

The findings of this research are a valuable source of knowledge for policymakers and regulators, particularly in the financial services sector for devising strategies to deal with future financial crises. This research contributes to the comparative banking literature on corporate governance. Additionally, future research could further extend the role of the Shari’ah supervisory board.

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### Table 6 Descriptive statistics for corporate governance variables. This table presents the descriptive statistics for the 12 governance items we use in constructing the corporate governance index (CGI)

| Corporate governance variables | Definition                                                                 | Islamic banks | Conventional Banks |
|-------------------------------|-----------------------------------------------------------------------------|---------------|--------------------|
| Board size                    | Board Size                                                                  | 340 9.206 3.069 9.000 1.454 6.173 | 687 9.643 2.442 10.000 0.776 5.273 |
| Board independence            | Ratio between number of independent directors to total board size            | 327 0.290 0.277 0.273 0.731 2.581 | 600 0.178 0.139 0.167 4.567 0.873 |
| Female director               | Number of female directors on the board                                     | 331 0.221 0.653 0.000 4.114 22.965 | 675 0.412 0.791 0.000 2.660 12.568 |
| Board meetings                | Number of board meetings in the year                                       | 286 7.888 4.642 6.000 1.810 6.534 | 553 8.333 4.721 7.000 1.984 7.829 |
| Board attendance              | Percent of board attendance                                                | 219 80.572 11.513 81.860 −0.462 2.425 | 456 85.767 11.076 89.185 −0.865 3.387 |
| Board committees              | Number of board committees                                                | 319 4.078 1.248 4.000 1.681 15.040 | 630 3.711 1.420 4.000 0.405 3.364 |
| Chair independence            | Is the Chairperson Independent? If yes then one, otherwise zero            | 328 0.259 0.439 0.000 1.099 2.209 | 611 0.296 0.457 0.000 0.893 1.797 |
| CEO-chair role duality        | Are the roles of Chair/CEO duality? If yes, then one, otherwise zero       | 340 0.156 0.363 0.000 1.897 4.600 | 719 0.207 0.406 0.000 1.445 3.087 |
| CEO-internal                  | If the CEO is not internally recruited, then one, otherwise zero           | 338 0.834 0.372 1.000 −1.798 4.234 | 671 0.611 0.488 1.000 −0.455 1.207 |
Table 6  (continued)

| Corporate governance variables | Islamic banks |               |               |               | Conventional Banks |               |               |
|-------------------------------|---------------|---------------|---------------|---------------|-------------------|---------------|---------------|
|                               | Observation  | Mean          | Std. Dev.     | Median        | Observation       | Mean          | Std. Dev.     |
| CEO qualification             | 324           | 3.346         | 0.950         | 4.000         | 659               | 3.660         | 0.934         |
|                               |               |               |               |               |                   |               |               |
| CEO banking experience        | 306           | 24.199        | 7.956         | 24.000        | 614               | 28.016        | 9.904         |
| CEO tenure                    | 325           | 4.120         | 3.300         | 3.000         | 590               | 7.625         | 7.717         |

We assign one for CEO qualification as high school, two for BA, three MA, four for MBA, and five for PhD or professional accounting (CA) and finance (CFA) qualifications.
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