BIROn - Birkbeck Institutional Research Online

Mamatzakis, Emmanuel and Alexakis, C. and Al Yahyaee, K. and Pappas, V. and Mobarek, A. and Mollah, S. (2023) Does corporate governance affect the performance and stability of Islamic banks? Corporate Governance , ISSN 0964-8410.

Does corporate governance affect the performance and stability of Islamic banks?

Emmanuel Mamatzakis, Christos Alexakis, Khamis Al Yahyaee, Vasileios Pappas, Asma Mobarek, Sabur Mollah

April 2023

Abstract

- **Purpose**
  In this paper, we investigate the impact of corporate governance practices on cost efficiency and financial stability for a sample of Islamic and conventional banks. In our analysis, we use a set of corporate governance variables which include, the board size, board independence, director gender, board meetings, board attendance, board committees, chair independence, and CEO characteristics.

- **Design/methodology/approach**
  We employ corporate governance data of Islamic banks that is unique in this field. In our analysis, we employ stochastic frontier analysis and panel VAR (PVAR) models to quantify long-run and short-run statistical relationships between the operational efficiency of Islamic Banks and corporate governance practices.

- **Findings**
  According to our results, Islamic and conventional banks exhibit important differences in the effects of corporate governance practices on cost efficiency and financial stability. Results show that with a blind general adoption of corporate governance practices, Islamic banks may suffer a loss in their value since the adoption of the third layer of binding practices, over and above the already existing ones, imposed by the Sharia Board and the Board of Directors, may lead to cumbersome business operations. This conclusion is of importance to Islamic Banks since they struggle to survive in a very competitive international environment.

- **Originality**
  Unique sample of Islamic banks from 14 countries for the period 2005-2013, unique findings of the corporate governance on Islamic banks performance and stability.

- **Practical implications**
  We believe that our results may be of a certain value to regulators, policymakers, and managers of Islamic banks. Based on our results we postulate that Islamic banks should select carefully international corporate governance practices.

- **Social implications**
  Islamic banks should not adopt additional third layer of binding practices as that would result lower performance and instability that would be damaging for the economy

1. Introduction

Islamic finance is a fast-developing area in the global financial system. Islamic assets achieved double-digit growth of 10.6%1 in 2020 with a total market value of $2.2 trillion, servicing of around a quarter of the world's population. (S&P Global Ratings, Islamic Finance Outlook 2022). The fast growth of the sector and its peculiarities has spurred interest from practitioners and academics alike. Research in Islamic economics and finance has advanced considerably in the recent years. Ghlamallah et. al. (2021), identified about 1500 research articles in this domain published since 1979, with most being published in the last decade. According to the above study, based on probabilistic topic modelling, the most important topics in Islamic Finance are economic philosophy and perspectives, economic and monetary policy and development, and the impact of economic conditions on Islamic economic policies.

Islamic banking, an important topic of Islamic Finance according to the above study, refers to these specialist institutions where practices emanating from the Islamic law (Sharia) are accommodated into a banking business model. The prohibition of interest and speculative activities, the shunning of investments in industries that are considered unlawful - alcohol, gambling, and tobacco to name some – as well as investments in complex derivative products with not well-defined risk characteristics, debt instruments and short-selling are some of the most acknowledged restrictions in this industry. According to the above characteristics, Islamic banking does not treat money as a commodity and there is prevalence of social justice, (Hamdan 2009), adding to economic growth and stability. A large chunk of the literature on Islamic banking has focused on similarities and differences of these institutions to the conventional banks, with respect to efficiency (Johnes et al., 2014), stability (Abedifar et al., 2013; Čihák and Hesse, 2010; Pappas et al., 2017), business model (Beck et al., 2013), loan default rates (Baele et al., 2014), loan issuance (Ongena and Sendeniz-Yüncü, 2011), accounting practices (Elnahass et al., 2014), corporate governance (Mollah and Zaman, 2015; Mollah et al. 2017; and Mollah et al. 2021), and convergence (Olson and Zoubi, 2016) among others. Abedifar et al. (2015) provides an excellent review of the current empirical literature on Islamic banking.

One important question for Islamic Banks, as these are driven by the supervision of the Sharia Board, is the contribution of Corporate Governance to the efficient operations of the Islamic banks. A particular theoretical challenge in Islamic Corporate Governance is the responsibility of management to maximise shareholder wealth, according to the prediction of the standard agency theory, but also to be Shariah compliant bringing some extra complexity to the Corporate Governance topic. Ghlamallah et al (2021) recognize Corporate Governance as an important topic in the Islamic governance and morality; and this fact, known to academics and market practitioners many years now, motivated our study.

As mentioned above, Islamic banking posits an alternative system of values with ethical and social aspects being of particular importance. The implementation of such values typically rests within the Sharia Supervisory Board (SSB), which works in parallel to the Board of Directors in an Islamic bank. Moreover, and as the SSB is considered the "Supra Authority" in an Islamic bank (Choudhury and Hoque, 2006), the shareholder value maximisation doctrine that standard financial theory suggests as the driving force of a corporate entity, such as a bank, may not be of top priority for an Islamic bank. This may be plausible as the Board of Directors is not the sole governing board in an Islamic bank and/or it comprises managers who also prescribe to the same system of values that Islamic banks represent. As far as the Corporate Governance for Islamic banks is concerned, Corporate Governance it is recognized that the most important stakeholder in the case of Islamic finance is Islam itself, (Chapra and Ahmed, 2002) (i.e. belief in one God 'Allah'). Thus, instead of having a set of Corporate Governance rules to ensure stable and less risky returns for the shareholders, in the case of Islamic banks Corporate Governance should ensure the enforcement of the Sharia Law. Mollah and Zaman (2015) find that Sharia's Supervision Boards (SBBs) can have a positive impact on performance when they have a supervisory role but not when the board has only an advisory role. Bukair and Abdul Rahman (2015) also shows that regular non-Islamic governance issues also affect the corporate governance of Islamic banks.

However, the impact of, admittedly unique, corporate governance common practices for Islamic banks on profit and cost efficiency or financial stability has not been addressed extensively. Ginena (2014), investigated the role of Sharia risk as an element of the corporate governance of Islamic banks, and its impact on these banks. According to the findings Sharia risk, an operational risk, poses a credible hazard to Islamic banks and their stakeholders. Farag et al (2018), find a positive

relationship between unrestricted contracts and agency costs. Aslam and Haron (2020), using standard econometrics (GMM), argue that Islamic Banks need to improve their financial performance through appropriate governance mechanisms. Aslam and Haron, (2021), investigate the impact of corporate governance on the risk-taking of Islamic banks. and they provide evidence that that board size and Shariah board are positively and significantly related to credit and liquidity risk. Board independence and CEO power are negative and significantly associated with credit and liquidity risk, but the audit committee has a mixed relationship with bank risk. Male CEOs take more risk compared to the female and more board meeting has an inverse relationship with Islamic banks risk. Bank size, however, does not influence the level of risk in Islamic banks, but leverage has an inverse relationship with bank risk.

We believe that the limited investigation of the topic is due to the limited availability of corporate governance data for the banks in countries where Islamic banking is substantial and for Islamic banks. Perhaps the study closest to ours is the Mollah et al. (2017), which investigates the differences of corporate governance upon risktaking and performance between Islamic and conventional banks, and highlights the catalytic, yet largely overlooked, role of corporate governance.

We believe that we contribute to the extant literature in two ways. First, this is the first study to examine the impact of a wide set of corporate governance practices on cost efficiency and financial stability of Islamic banks. The existing studies on Islamic bank governance examine the effect of some aspects of corporate governance on bank performance and risk-taking (see Mollah and Zaman, 2015; Zeineb and Mensi, 2018; Safiullah and Shamsuddin, 2019; Mollah et al. 2017; and Mollah et al. 2021). In this study, we examine the effect of corporate as a holistic approach on cost efficiency and financial stability of Islamic banks. We quantify and measure the actual value of corporate governance rules to the operational efficiency of Islamic Banks in this study. This is of paramount importance for the Islamic Finance industry since Islamic Banks must compete in terms of operational efficiency with the conventional banks to survive in a very competitive international market. In this study, we do not focus on a single corporate governance variable but instead we use a set of such variables which include, board size, board independence, director gender, board meetings, board attendance, board committees, chair independence and CEO characteristics like chair duality, internal origin, qualification, banking experience and tenure. The above corporate governance data set was constructed by the study of annual reports and other documents of Islamic

banks for the period 2005-2013 and is unique in this field. This was a very time-consuming task requiring human and capital resources. Nevertheless, our sample size allows us to have confidence for our statistical results and may help market practitioners to identify possible positive changes that took place in the governance of the Islamic Banking industry.

Second, this study is the first to use stochastic frontier analysis and panel VAR (PVAR) models to obtain long run and short run quantitative results on the effect of corporate governance variables on Islamic banks performance. The PVAR approach combines a VAR approach which treats all the variables in a system as endogenous and panel-data sets, allowing for possible heterogeneities (Love & Zicchino, 2006). In this respect the method is considered as a superior one.

According to our results, the two bank types exhibit important differences in the effects of corporate governance practices on cost efficiency and risk. In general, Islamic, and conventional banks show comparable cost efficiency estimates; however, differences in key corporate governance effects are revealed. Specifically, corporate governance variables like board independence or board attendance are positively associated with cost efficiency for conventional banks. By contrast, the board committee's variable has a detrimental effect on the Islamic banks' cost efficiency. We obtained similar but weaker results when the dependent variable took the form of financial stability. In this case, for Islamic Banks we found statistically significant and positively related the variable of internal CEO. PVAR results were in the same direction although from the short run dynamics we do not have any important additional evidence on the effect of corporate governance on the performance of Islamic banks or conventional banks. This may be since corporate governance practices, when adopted, may take time to influence economic performance.

According to the above results we may say that Islamic banks may adopt international corporate governance practices but with caution. The special characteristics of Islamic banks may require a careful selection of corporate governance practices. Otherwise, Islamic banks may suffer a loss in operational efficiency since the adoption of extra binding practices, over and above the already existing ones imposed by the Sharia Board, may need to rethink about cost effective sharia board. On the other hand, the special management structure and management relationships i.e., board of directors and Sharia board, of Islamic banks may welcome the idea of an internal CEO in the grounds of financial stability. We believe that our results may be of a certain value to regulators, policy makers and bank managers of Islamic banks.

The remainder of the paper is structured as follows. The relevant literature review is presented in Section 2. Section 3 presents the methodology and data used. Results and discussion are presented in Section 4. A final section concludes.

2. Corporate Governance and bank performance for Islamic and conventional banks.

A renewed interest in the governance of financial institutions is warranted by the on-going financial globalisation and the increasingly complex forms of risk. Despite that the term corporate governance is relatively new, the aspects surrounding it have been around since the first half of the century, Berle and Means (1932), or even earlier, Smith (1776). According to the standard definitions corporate governance refers to a blend of law, regulation, supervision, and appropriate private-sector practices, which taken together enable a corporate entity, in our case a financial institution, to attract financial and human capital, perform efficiently, and generate long-term economic value for its shareholders, while safeguarding the interest of other stakeholders and the society. The OECD has defined corporate governance as the set of relationships between a company's management, its board and its stakeholders (OECD, 2004). Thus, it is a common practice for conventional banks to follow corporate governance rules to ensure proper functioning and benefits to their shareholders.

Conventional bank performance has been associated with various aspects of Corporate Governance, such as board size (Belkhir, 2009; Bennedsen et al., 2008). Using Tobin's Q and ROA as a performance measure, Belkhir (2009) provides evidence of positive association between the board size and performance of large sample of bank and savings-and-loan holding companies. Ethnic diversity of board members (Carter et al., 2010; Cheong and Sinnakkannu, 2014) as well as gender diversity in the board (Adams and Ferreira, 2009; Khan and Vieito, 2013) have also been associated with bank performance. Vallascas et al. (2017) document that board independence has a positive effect on the banks' risk-taking behaviour.

However, the particularities of Islamic finance are not completely covered by the existing western standards of Corporate Governance, which do not necessarily fit with the priorities of the Islamic banks. Islamic banks are subject to an additional layer of rules, that of the Sharia Supervisory

Board[1], whose primary task is to ensure that the bank is operating within the framework of the Sharia. The SSB has substantial influence and control over the management of an Islamic bank, which becomes more challenging. For members of the SSB to be effective they must be both Sharia scholars and financial experts. Unfortunately, this is not a common pairing of expertise. Sharia scholars with financial knowledge are in high demand and as a result many scholars sit on the boards of multiple institutions. This presents concerns about the independence and potential conflicts of SSB members, as they can obtain crucial proprietary financial information from multiple Institutions. According to Zawya (2010) each of the top 20 Sharia scholars across 28 countries held an average of 14 positions. Thus, the independence of the Sharia Board members is an important issue for IFIs. In this respect, institutional environment in which Islamic banks operate is characterized as less transparent with sometimes weaker government oversight, Claessens (2006).

2.1 Corporate Governance and Financial Stability

There is little research on the impact of corporate governance on financial aspects of Islamic banks, in part due to data limitations but also due to their unique structure with dual boards (the board of directors and the SSB). Hassan (2011) investigates differences in ownership structure, audit services and level of transparency between financial and non-financial firms in the UAE. However, no attempt is made to distinguish conventional from Islamic financial institutions. Garas (2012) studied the conflicts of interest in the Sharia supervisory board and the conflict of interest between the Sharia board and board of directors and others third parties in IFIs. The research findings confirmed that the conflict of interest in the Shariah board is significantly affected by the executive position of the Shariah board members. Quttainah et al., (2013) examined how the Sharia supervisory boards impact the earnings management behaviours of Islamic banks. Their findings suggest that Islamic banks are less likely to engage in earnings management than their conventional counterparts, which is partially attributed to SSB board size and AAOIFI members participating in

---

[1] According to the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) A SSB is an independent body of specialised jurists in fiqhalmua'malat (Islamic commercial jurisprudence). However, the SSB may include a member other than those specialised in fiqhalmua'malat, but who should be an expert in the field of Islamic Financial Institutions and with knowledge of fiqhalmua'malat. The SSB is entrusted with the duty of directing, reviewing, and supervising the activities of the Islamic Financial Institution to ensure that they are in compliance with Islamic Sharia Rules and Principles. The fatwas and rulings of the SSB shall be binding on the Islamic Financial Institution. The SSB is appointed by the shareholders during the annual general meeting based on the recommendation of the board of directors. It consists of at least 3 members and is responsible for publishing a report (within the annual report of the IFI) opining on what degree the institution has remained faithful to the rules of the Sharia.

the SSB. Grassa and Matoussi (2014) investigate differences in corporate governance practices of Islamic banks in the GCC region against the Southeast Asia over the period 2002-2011. The findings highlight that the lack of standardization in Islamic banking practices are also infused in their corporate governance culture. In addition, the Islamic banks' superior performance compared to their conventional counterpart is in part attributed to the SSB, while key metrics of the board of directors (e.g., board structure and CEO power) suggest a negative effect (Mollah and Zaman, 2015). The recent study of Grassa and Chakroun (2016) examines the corporate governance disclosure practices for GCC banks (conventional and Islamic). The authors acknowledge the low disclosure, which however is on a rising trend in the recent years, particularly as Islamic banks are keener to disclose such information.

The loyalty of Islamic values has a significant impact on high corporate governance disclosures of banks [Bassam & Ntim, 2017]. They find that corporations that represent greater commitment towards incorporating Islamic values into their operations through high Islamic values disclosure index engage in higher voluntary disclosures than those that are not using a sample of 75 Saudi-listed firms. This study could be related to a positive role of Islamic governance on reducing information asymmetries and financial stability. Similarly, a related research by Elghuweel et al. (2017) who observe corporate and Islamic governance mechanisms on corporate earnings management behaviour in Oman also evidence that better-governed corporations tend to engage significantly less in earnings management and corporations that depict greater commitment towards incorporating Islamic religious beliefs and values into their operations through the establishment of an Islamic governance committee tend to engage significantly less in Earnings management. However, the authors do not find any evidence that board size, audit firm size, the presence of a Corporate Governance committee and board gender diversity have any significant relationship with the extent of earnings management. The paper motivates us to see the impact of shariah board committee on financial stability might be closely related to less earnings management. This is in line with the agency theory suggests that effective and transparent operational risk disclosure can mitigate agency costs between insiders and shareholders, and thus effect positively on the performance of IBs (Jensen & Meckling, 1976). Similarly, signaling theory predicts that IBs communicate operational risk information to outsiders to signal to probable investors the banks' apparent sound operational risk management practices and performance, and hence reducing information asymmetry between insiders and outsiders (Connelly et al., 2011). The legitimacy

theory stance, engaging in increased, including those relating to Sharia, can be considered a strategic way in which Islamic Banks can legitimise their operations and gain acceptance within the broader society (Connelly et al., 2011). Finally, resource dependence theory predicts that increased operational risk disclosure can help in granting Islamic Banks access to essential resources, such as finance and contracts that can facilitate their long-term survival (Elamer et al., 2019). On the other hand, nonengaged extra committee may increase risk and decrease performance. According to quiet life hypothesis, the board/manager does not like to take the challenges reduce efficiency of the banks.

Hypothesis 1: Whether corporate governance IBs has a positive effect on financial stability compared to conventional banks?

2.2 Corporate Governance and Cost Efficiency

Coming to bank performance, this is usually measured by variables related to efficiency. Banking efficiency (either technical or cost efficiency) is a latent variable that is typically estimated using either Data Envelopment Analysis (DEA) or Stochastic Frontier Approach (SFA), albeit other methods exist – see for example (Fethi and Pasiouras, 2010) for a recent survey on these approaches. Direct comparisons across studies are subject to a large degree of variation due to the array of parameters that can change (e.g., estimation method, sampled countries, time, choice of inputs/outputs for the production function, the type of efficiency under investigation, outlier treatment techniques, use of consolidated/unconsolidated accounts, balanced/unbalanced panels to name a few); hence require careful interpretation. The literature that compares Islamic with conventional banks has typically focused on technical (Grigorian and Manole, 2005; Johnes et al., 2014; Mokhtar et al., 2007; Muharrami, 2008; Zuhroh et al., 2015) and cost efficiency; with this review focusing on the latter as it is also the type of efficiency we examine in this paper.

Cost efficiency differentials between Islamic and conventional banks have been studied in (Al-Jarrah and Molyneux, 2006; Bader et al., 2008; El-Gamal and Inanoglu, 2005; Kamarudin et al., 2014; Mobarek and Kalonov, 2014; Mokhtar et al., 2007; Saeed and Izzeldin, 2016; Srairi, 2010; Zuhroh et al., 2015) among others. With regards to the technique followed, DEA is the preferred estimation approach in(Bader et al., 2008; Kamarudin et al., 2014; Mobarek and Kalonov, 2014), while (Al-Jarrah and Molyneux, 2006; El-Gamal and Inanoglu, 2005; Mokhtar et al., 2007; Saeed

and Izzeldin, 2016; Srairi, 2010; Zuhroh et al., 2015) use SFA. Most are cross-country studies, such as Saeed and Izzeldin(2016) with a global sample of listed banks and Srairi (2010) that focuses on the Gulf Cooperation Council countries that have a dominant presence of Islamic banks, while others are single-country studies focusing on Indonesia (Zuhroh et al., 2015), Malaysia (Mokhtar et al., 2007) and Turkey (El-Gamal and Inanoglu, 2005). When specifying the output distance function, data availability issues generally force the use of two outputs – one referring to the interest revenue and another to the fee-generated income of a bank.[2] For Islamic banks that neither issue loans nor have any interest revenue, these are substituted with the size and/or income stemming from the equity-type of contracts, where a profit-share ratio is applied. Perhaps as expected from this wide variation across the studies on this topic, there is little consensus on cost efficiency patterns between the two bank types. Most studies find Islamic banks to be of no higher cost efficiency than their conventional counterparts (Bader et al., 2008; El-Gamal and Inanoglu, 2005; Kamarudin et al., 2014; Mobarek and Kalonov, 2014; Mokhtar et al., 2007; Saeed and Izzeldin, 2016; Srairi, 2010; Zuhroh et al., 2015), although only a subset is reporting proper statistical tests. The gist of the lower cost efficiency of Islamic banks is their more convoluted governance structure with the dual board structure and their lack of standardisation in financial products, some of which need to be customised to the client/project at hand and obtain certification from the SSB board.[3] The higher costs that Islamic banks face is also acknowledged in studies that utilise financial ratio analysis – most notably cost to income – such as(Beck et al., 2013; Hasan and Dridi, 2010; Olson and Zoubi, 2016, 2008). We are only aware of a single study that finds Islamic banks to be of higher cost efficiency than conventional banks(Al-Jarrah and Molyneux, 2006).

In terms of cost efficiency and corporate governance role theoretical notion is based on neo-institutional theory that integrates both efficiency and legitimation of Islamic banks operating in an institutional environment rather than examining the incidence of influential isomorphy (e.g., coercive, mimetic) or normative institutional pressures [Elamer et al. (2020)]. Efficiency measurement in general suggests that economic actors predominantly be inclined to maximize their self-interests by competing for critical resources. However, Sociology theorists consider institutions to be beyond not only delivering economic efficiency but also as social institutions. The sociological neo-institutionalism theorists suggest that individuals and firms not only compete

---

[2] By contrast, studies using US data can have as many as five outputs, see for example Kumbhakar et al. (2013).
[3] Hayat et al. (2013) highlight the costs in time (2-3 months) and in money required for a product to be certified as in line with the Sharia law.

for critical resources but also endeavour to gain social acceptance. Thus, legitimation is guided by the different values and ethics of economic actors, which may direct an Islamic bank, for example, to implement some practices with no immediate or clear economic benefits (e.g., interest-free loans or 'Qard Hassan').

Hypothesis 2: Whether Corporate governance of IBs have a decreasing cost efficiency effect compared to conventional banks?

3. Data description

Our sample spans the 2005-2013 period and the following 14 countries: Bahrain, Bangladesh, Jordan, Kuwait, Lebanon, Malaysia, Pakistan, Qatar, Saudi Arabia, Sudan, Syria, Turkey, the UAE and Yemen. Islamic banking accounts for a substantial part of the financial sector in these countries, accounting for more than 20% of the total banking assets in the GCC countries and Malaysia (Ernst & Young, 2016). For the categorization of Islamic banks, we rely on Bankscope but we cross-check with other databases (e.g., Zawya, World Database for Islamic Banking and Finance, Central Banks) and individual banks' websites. We use unconsolidated data when these are available to avoid possible double counting of subsidiaries of international banks, in line with the studies of Beck et al., (2013) and Mollah et al., (2017).

For our sample selection, we require countries that operate a dual-banking system; both Islamic and conventional banks should exist. We exclude countries with less than three banks of either type. We also exclude banks with less than three years of observations. Banks with missing information in the key variables of our study are also excluded. Our final sample is an unbalanced panel of 1,277 bank-year observations, which corresponds to 142 banks on average. Of the total of bank-year observations, 865 relate to conventional banks and 412 to Islamic banks that are, on average, 96 and 46 banks respectively. Around 32% of our bank-year observations relate to Islamic banks, which is comparable to previous studies (Al-Jarrah and Molyneux, 2006); see also, for example, Abdul-Majid et al., (2010); Beck et al., (2013); Čihák and Hesse (2010); Srairi (2010). Table 1 presents the distribution of bank observations by operational mode and country. The appendix table A1 explains and classifies the variables used in the following parts of the study.

[Table 1 around here]

Table 2 presents key descriptive statistics for the financial variables of the two bank types in our sample. All monetary values are in USD millions, deflated by the GDP deflator for each country.[4] As expected, conventional banks are larger in almost every respect than their Islamic counterparts. For example, with respect to Loans[5] and Total Assets the conventional banks are at 8 and 13.6 billion USD respectively, while Islamic banks are at 3.2 and 5.2 respectively. Interestingly, the two kinds of banks are comparable in terms of Fixed Assets (126.09 vs 119.09 million USD for conventional and Islamic), possibly due to some of the Islamic banking products requiring collateral assets; hence banks would typically have tangible assets (e.g., buildings, commodities) at their disposal for such use. The two bank types share similar profitability as borne out by their ROAS (1.65 vs 1.55 for conventional and Islamic banks respectively). Islamic banks face higher insolvency risk, as suggested by their lower z-score compared to their conventional counterparts (12.76 vs 23.43).[6] By contrast, Islamic banks, as expected, are better capitalized as evident by their superior Equity/Assets (22.33 vs 13.19).

[Table 2 around here]

Regarding the corporate governance variables, we do not focus on a single corporate governance variable but instead we use a set of such variables which include, board size, board independence, director gender, board meetings, board attendance, board committees, chair independence and CEO characteristics like chair duality, internal origin, qualification, banking experience and tenure. The above corporate governance data set was constructed by the study of annual reports and other documents of Islamic banks and conventional banks and is unique in this field. Table 3 presents key descriptive statistics for the corporate governance variables of the two bank types in our sample. A cursory inspection of the data suggests important differences in the corporate governance structure of the two bank types. In more detail, Islamic banks score higher in the board independence as they have a higher percentage of independent directors (28.5% vs 17.8%) in their board. Moreover, Islamic banks have significantly more board committees (4.087 vs 3.711), which is plausibly reflective of their more complex structure that also needs to accommodate a Shariah

---

[4] Source for GDP data is the World Bank.
[5] Even though Islamic banks do not issue "loans" in the conventional sense, for standardisation purposes most databases (e.g. Bankscope) would classify under Loans the equity-type of products of Islamic banks, for which a profit-share ratio is applied in a similar notion to interest rate.
[6] With regards to financial stability of Islamic banks, the evidence in the literature seems mixed. It has been suggested that only the small Islamic banks are financially more stable than their similarly-sized conventional peers(Čihák and Hesse, 2010). The results in Beck et al., (2013) suggest that Islamic banks are less financially stable, which is in line with(Alandejani et al., 2017).

supervisory board. This increased complexity may be, in part, responsible for the reduced attendance recorded at board meetings of Islamic banks (80.72%) as opposed to those of conventional banks (85.98%). A CEO that also acts as Chair is more common in conventional banks as opposed to Islamic banks. The literature considers this CEO-Chair duality to have a negative impact on board independence by reducing the flexibility that the board of directors typically enjoy (Cerbioni and Parbonetti, 2007; Krause et al., 2014). However, CEO-Chair duality for Islamic banks may be a by-product of the close connection these banks typically enjoy with the state and/or the royal family of the country they are domiciled. As such, the Chair position is associated with the prestige, while the CEO is responsible for the daily operation of the bank. Internal promotions to CEO level are significantly more typical in Islamic banks (0.839) than conventional ones (0.609). This seems to suggest that these banks put a higher weight on loyalty and knowhow on Islamic finance mode of operations than perhaps acquiring the most qualified CEO, a fact that is reflected on CEO-qualifications, CEO-banking experience, and CEO-tenure where Islamic banks fall behind of conventional banks.

[Table 3 around here]

Besides the corporate governance variables described above we utilize a series of dummy variables (dubbed as cgi1-12) that are better suited to capture heterogeneity in the sample, and are constructed as follows:(cgi1) Board Size: Is the board size of this bank smaller than the median board size of the sample? If yes, then one, otherwise zero. (cgi2) Independent Directors: Is the value of board's independence larger than median of the sample? If yes then one, otherwise zero. (cgi 3) Female Director: Is there any female director on the board? If yes then one, otherwise zero. (cgi 4) Board Meeting: Are the number of board meetings larger than the median board meetings of the sample? If yes, then one, otherwise zero. (cgi 5) Board Attendance: Are the percent of board attendance larger than 75 %? If yes, then one, otherwise zero. (cgi 6) Board Committees: Are the number of board committees larger than the median board committees of the sample? If yes, then one, otherwise zero. (cgi 7) Chair Independence: Is the chairman independent? If yes then one, otherwise zero. (cgi 8) Chair/CEO Split: Are the roles of Chair/CEO split? If yes, then one, otherwise zero. (cgi 9) Internal CEO: If the CEO is not internally recruited, then one, otherwise zero. (cgi 10) CEO Qualification: MA or higher than one, otherwise zero. (cgi 11) CEO Banking Experience: If the CEO has more than the median years of experience in the sample, then one,

otherwise zero. (cgi 12) CEO Tenure: If the CEO has more than the median tenure in the sample then one, otherwise zero. In addition, a corporate governance index (cgi_sum) variable is constructed as the summation of all cgi1-12 variables.

Table 4 displays the descriptive statistics of the inputs and outputs used in the SFA efficiency estimation.

[Table 4 around here]

4. Methodology

In this study, we measure bank performance in terms of cost efficiency by employing Stochastic Frontier Analysis (SFA). The advantage of this parametric methodology is that both random error and inefficiency are combined in a composite error term (Berger and Humphrey, 1997). More specifically, we use the following specification for the cost frontier:

$$TC_{it} = f(P_{it}, Y_{it}, N_{it}, Z_{it}) + v_{it} + u_{it} \tag{1}$$

Where TC_{it} is the total cost for bank i in year t. Total cost is defined as the sum of personnel, interest, and non-interest expenses. P_{it} is a vector of input prices, Y_{it} is a vector of outputs, N_{it} is a vector of fixed netputs and Z_{it} is a vector of control variables. We use country dummy variables to control for home country characteristics [7] and a dummy variable for Islamic banks. The term $v_{i,t}$ stands for the error term, while $u_{i,t}$ denotes bank's efficiency. The translog cost function of the above total cost, opted in the paper, takes the form:

$$lnC_{i,t} = \alpha_0 + \sum_i \alpha_i lnP_{i,t} + \sum_i \beta_i lnY_{i,t} + {}^1\!/_2 \sum_i \sum_j \alpha_{ij} lnP_{i,t} lnP_{j,t} + {}^1\!/_2 \sum_i \sum$$

$$\sum_i \sum_j \delta_{ij} lnP_{i,t} lnY_{j,t} + \sum_i \zeta_i lnN_{i,t} + {}^1\!/_2 \sum_i \sum_j \zeta_{ij} lnN_{i,t} lnN_{j,t} + {}^1\!/_2 \sum_i \sum_j \theta_{ij}$$

$$\sum_i \sum_j \kappa_{ij} lnY_{i,t} lnN_{j,t} + \mu_1 t + {}^1\!/_2 \mu_2 t^2 + \sum_i v_i t lnP_{i,t} + \sum_i \xi_i t lnY_{i,t} + \sum_i \rho_i tl$$

$$\sum_i \varphi_i Z_{i,t} + u_{i,t} \pm v_{i,t^c}$$

---

[7] Structural and macroeconomic conditions might create variances in efficiency from country-to-country and time-to-time. To control for these differences, we employ both time effects and country effects in the estimation of the efficiency as in Bonin et al. (2005).

Standard linear homogeneity and symmetry restrictions are applied. The tranlsog cost function is estimated via a maximum likelihood procedure parameterized in terms of the variance parameters:

$$\sigma_\varepsilon^2 = \sigma_u^2 + \sigma_v^2 \tag{2}$$

$$\beta = \sigma_u^2 / \sigma_\varepsilon^2 \tag{3}$$

Moreover, given the properties of the underlying data generating process in the empirical section, we shall estimate the stochastic frontier using ML random-effects time-varying efficiency decay model, see (Battese and Coelli, 1992). The model we estimate takes the following form:

$$eff_{it} = \mu_i + \lambda_1 m_{it} \, I + \delta_1 X + \lambda_2 Z + \varepsilon_{it} \tag{4}$$

Where eff_{it} is the dependent variable (efficiency scores derived from SFA), μ_i is the bank-specific fixed effect. We estimate the above using GLS random-effects (RE) model and ML random-effects (MLE) model with robust standard errors. The same kind of analysis applies when the dependent variable refers to financial stability as this is measured by the z-score.

Next, we will extend our analysis using a Panel-VAR analysis. Panel VARs have the same structure as VAR models, in the sense that all variables are assumed to be endogenous and interdependent, but a cross sectional dimension is added to the representation. Panel VARs are particularly suited to analyzing the transmission of idiosyncratic shocks across units and time. Panel VARs are used to examine topics that are of particular interest since they can capture both static and dynamic interdependencies and at the same time treat the links across units in an unrestricted fashion.

All variables are considered as endogenous within the Panel VAR, without having to resolve into strong assumptions concerning causality issues. To this end, we examine the underlying causality links between the estimated bank efficiency and corporate governance, as well as financial stability and Corporate governance. For exposition purposes, we present a first order 2x2 panel-VAR model:

$$X_{it} = \mu_i + \Phi X_{it-1} + \varepsilon_{it} \tag{5}$$

where X_{it} is a vector of four random variables, that is, the estimated efficiency by country and by year and a Corporate governance variable such as attendance. Thus, Φ is a 2x2 matrix of coefficients, μ_i is a vector of m individual effects and ε_{it} are *iid* residuals. For the case of cost efficiency, the panel-VAR may take the following form:

$$eff_{it} = a_{10} + \sum_{j=1}^{J} \beta_{11j}eff_{it-j} + \sum_{j=1}^{J} \beta_{12j}Corporate_{it-j} + e_{1it} \tag{6}$$

$$Corporate_{it} = a_{20}$$
$$+ \sum_{j=1}^{J} \beta_{21j}Corporate_{it-j} + \sum_{j=1}^{J} \beta_{22j}eff_{it-j} + e_{2it} \tag{7}$$

The moving averages (MA) form of the model sets $a_{it}, X1_{it}, X2_{it}, X3_{it}$ equal to a set of present and past residuals e_1, e_2, e_3, e_4 from the panel-VAR estimation:

$$eff_{it} = \mu_{10} + \sum_{j=1}^{J} b_{11}e_{1it-j} + \sum_{j=1}^{J} b_{12}e_{2it-j} + e_{1i,t} \tag{8}$$

$$Corporate_{it} = \mu_{20} + \sum_{j=1}^{J} b_{21}e_{1it-j} + \sum_{j=1}^{J} b_{22}e_{2it-j} + e_{2i,t} \tag{9}$$

Under the endogeneity assumption the residuals will be correlated and therefore the coefficients of the MA representation are not interpretable. As a result, the residuals must be orthogonal. We orthogonalize the residuals by multiplying the MA representation with the Cholesky decomposition of the covariance matrix of the residuals.

Using the above panel-VAR individual heterogeneity in the levels is ensured by introducing fixed effects in the model, denoted μ_i, and the data are forward mean-differenced using the Helmert procedure (Arellano and Bover, 1995). Standard errors of the impulse response functions are calculated, and confidence intervals generated with Monte Carlo simulations.

4. Results

Table 5 presents the efficiency scores from the SFA model, from which it is evidenced that the conventional and Islamic banks share similar average cost efficiency scores; albeit the cost efficiency distribution of Islamic banks is more spread out. This is likely to be reflective of the less homogenous sample that Islamic banks constitute worldwide. And with regards to financial products, Islamic microfinance and Islamic capital markets are more common in the Far East, whereas real estate finance is the focus in the Gulf Cooperation Council (GCC) region. Moreover, Islamic banking is overall a relatively young industry with some well-established banks and some very new. Consequently, cross-bank differences in knowhow, recognisability and managerial practices are likely to be more pronounced within the Islamic banking industry.[8]For example, the Dubai Islamic Bank (UAE) was established in 1975, while the Islamic International Arab Bank (Jordan) in 1997 and Noor Bank (UAE) only in 2008.

[Table 5 around here]

4.1 Corporate Governance and Cost Efficiency

Table 6 presents estimated coefficients and standard errors in italics for the regressions of cost efficiency on corporate governance variables, the z-score proxy for financial stability and the Lerner index of market power. Table 7 repeats for separate models on conventional and Islamic banks.

[Tables 6 and 7 around here]

A cursory inspection of the results suggests that Board attendance, Board committees, Chair independence, and the CGI indicators related to board attendance (cgi5) and CEO-Tenure (cgi12) are statistically significant with the expected signs in Models I and II. These results persist when we control for market power (*Lerner*) and financial stability (*Z-score*) differences (Models IV-VII).

Higher board attendance has a positive effect on cost efficiency; a result driven by conventional banks (Table 7). Higher attendance at the board of directors of a bank seems to be beneficial as it enables plurality of opinions, fosters cooperation and commitment between all interested parties,

---

[8] Johnes et al. (2017) discuss about "leaders and followers" within the Islamic banking industry, when commenting on the greater volatility of technology and technical efficiency year-on-year changes of a group of Islamic banks compared to conventional parties.

which should be beneficial in providing advice to the CEO. This is consistent with Adams and Mehran, (2012); Andres and Vallelado, (2008); Cornetta et al., (2010); Francis et al., (2012); Pathan and Faff, (2013); Sierra et al., (2006); Wintoki et al., (2012). Sierra et al., (2006) among others who investigate governance and performance in the banking sector verifying that strong boards improve performance. However, a non-linear effect is evidenced here with the negative sign of the cgi5 variable, which suggests that there is some optimal level of board attendance that maximizes the gains in terms of efficiency. This could be particularly relevant in bank-holding companies where attendance at both subsidiary boards and parent boards could introduce further complexity in dealing with pending issues and/or unnecessary prolong decision making time (Adams and Mehran, 2012). Furthermore, we note that board attendance appears as more relevant determinant of cost efficiency for banks than board size. This is linked to the attendance problems that a bank board often exhibits, see (Adams and Mehran, 2012).

The number of board committees is linked with a lower cost efficiency. This is consistent with (Adams and Mehran, 2012) who document an inverse relation between board committees and bank performance. This result is driven by Islamic banks (see Table 7), which have an increased number of committees as verified by Table 3. This finding reflects, in part, the existence of the Sharia Supervisory Board (SSB) in Islamic banks which opines on the ethical characteristics of financial products that the bank engages into. Moreover, the board of directors works under the guidance of the SSB in such issues, with the latter being capable of overruling decisions and practices of the board of directors (Usmani, 1998).

Our combined results (see Table 6) suggest that board independence does not affect cost efficiency; a finding that is mainly driven by Islamic banks. By contrast, conventional banks when used separately (Table 7) register a positive sign for the number of independent members on the board. Related research yields mixed evidence with some reports of a positive link between independent directors and bank performance (Andres and Vallelado, 2008), some studies documenting a negative link (Pathan and Faff, 2013) or no link (Adams and Mehran, 2012; Wintoki et al., 2012).

An independent chair is related to lower cost efficiency but only for conventional banks; perhaps a sign that too much power may lead to unnecessary sacrifice of resources. By contrast if the chairman is not independent more control may be exerted. Moreover, CEO power– as proxied by

CEO-Chair duality and internally recruited CEO– significantly increase cost efficiency of Islamic banks while having no effect for conventional banks. Overall, it seems that Islamic banks do better, in terms of cost efficiency, with a more powerful and concentrated management.

The Lerner index suggests that higher cost efficiency is linked with higher market power of the financial institution. This may be related to the Quiet Life hypothesis which suggests that banks enjoy the benefits of increased market power, such as cost savings. However, once marginal effects are allowed to differ across the two bank types (see Table 7), the Quiet life hypothesis seems more relevant for the Islamic banks as the Lerner index is consistently positive and significant for these banks only. This is an important finding for regulators and policy makers as it is harder for Islamic banks to operate in as competitive settings as conventional banks do. This is, perhaps, an explanation as to why Islamic banks have difficulties in operating at retail banking as opposed to macro financing (e.g., real estate, infrastructure). At the retail level (e.g., personal finance products) Islamic banks must compete with many conventional banks offering similar products, while bearing the additional costs of Shariah Supervisory boards and financial products that are not as flexible as the equivalent conventional ones (for example, a loan in an Islamic bank is structured as a purchase-repurchase agreement). By contrast, at macro financing there is wider scope for Islamic finance contracts to be applied (e.g., equity type contracts make more economic sense as financing needs rise), allowing these banks to play to their advantage, while competition is not as high as at the retail level. Often the commitment from governmental institutions to use Islamic finance for their financing needs in spite of the higher cost and in line with(El-Gamal, 2006)comments about users of Islamic banks willing to pay higher prices for their peace of mind works to the benefit of such bank types.

The link between financial stability and cost efficiency provides for interesting reading. When using the combined dataset (see Table 6), no statistically significant relation is evidenced. This is not the case when conventional and Islamic banks are used in separate samples. In particular, the negative and significant z-score suggests that cost efficiency and financial stability are two concepts that conventional banks need to balance in their agendas as higher financial stability would lead to lower cost efficiency levels. However, for Islamic banks this is not the case as suggested by the positive sign on the z-score. For Islamic banks, it seems that higher financial

stability would not come at the expense of cost efficiency, and this is perhaps attributed to their shunning of speculation and complex financial derivatives.

4.2 Corporate Governance and Financial Stability

Table 8 presents estimated coefficients and standard errors in italics for the regressions of the financial stability proxy (Z-score) on cost efficiency, corporate governance variables and the Lerner index of market power.[9]

[Table 8 around here]

A first inspection of the results suggests that an increase in cost efficiency leads to lower financial stability for conventional banks. This is evidenced by the strong statistical significance and the negative sign on the efficiency variable. For Islamic banks the effect is more muted as shown by the lower magnitude of the coefficient, in absolute terms. These results corroborate the finding of the previous section that conventional banks need to optimise their cost efficiency/financial stability mix.

Board structure is a significant determinant to the financial stability of both bank types, however different components matter for each type. More specifically, for Islamic banks, higher financial stability is induced by a larger board size, while board independence is of no significant relevance. As Islamic banks deal with more exquisite financial products for which unique sources of risk exist, for example displaced commercial risk[10] or Shariah compliance risk[11], more members on the board may extend the combined knowledge; thus, eliminating risks from unforeseen exposures. Nevertheless, this increased financial stability may come at the cost of lower performance (Mollah and Zaman, 2015).By contrast, board size does not affect the financial stability of conventional

---

[9] Here we report the results for the separate analyses on conventional and Islamic banks. The combined analysis is not reported for brevity and is available from the authors upon request.

[10] Islamic banks operating alongside conventional banks are subject to displaced commercial risk, which is the risk arising from managing assets on behalf of investment accountholders that is effectively transferred to the Islamic banks' own capital. This risk unfolds as the bank may forgo its profit share on such investment when it considers this essential due to the commercial pressure to increase the rate of return payable to investment accountholders.

[11]Shariah compliance risk is the risk arising from a financial service or product that is ruled as not in line with the established Shariah principles and standards. The risk can extend beyond products and practices and affect the bank itself as the SSB, which is responsible for the Shariah conformity of an Islamic bank, opines on every relevant aspect of the bank's operations including, for example, capital structure. Even though the SSB is responsible to issue a certificate of Shariah compliance (fatwa), there is little guarantee that this would be uniformly accepted. Cross country differences (e.g., GCC countries, Malaysia) in Shariah interpretation among scholars are largely responsible for Shariah compliance risk.

banks, albeit a higher number of independent board members significantly enhances financial stability.

The increased number of committees in Islamic banks compared to their conventional counterparts has a negative effect on their financial stability. This result is in line with our previous analysis on cost efficiency and highlights further the negative externalities that come as a by-product of the dual boards (board of directors and SSB) and their interactions and are embedded in the corporate governance culture of the Islamic banks.

Financial stability is enhanced in an Islamic bank when the CEO is recruited internally. This may be since Islamic banks are less institutionally organized than the conventional and the need of someone to synchronize the efforts with deep knowledge of the institution is prominent. The choice of an internal CEO may lead to smoother management and thus less exposure to operational risks. A similar finding is not evidenced for conventional banks.

4.3 Panel VAR results

As a first step in the panel VAR estimation, we made a choice regarding the optimal lag order j for the right-hand variables in the system of equations (Lutkepohl, 2006). The Arellano-Bond GMM estimator was used for the lags of j=1, 2 and 3.[12] Optimal lag order of one was based on the Akaike Information Criterion (AIC), confirmed by Arellano-Bond AR tests. To test for autocorrelation, more lags were added. The Sargan tests showed that for lag ordered one, the null hypothesis cannot be rejected and thus the VAR model is of order one. The lag order of one preserves the degrees of freedom and information, given the low time frequency of the data. In addition, normality tests for the residuals use the Sahpiro-Francia W-test.[13]

The impulse response functions (IRF) derived from the unrestricted panel-VAR in the case of conventional banks are reported in Figure 1 and for Islamic banks in Figure 2. The VAR analysis includes the set of the significant corporate governance variables of the estimated regressions i.e., Board independence, Board independence percentage, number of committees and Board attendance. The plots show the response of each variable in the panel-VARs for bank efficiency

---

[12] Results are available upon request.
[13] The results do not show violation of the normality. Panel VAR results are available under request.

and financial stability, and corporate governance variables to its own innovation and to the innovations of the other variables of the system.

[Figures 1 and 2 around here]

The accompanying tables present the variance decomposition (VDC) estimations. In every relevant table, the first row shows the response of corporate governance variables on a one standard deviation shock, and bank efficiency. The second raw is of interest since it shows the response of bank efficiency and financial stability to a shock in corporate governance variables.

For the case of Islamic banks and according to the VAR results we have significant statistical evidence that the variable related to the percentage of the Board independence influence efficiency in a negative fashion. In the case of financial stability, we do not observe any short run dynamics captured by the VAR models.[14]

For the case of the conventional banks the variables of Board independence, percentage of Board independence and number of committees have a negative effect on bank efficiency where in the case of financial stability we do not have statistical evidence for significant relations.

These results are consistent with the impulse response functions (IRF) and provide further evidence of the importance of corporate governance variables in explaining the variation in bank efficiency. Overall, the VDC analysis confirms the importance of the significant corporate governance variables.

[Table 9 and 10 around here]

Panel VAR results were in the same direction as the initial results although from the short run dynamics we do not have any important additional evidence on the effect of corporate governance on the performance of Islamic banks.

5. Conclusions

A considerable volume of research compares Islamic and conventional banks across many aspects, including but not limited to, business models, performance, efficiency, and stability. However,

---

[14] These results are not shown for brevity but are available on request.

there is very limited research on the role that corporate governance plays in these special institutions. The study of Mollah et al., (2017) that finds that the superior performance of Islamic banks is in part attributed to their governance structure. Our study seeks to address how differences in corporate governance culture between Islamic and conventional banks help to explain one of the most well-documented differences between the two bank types in the relevant literature - cost.

We use a sample of 46 Islamic banks and 96 conventional banks in 14 countries for the period 2005 to 2013. In a first stage, we derive cost efficiency estimates using a Stochastic Frontier Approach. In a second stage, we compare the marginal effects of a comprehensive array of Corporate Governance indicators that account for board structure and CEO power. We further control for financial risk and market power differences between the two bank types.

We find Islamic and conventional banks to be of comparable cost efficiency. However, a difference in corporate governance culture is evidenced between the two bank types with regards to key corporate governance indicators. Specifically, higher board attendance is associated with higher cost efficiency for conventional banks and a similar result is reached for board independence. This outcome is expected when the Board acts to the benefit of the shareholders as the standard financial theory predicts. However, these variables do not appear to matter in the case of Islamic Banks, possibly due to the close link between Board of Directors and the Sharia Board, with the latter having the "final word". Nevertheless, more board committees have a detrimental effect on Islamic banks' cost efficiency, perhaps a reflection of over-governance, which may cause delays in decision making or even lack of clarity on how directors should take decisions. For the SSB, the Board of Directors and a Committee to agree it may take a lot of time - if at all. We obtained similar but weaker results when the dependent variable took the form of financial stability. In this case, for Islamic Banks we found statistically significant and positively related the variable of internal CEO. Panel VAR models show a negative relationship between corporate governance   practices and efficiency. This can be explained by the fact that corporate governance practices in the short run may have a negative impact, if any at all, due to the limitations they impose in the operations of a financial institution.

According to the above results we may say that Islamic banks may adopt international corporate governance practices with caution. The special characteristics of Islamic banks may require a

careful selection of corporate governance practices. Otherwise, Islamic banks may suffer a loss in cost efficiency since the adoption of extra binding practices, over and above the already existing ones imposed by the Sharia Board, may lead to overregulation in their operations. On the other hand, the special management structure and management relationships i.e. board of directors and Sharia board, of Islamic banks may welcome the idea of an internal CEO in the grounds of financial stability. We believe that our results may be of a certain value to regulators, policy makers and bank managers of Islamic banks.

Islamic banks are an important part of the Islamic finance literature. In this study the question under investigation is the role of the corporate governance for the stability and the efficiency of Islamic banks. Under the new developments of sustainable finance more research questions arise. We believe that it would be interesting to examine the role of ESG in the Islamic banking industry. We believe that under the new sustainable finance rules according to the EU policy the possibility of convergence between the two banking systems is higher than ever. We hope that we will be able to perform research in this direction soon.

References

Abdul-Majid, M., Saal, D.S., Battisti, G., 2010. Efficiency in Islamic and conventional banking: An international comparison. J. Product. Anal. 34, 25–43. doi:10.1007/s11123-009-0165-3

Al-Bassam, W. M., Ntim, C., 2017. The effect of Islamic values on voluntary corporate governance disclosure: the case of Saudi listed firms. Journal of Islamic Accounting and Business Research, 8(2), 182-202. https://doi.org/10.1108/JIABR-09-2015-0046.

Abedifar, P., Molyneux, P., Tarazi, A., 2013. Risk in islamic banking. Rev. Financ. 17, 2035–2096. doi:10.1093/rof/rfs041

Adams, R.B., Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance. J. financ. econ. 94, 291–309. doi:10.1016/j.jfineco.2008.10.007

Adams, R.B., Mehran, H., 2012. Bank board structure and performance: Evidence for large bank holding companies. J. Financ. Intermediation 21, 243–267. doi:10.1016/j.jfi.2011.09.002

Al-Jarrah, I., Molyneux, P., 2006. Cost Efficiency , Scale Elasticity and Scale Economies in Arab Banking. Banks Bank Syst. 1, 60–89.

Alandejani, M., Kutan, A.M., Samargandi, N., 2017. Do islamic banks fail more than conventional banks? J. Int. Financ. Mark. Institutions Money. doi:http://dx.doi.org/10.1016/j.intfin.2017.05.007

Andres, P. de, Vallelado, E., 2008. Corporate Governance in banking: The role of the board of directors. J. Bank. Financ. 32, 2570–2580. doi:10.1016/j.jbankfin.2008.05.008

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. J. Econom. 68, 29–51. doi:10.1016/0304-4076(94)01642-D

Aslam, E. and Haron, R., 2020. Does corporate governance affect the performance of Islamic banks? New insight into Islamic countries. *Corporate Governance*, Vol. 20 No. 6, pp. 1073-1090. https://doi.org/10.1108/CG-11-2019-0350

Aslam, E. and Haron, R., 2021. Corporate governance and risk-taking of Islamic banks: evidence from OIC countries", *Corporate Governance*, Vol. 21 No. 7, pp. 1460-1474. https://doi.org/10.1108/CG-08-2020-0311

Bader, M.K.I., Mohamad, S., Mohamed, A., Hassan, T., 2008. Cost, Revenue, and Profit Efficiency of Islamic Versus Conventional Banks: International Evidence Using Data Envelopment Analysis. Islam. Econ. Stud. 15, 54.

Baele, L., Farooq, M., Ongena, S., 2014. Of religion and redemption: Evidence from default on Islamic loans. J. Bank. Financ. 44, 141–159. doi:10.1016/j.jbankfin.2014.03.005

Battese, G.E., Coelli, T.J., 1992. Frontier production functions, technical efficiency and panel data: With application to paddy farmers in India. J. Product. Anal. 3, 153–169. doi:10.1007/BF00158774

Beck, T., Demirgüç-Kunt, A., Merrouche, O., 2013. Islamic vs. conventional banking: Business model, efficiency and stability. J. Bank. Financ. 37, 433–447. doi:10.1016/j.jbankfin.2012.09.016

Belkhir, M., 2009. Board of directors' size and performance in the banking industry. Int. J. Manag. Financ. 5, 201–221. doi:10.1108/17439130910947903

Bennedsen, M., Kongsted, H.C., Nielsen, K.M., 2008. The causal effect of board size in the performance of small and medium-sized firms. J. Bank. Financ. 32, 1098–1109. doi:10.1016/j.jbankfin.2007.09.016

Berger, A.N., Humphrey, D.B., 1997. Efficiency of Financial Institutions: International Survey and Directions for Future Research. Eur. J. Oper. Res. 98, 175–212. doi:10.1016/S0377-2217(96)00342-6

Berle, A.A., Means, G.C., 1932. The Modern Corporation and Private Property, 2 edition. ed. Transaction Publishers.

Bonin, J., Hasan, I., Wachtel, P., 2005. Bank performance, efficincy and ownership in transion countries. J. Bank. Financ. 29, 31-35

Bukair, A. A., & Rahman, A. A. (2015). Bank performance and board of directors' attributes by Islamic banks. *International Journal of Islamic and Middle Eastern Finance and Management*.

Carter, D.A., D'Souza, F., Simkins, B.J., Simpson, W.G., 2010. The gender and ethnic diversity of US boards and board committees and firm financial performance. Corp. Gov. 18, 396–414. doi:10.1111/j.1467-8683.2010.00809.x

Cerbioni, F., Parbonetti, A., 2007. Exploring the Effects of Corporate Governance on Intellectual Capital Disclosure: An Analysis of European Biotechnology Companies, European Accounting Review. doi:10.1080/09638180701707011

Chapra, M.U., Ahmed, H., 2002. Corporate Governance in Islamic Financial Institutions. Occas. Pap. No. 6, Jeddah, IRTI/IDB, 1–170. doi:10.1002/jcaf.20374

Cheong, C.W.H., Sinnakkannu, J., 2014. Ethnic Diversity and Firm Financial Performance: Evidence From Malaysia. J. Asia-Pacific Bus. 15, 73–100. doi:10.1080/10599231.2014.872973

Choudhury, M.A., Hoque, M.Z., 2006. Corporate Governance in Islamic perspective. Corp. Gov. Int. J. Bus. Soc. 6, 116–128. doi:10.1108/14720700610655132

Čihák, M., Hesse, H., 2010. Islamic Banks and Financial Stability: An Empirical Analysis. J. Financ. Serv. Res. 38, 95–113. doi:10.1007/s10693-010-0089-0

Claessens, S., 2006. Access to financial services: A review of the issues and public policy objectives. The World Bank Research Observer, 21, 207-240.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R., 2011. Signaling theory: A review and assessment. Journal of Management, 37, 39-67.

Cornetta, M.M., McNuttb, J.J., Tehranianc, H., 2010. The financial crisis, internal Corporate Governance, and the performance of publicly-traded U.S. bank holding companies.

El-Gamal, M.A., 2006. Islamic Finance - Law, Economics and Practice. Cambridge University Press.

El-Gamal, M.A., Inanoglu, H., 2005. Inefficiency and heterogeneity in Turkish banking: 1990-2000. J. Appl. Econom. 20, 641–664. doi:10.1002/jae.835

Elghuweel, M., Ntim, C., Opong, K., Avison A., 2017. Corporate governance, Islamic governance, and earnings management in Oman: a new empirical insight from a behavioural theoretical framework. Journal of Accounting in Emerging Economies, 7(2), 190-224. https://doi.org/10.1108/JAEE-09-2015-0064

Elnahass, M., Izzeldin, M., Abdelsalam, O., 2014. Loan loss provisions, bank valuations and discretion: A comparative study between conventional and Islamic banks. J. Econ. Behav. Organ. 103, S160–S173. doi:10.1016/j.jebo.2013.08.018.

Elamer, A., Ntim, C., Abdou, A., Pyke, C. 2019. Sharia supervisory boards, governance structures and operational risk disclosures: evidence from Islamic banks in MENA countries. Global Finance Journal, [100488]. https://doi.org/10.1016/j.gfj.2019.100488

Elamer, A., Ntim, C., Abdou, H., 2020. Islamic governance, national governance, and bank risk management and disclosure in MENA countries. Business & Society, 59(5), 914-955.

Ernst and Young, 2016. World Islamic Banking Competitiveness Report 2016. Ernst and Young 68.

Farag H., Mallin, C., Ow-Yong, K., 2018. Corporate governance in Islamic banks: New insights for dual board structure and agency relationships. Journal of International Financial Markets, Institutions and Money, 54, 59-77.

Fethi, M.D., Pasiouras, F., 2010. Assessing bank efficiency and performance with operational research and artificial intelligence techniques: A survey. Eur. J. Oper. Res. 204, 189–198. doi:10.1016/j.ejor.2009.08.003

Francis, B., Hasan, I., Wu, Q., 2012. Do corporate boards affect firm performance? New evidence from the financial crisis. Bank Finl. Res. Discuss. Pap. 11.

Garas, S.N., 2012. The control of the Shari'a Supervisory Board in the Islamic financial institutions. Int. J. Islam. Middle East. Financ. Manag. 5, 8–24. doi:10.1108/17538391211216794

Ghlamallah E., Alexakis C., Dowling M., Piepenbrink A., 2021. The topics of Islamic economics and finance research, International Review of Economics & Finance, 75, 145-160.

Ginena, K. 2014. Sharī'ah risk and corporate governance of Islamic banks. *Corporate Governance*, 14, 86-103. https://doi.org/10.1108/CG-03-2013-0038.

Grassa, R., Chakroun, R., 2016. Ownership structure, board's characteristics and Corporate Governance disclosure in GCC banks: what about Islamic banks? Int. J. Accounting, Audit. Perform. Eval. 12, 360. doi:10.1504/IJAAPE.2016.079862

Grassa, R., Matoussi, H., 2014. Corporate Governance of Islamic banks: A comparative study between GCC and Southeast Asia countries. Int. J. Islam. Middle East. Financ. Manag. 7, 346–362. doi:10.1108/IMEFM-01-2013-0001

Grigorian, D., Manole, V., 2005. A Cross-Country Nonparametric Analysis of Bahrain ' s Banking System. Int. Monet. Fund Work. Pap. WP 05/117.

Hasan, M., Dridi, J., 2010. The Effects of the Global Crisis on Islamic and Conventional Banks: A Comparative Study. IMF Work. Pap. 10. doi:10.1142/S1793993311000270

Hassan, M.K., 2011. Corporate Governance Practices in Emerging Economies: Initial Findings From the UAE. China-USA Bus. Rev. 10, 856–864.

Hayat, R., Den Butter, F., Kock, U., 2013. A study of geometry content knowledge of elementary preservice teachers. J. Bus. Ethics 117, 601–613. doi:10.1007/s

Jensen, C., Meckling, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure, Journal of Financial Economics, 3, 305-360.

Johnes, J., Izzeldin, M., Pappas, V., 2014. A comparison of performance of Islamic and conventional banks 2004–2009. J. Econ. Behav. Organ. 103, S93–S107. doi:10.1016/j.jebo.2013.07.016

Kamarudin, F., Nordin, B.A.A., Muhammad, J., Hamid, M.A.A., 2014. Cost, Revenue and Profit Efficiency of Islamic and Conventional Banking Sector: Empirical Evidence from Gulf Cooperative Council Countries. Glob. Bus. Rev. 15, 1–24. doi:10.1177/0972150913515579

Khan, W.A., Vieito, J.P., 2013. Ceo gender and firm performance. J. Econ. Bus. 67, 55–66. doi:10.1016/j.jeconbus.2013.01.003

Khalil, A. and Ben Slimene, I. 2021. Financial soundness of Islamic banks: does the structure of the board of directors matter?, *Corporate Governance*, Vol. 21 No. 7, pp. 1393-1415. https://doi.org/10.1108/CG-06-2020-0237

Krause, R., Semadeni, M., Cannella, A.A., 2014. CEO Duality, Journal of Management. doi:10.1177/0149206313503013

Kumbhakar, S.C., Parmeter, C.F., Tsionas, E.G., 2013. A zero inefficiency stochastic frontier model. J. Econom. 172, 66–76. doi:10.1016/j.jeconom.2012.08.021

Love, I., & Zicchino, L. (2006). Financial development and dynamic investment behaviour:

Evidence from panel VAR. The Quarterly Review of Economics and Finance, 46, 190–210. https://doi.org/10.1016/j.qref.2005.11.007

Lutkerpohl H. 2006, Handbook of Economic Forecasting, Volumes I and II, Elsevier.

Mobarek, A., Kalonov, A., 2014. Comparative performance analysis between conventional and Islamic banks: empirical evidence from OIC countries. Appl. Econ. 46, 253–270. doi:10.1080/00036846.2013.839863

Mokhtar, H.S.A., Abdullah, N., AlHabshi, M.S., 2007. Technical and Cost Efficiency of Islamic Banking in Malaysia Technical and Cost Efficiency of Islamic Banking in Malaysia. Rev. Islam. Econ. 11, 5–40.

Mollah, S., Hassan, M.K., Al Farooque, O., Mobarek, A., 2017. The governance, risk-taking, and performance of Islamic banks. J. Financ. Serv. Res. 51, 195–219. doi:10.1007/s10693-016-0245-2

Mollah, S., Skully, M., and Liljeblom, E., 2021. Strong boards and risk-taking in Islamic banks. Rev. Corp. Financ 1, 135-180.

Mollah, S., Zaman, M., 2015. Shari'ah supervision, Corporate Governance and performance: Conventional vs. Islamic banks. J. Bank. Financ. 58, 418–435. doi:10.1016/j.jbankfin.2015.04.030

Muharrami, S. Al, 2008. An examination of technical, pure technical and scale efficiencies in GCC banking. Am. J. Financ. Account. 1, 152. doi:10.1504/AJFA.2008.019950

OECD, 2004. OECD principles of Corporate Governance 109–117. doi:10.1007/978-4-431-30920-8_10

Olson, D., Zoubi, T., 2016. Convergence in bank performance for commercial and Islamic banks during and after the Global Financial Crisis. Q. Rev. Econ. Financ. doi:10.1016/j.qref.2016.06.013

Olson, D., Zoubi, T.A., 2008. Using accounting ratios to distinguish between Islamic and conventional banks in the GCC region. Int. J. Account. 43, 45–65. doi:10.1016/j.intacc.2008.01.003

Ongena, S., Sendeniz-Yüncü, I., 2011. Which firms engage small, foreign, or state banks? And who goes Islamic? Evidence from Turkey. J. Bank. Financ. 35, 3213–3224. doi:10.1016/j.jbankfin.2011.05.001

Pappas, V., Ongena, S., Izzeldin, M., Fuertes, A.M., 2017. A Survival Analysis of Islamic and Conventional Banks. J. Financ. Serv. Res. 51, 1–36. doi:10.1007/s10693-016-0239-0

Pathan, S., Faff, R., 2013. Does board structure in banks really affect their performance? J. Bank. Financ. 37, 1573–1589. doi:10.1016/j.jbankfin.2012.12.016

Quttainah, M.A., Song, L., Wu, Q., 2013. Do Islamic Banks Employ Less Earnings Management? Do Islamic Banks Employ Less Earnings Management? J. Int. Financ. Manag. Account. 24, 203–233. doi:10.2139/ssrn.2283968

Saeed, M., Izzeldin, M., 2016. Examining the relationship between default risk and efficiency in Islamic and conventional banks. J. Econ. Behav. Organ. 132, 127–154. doi:10.1016/j.jebo.2014.02.014

Safiullah, M., Shamsuddin, A., 2019. Risk-adjusted efficiency and coporrate govreance: Evidence from Islamic and conventiona banks. Journal of Corporate Finance, 55, 105-140.

Sierra, G.E., Talmor, E., Wallace, J.S., 2006. An examination of multiple governance forces within bank holding companies. J. Financ. Serv. Res. 29, 105–123. doi:10.1007/s10693-006-5921-1

Smith, A., 1776. An Inquiry into the Nature and Causes of the Wealth of Nations.

Srairi, S.A., 2010. Cost and profit efficiency of conventional and Islamic banks in GCC

countries. J. Product. Anal. 34, 45–62. doi:10.1007/s11123-009-0161-7

Usmani, M.M.T., 1998. An Introduction to Islamic Finance. doi:10.1159/000360657

Vallascas, F., Mollah, S., Keasey, K., 2017. Does the impact of board independence on large bank risks change after the global financial crisis? J. Corp. Financ. 44, 149–166. doi:10.1016/j.jcorpfin.2017.03.011

Wintoki, M.B., Linck, J.S., Netter, J.M., 2012. Endogeneity and the dynamics of internal Corporate Governance. J. financ. econ. 105, 581–606. doi:10.1016/j.jfineco.2012.03.005

Zeineb, G., Mensi, S., 2018. Corporate giverance, risk and efficincy: Evidence from GCC Islamic Banks. Mangaerial Finance 44, 551-569.

Zuhroh, I., Ismail, M., Maskie, G., 2015. Cost Efficiency of Islamic Banks in Indonesia – A Stochastic Frontier Analysis. Procedia - Soc. Behav. Sci. 211, 1122–1131. doi:10.1016/j.sbspro.2015.11.150

Table 1. Bank observations

Country Name	All banks	Conventional banks	Islamic banks	Islamic %
Bahrain	149	85	64	42.95
Bangladesh	144	99	45	31.25
Jordan	98	81	17	17.35
Kuwait	111	54	57	51.35
Lebanon	73	62	11	15.07
Malaysia	121	83	38	31.40
Pakistan	63	54	9	14.29
Qatar	83	57	26	31.33
Saudi Arabia	63	54	9	14.29
Sudan	66	33	33	50.00
Syria	65	51	14	21.54
Turkey	27	9	18	66.67
United Arab Emirates	178	116	62	34.83
Yemen	36	27	9	25.00
Total	**1277**	**865**	**412**	**32.26**

Notes: The table presents bank-year observations per country and per bank type. The column Islamic % denotes the percentage of bank-year observations in each country that correspond to Islamic banks.

Table 2. Descriptive Statistics of Financial Variables

Variable	Conventional banks				Islamic banks			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Total Securities	2981.23***	4516.75	0.00	35905.75	722.54	1354.55	0.00	8992.19
Gross Loans	8059.93***	11778.41	0.09	70054.36	3294.23	6319.28	0.09	43379.53
Fixed Assets	126.09	182.83	0.00	1728.13	119.09	320.52	0.00	2640.18
Total Assets	13661.88***	18629.88	2.62	112747.40	5262.05	9424.21	1.31	62840.57
Equity	1597.47***	2208.35	0.46	13067.38	783.80	1365.19	-100.18	8981.26
Total Interest Expense	309.68***	517.20	0.00	5551.24	108.74	158.06	0.00	1193.07
Total Non-Interest Expense	190.89***	294.00	0.00	2597.12	110.02	176.56	0.05	1098.82
Net Interest Revenue	347.00***	506.95	-5.37	3781.88	171.68	377.73	-146.12	2923.03
Non-Interest Revenue	163.08***	253.04	-119.43	2168.70	92.57	184.67	-235.00	1111.73
Personnel Expenses	107.28***	159.03	0.00	1274.01	56.66	91.62	0.00	538.11
Total Customer Deposits	9295.01***	12448.84	1.28	77603.44	4034.14	7340.94	0.47	51999.62
Non-Performing Loans	360.23***	703.74	0.05	8515.58	226.96	435.86	0.00	3065.57
Loan Loss Reserves	294.09***	448.50	0.00	4896.84	145.33	288.66	0.00	1901.92
Loan Loss Provisions	70.49***	153.53	-71.83	1665.54	46.24	99.95	-85.52	550.29
NetFees	101.55***	146.25	0.00	981.25	39.97	81.81	0.00	684.46
ROA	1.65	2.65	-55.49	18.04	1.55	5.95	-28.41	35.10
ROE	14.58***	12.79	-135.99	101.00	7.66	34.87	-573.30	73.18
Equity/Assets	13.19***	9.37	0.77	99.78	22.33	19.97	-1.90	99.66
Z-score	23.43***	17.82	0.12	130.95	12.76	9.58	0.12	68.21

Notes: The table presents descriptive statistics for the conventional and Islamic banks in the sample. All monetary variables in mil USD. ***denotes statistical significance at the 1% for the t-test between conventional and Islamic banks.

Table 3. Descriptive Statistics of Corporate Governance Variables

Variable	Conventional				Islamic			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Board size	9.649*	2.344	5.000	20.000	9.308	3.060	3.000	22.000
Board independence (#)	1.678***	1.184	0.000	8.000	2.401	2.348	0.000	9.000
Board independence (%)	0.178***	0.136	0.000	0.833	0.285	0.278	0.000	1.000
Female director	0.400***	0.777	0.000	5.000	0.233	0.672	0.000	5.000
Board meetings	8.409	4.858	3.000	31.000	7.960	4.715	0.000	30.000
Board attendance	85.982***	11.037	38.889	100.000	80.726	11.717	50.000	100.000
Board committees	3.711***	1.404	0.000	8.000	4.087	1.256	1.000	14.000
Chair independence	0.298	0.458	0.000	1.000	0.268	0.444	0.000	1.000
CEO-Chair Duality	0.207**	0.406	0.000	1.000	0.151	0.359	0.000	1.000
CEO-Internal	0.609***	0.488	0.000	1.000	0.839	0.368	0.000	1.000
CEO-Qualification	3.672***	0.944	2.000	5.000	3.339	0.944	2.000	5.000
CEO-Banking experience	28.127***	9.980	1.000	58.000	23.929	8.082	5.000	52.000
CEO-Tenure	7.819***	7.773	0.000	37.000	4.016	3.022	1.000	19.000

Notes: The table presents descriptive statistics for the conventional and Islamic banks in the sample. *, **, *** denote statistical significance at the 10, 5 and 1% significance level for the t-test between conventional and Islamic banks. Source: Hand collected.

Table 4. Descriptive statistics of variables used in the SFA efficiency estimation.

Variable	Definition	Mean	SD	Min	Max
Total Cost	Total Interest Expenses + Total Non-Interest Expenses	420.223	695.477	0.000	7487.963
Price of Funds	Total Interest Expenses / Total Funding	0.037	0.029	0.000	0.342
Price of Physical Capital	Other Operating Expenses / Fixed Assets	3.742	93.949	-0.022	3194.800
Price of Labour	Personnel Expenses / Fixed Assets	1.150	1.966	0.025	51.375
Output 1	Net Loans	6275.549	10228.500	0.000	69134.480
Output 2	Total Earning Assets - Net Loans	3433.668	5114.709	0.000	38505.550
Output 3	Net Fees And Commissions	81.785	132.250	0.000	981.247
Equity	Total Equity	1330.275	2007.770	-100.179	13067.380

Notes: Table shows descriptive statistics for the variables used in the efficiency estimation.

Table 5. Cost efficiency estimates.

	Mean	SD	Min	Max	t-test	p-value
Conventional banks	0.3225	0.0804	0.1428	0.7218	1.5886	0.1124
Islamic banks	0.3119	0.1589	0.0972	0.8796		

Notes: The table reports descriptive statistics of the cost efficiency estimate (see Eq. 1).

Table 6. Cost Efficiency and Corporate Governance

Model	I	II	III	IV	V	VI	VII
Variables	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency
Lerner				0.000004***	0.000004***	0.000004***	0.000004***
				0.000001	*0.000001*	*0.000001*	*0.000001*
Z-score				-0.000103	-0.000058	-0.000178	-0.000177
				0.000201	*0.000204*	*0.000263*	*0.000284*
Board size	-0.000966	-0.000966	-0.000756	0.000124		-0.000746	
	0.000641	*0.000640*	*0.000554*	*0.000343*		*0.000607*	
Board independence (#)	0.001120	0.001120	0.000801	0.000265		0.001180	
	0.001310	*0.001310*	*0.000940*	*0.000977*		*0.001180*	
Board independence (%)	-0.007010	-0.006970	-0.001620	-0.003460		-0.007450	
	0.009660	*0.009710*	*0.009030*	*0.008900*		*0.010600*	
Female director	-0.003070	-0.003080	-0.000829			-0.001300	
	0.002550	*0.002550*	*0.002230*			*0.001190*	
Board meetings	0.000165	0.000165	0.000113			0.000197	
	0.000262	*0.000262*	*0.000221*			*0.000247*	
Board attendance	0.000446***	0.000446***				0.000363***	
	0.000106	*0.000106*				*0.000067*	
Board committees	-0.00272***	-0.00272***				-0.00134**	
	0.000654	*0.000651*				*0.000648*	
Chair independence	-0.00513**	-0.00513**			-0.002030	-0.003700	
	0.002260	*0.002250*			*0.001870*	*0.002300*	
CEO-Chair Duality	-0.002800	-0.002800			0.004480*	-0.002970	
	0.003180	*0.003180*			*0.002430*	*0.003490*	
CEO-Internal	0.003220	0.003220			0.001290	0.001570	
	0.002980	*0.002980*			*0.001920*	*0.002870*	
CEO-Qualification	0.000659	0.000650			-0.000112	-0.000023	
	0.001530	*0.001520*			*0.000633*	*0.001020*	
CEO-Banking experience	0.000095	0.000094				-0.000068	
	0.000197	*0.000196*				*0.000091*	
CEO-Tenure	0.000235	0.000234				0.000125	
	0.000255	*0.000253*				*0.000210*	
cgi-index						-0.001400	
						0.001010	
cgi1	-0.003760	-0.003760	-0.002520			-0.002000	-0.001190

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0.002520	*0.002510*	*0.002430*			*0.002950*	*0.002000*
cgi2	-0.000552	-0.000560	-0.002420				-0.000389
	0.002290	*0.002280*	*0.002000*				*0.001950*
cgi3	0.002330	0.002330	0.001180				-0.002030
	0.004760	*0.004750*	*0.004290*				*0.002380*
cgi4	0.000716	0.000722					-0.000839
	0.002320	*0.002310*					*0.002380*
cgi5	-0.004620*	-0.004620*					0.004360**
	0.002790	*0.002780*					*0.002020*
cgi6	0.002500	0.002510					-0.002510
	0.002670	*0.002660*					*0.002100*
cgi7							-0.00402*
							0.002290
cgi8							-0.001400
							0.003140
cgi9							-0.003590
							0.002730
cgi10	-0.002240	-0.002230					-0.000432
	0.003030	*0.003010*					*0.001880*
cgi11	-0.004950	-0.004940					-0.00341*
	0.003530	*0.003520*					*0.001900*
cgi12	-0.00451*	-0.00449*					-0.000954
	0.002320	*0.002310*					*0.001810*
Islamic	0.002390						
	0.021400						
Constant	0.298000***	0.299000***	0.319000***	0.320000***	0.315000***	0.309000***	0.324000***
	0.014900	*0.013900*	*0.010100*	*0.009940*	*0.009710*	*0.013600*	*0.012500*
Observations	345	345	532	650	574	345	345
Number of banks	114	114	145	163	156	114	114
Method	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE
Bank Types	ALL Banks	ALL Banks	ALL Banks	ALL Banks	ALL Banks	ALL Banks	ALL Banks

Notes: The table reports estimated coefficients and standard errors in italics for the regressions of cost efficiency (*Efficiency*) on Corporate Governance variables for the pooled sample of banks. The definition of Corporate Governance variables and the cgi variables is described in the data section. *Lerner* denotes the Lerner index of market power; *z-score* is a proxy for financial stability. *Islamic* is a dummy variable that takes the value 1 for Islamic banks; zero otherwise. RE denotes the panel random effects method of estimation with robust standard errors clustered at the bank level. ***, **, * denote statistical significance at the 1, 5 and 10% significance level.

Table 7. Cost Efficiency, Corporate Governance and Bank Type

Model	I-CB	I-IB	II-CB	II-IB	III-CB	III-IB	IV-CB	IV-IB
Variables	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency
Lerner	0.000033	0.000002***	0.000002	0.000004***	0.000054	-0.000001	0.000065	0.000004*
	0.000126	*0.000001*	*0.000063*	*0.000000*	*0.000086*	*0.000002*	*0.000089*	*0.000002*
Z-score	-0.000642***	0.000529***	-0.000597***	0.000413***	-0.000896***	0.000109	-0.000927***	0.000071
	0.000189	*0.000168*	*0.000214*	*0.000131*	*0.000200*	*0.000135*	*0.000222*	*0.000162*
Board size	0.000293	-0.000570			-0.001118	-0.000022		
	0.000349	*0.000833*			*0.000714*	*0.000977*		
Board independence (#)	0.001522	-0.001457			0.003441***	0.000819		
	0.000936	*0.001270*			*0.001261*	*0.001374*		
Board independence (%)	-0.009810	0.001888			-0.019541***	-0.008622		
	0.006929	*0.013278*			*0.007222*	*0.010865*		
Female director					-0.000580	-0.001174		
					0.000956	*0.002000*		
Board meetings					0.000469	-0.000270		
					0.000300	*0.000334*		
Board attendance					0.000367***	0.000172		
					0.000095	*0.000109*		
Board committees					-0.000685	-0.003587***		
					0.000675	*0.000552*		
Chair independence			-0.001573	-0.004403	-0.004912*	0.002355		
			0.001995	*0.003644*	*0.002681*	*0.005477*		
CEO-Chair Duality			0.002313	0.015363***	-0.006352*	0.005207		
			0.002532	*0.002736*	*0.003589*	*0.006571*		
CEO-Internal			0.000188	0.009668*	0.002742	0.005564		
			0.001968	*0.005853*	*0.002953*	*0.003725*		
CEO-Qualification			-0.000423	0.001177	-0.000248	0.002767		
			0.000664	*0.001898*	*0.001298*	*0.002829*		
CEO-Banking experience					-0.000028	-0.000438		
					0.000120	*0.000474*		
CEO-Tenure					0.000121	-0.000128		
					0.000243	*0.000300*		
cgi-index					-0.000775	-0.004231		
					0.001224	*0.001670*		
cgi1					-0.003151	0.001302	-0.001760	-0.001662

37

	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic
					0.003192	*0.006571*	*0.001960*	*0.006658*
cgi2							0.000186	-0.001530
							0.002356	*0.004052*
cgi3							-0.001905	-0.006091
							0.002504	*0.004664*
cgi4							0.003444	-0.008847**
							0.002786	*0.003517*
cgi5							0.004921	0.001835
							0.002360	*0.002400*
cgi6							-0.001824	-0.011394***
							0.002050	*0.001928*
cgi7							-0.005445	-0.002515
							0.002303	*0.006186*
cgi8							0.004055	-0.015218*
							0.002375	*0.008392*
cgi9							-0.002651	-0.010215**
							0.002699	*0.004040*
cgi10							0.000882	0.000845
							0.002096	*0.006916*
cgi11							-0.000741	-0.012548**
							0.001740	*0.005073*
cgi12							-0.001035	-0.003547*
							0.001922	*0.002155*
Constant	0.329465***	0.323554***	0.336193***	0.287599***	0.324012***	0.334134***	0.337847***	0.347202***
	0.008371	*0.020792*	*0.009545*	*0.018471*	*0.012781*	*0.024958*	*0.013203*	*0.022132*
Observations	429	221	372	202	217	128	217	128
Number of banks	104	59	101	55	73	41	73	41
Bank Type	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic
R-squared	0.0799	0.0616	0.084	0.0001	0.0406	0.0804	0.0332	0.0941
Method	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE

Notes: The table reports estimated coefficients and standard errors in italics for the regressions of cost efficiency (*Efficiency*) on Corporate Governance variables for conventional and Islamic banks. The definition of Corporate Governance variables and the cgi variables is described in the data section. *Lerner* denotes the Lerner index of market power; *z-score* is a proxy for financial stability. RE denotes the panel random effects method of estimation with robust standard errors clustered at the bank level. ***, **, * denote statistical significance at the 1, 5 and 10% significance level.

Table 8. Financial Stability, Cost Efficiency, Corporate Governance and Bank Type

Model	I-CB	I-IB	II-CB	II-IB	III-CB	III-IB	IV-CB	IV-IB
Variables	Z-score	Z-score	Z-score	Z-score	Z-score	Z-score	Z-score	Z-score
Efficiency	-0.190982***	-0.021767	-0.197500***	-0.013383	-0.275877***	-0.073684*	-0.272167***	-0.074506**
	0.053311	0.024820	0.068866	0.032901	0.064568	0.039440	0.068944	0.035797
Lerner	0.009194	0.000524	-0.001441	0.000369	0.013461	-0.000516	0.015782*	0.001536
	0.015957	0.000612	0.010297	0.000559	0.012595	0.000700	0.008976	0.001624
Board size	0.124297	0.323008*			0.184433	0.918939**		
	0.104064	0.186074			0.193402	0.395950		
Board independence (#)	0.099323	-0.306872			0.916300**	-0.725544		
	0.259814	0.338729			0.376606	0.555110		
Board independence (%)	0.216367	2.979313			-5.672195***	5.159105		
	1.711738	3.698054			2.148919	4.603694		
Female director					-0.093114	-0.046537		
					0.407156	0.702208		
Board meetings					-0.056388	-0.143098		
					0.058421	0.246590		
Board attendance					-0.022337	0.041556		
					0.037876	0.069162		
Board committees					-0.196718	-0.601156*		
					0.221429	0.328670		
Chair independence			0.610607	1.392000	0.787857	3.498430		
			0.658510	1.159861	0.760188	2.791346		
CEO-Chair Duality			-0.729358	3.222628*	-1.072598	0.470357		
			0.610466	1.784413	1.054819	3.316621		
CEO-Internal			-0.067857	2.018150*	-0.379170	4.150826**		
			0.616063	1.190141	0.610570	1.857623		
CEO-Qualification			0.040689	-0.436855	0.062000	-0.803123		
			0.223409	0.868196	0.380067	0.865434		
CEO-Banking experience					0.031572	-0.291186		
					0.045436	0.238829		
CEO-Tenure					0.005646	-0.250643		
					0.060407	0.268431		
cgi-index					-0.268778	-0.437773		
					0.368050	0.851921		
cgi1					0.331677	1.670096	-1.031012**	-1.624680

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							0.938531	2.415173
cgi2							-0.121417	0.220125
							0.598477	1.834890
cgi3							-0.276763	-1.159855
							0.609182	1.623212
cgi4							-0.526502	-3.637816
							0.569699	3.270115
cgi5							-0.254232	0.461029
							0.776283	1.651728
cgi6							-1.096327**	-2.588362*
							0.533526	1.540354
cgi7							-0.043531	1.135427
							0.775200	2.548886
cgi8							1.475842*	-1.984869
							0.827397	2.239934
cgi9							0.010280	-4.083859**
							0.564179	1.881766
cgi10							0.454083	1.633140
							0.585432	2.540488
cgi11							0.414353	-2.466033
							0.605178	1.949283
cgi12							-0.098331	0.618377
							0.643779	1.082790
Constant	1.560872	7.598053**	2.231758	11.123600*	-5.097360	5.322264	-6.141999	12.06147**
	6.283977	3.820439	7.929579	6.350663	7.671534	7.614948	7.173932	6.113884
Observations	429	221	372	202	217	128	217	128
Number of banks	104	59	101	55	73	41	73	41
Bank Type	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic	Conventional	Islamic
R-squared	0.1066	0.1068	0.1218	0.0132	0.0722	0.1935	0.0611	0.1409
Method	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE	Robust RE

Notes: The table reports estimated coefficients and standard errors in italics for the regressions of financial stability (*Z-score*) on cost efficiency (*Efficiency*) and Corporate Governance variables for conventional and Islamic banks. The definition of Corporate Governance variables and the cgi variables is described in the data section. *Lerner* denotes the Lerner index of market power; *Efficiency* is the cost efficiency estimated via SFA and presented in an earlier section. RE denotes the panel random effects method of estimation with robust standard errors clustered at the bank level. ***, **, * denote statistical significance at the 1, 5 and 10% significance level.

Table 9. Forecast-error variance decomposition – Islamic banks

		Impulse Variables		Impulse Variables		Impulse Variables		Impulse Variables	
		Efficiency	Board independence (#)	Efficiency	Board independence (%)	Efficiency	Board attendance	Efficiency	Board committees
		Panel A. Response Variable = Efficiency							
Forecast Horizon	0	0	0	0	0	0	0	0	0
	1	1	0	1	0	1	0	1	0
	2	0.722	0.278	0.803	0.197	0.412	0.588	0.879	0.121
	3	0.651	0.350	0.780	0.220	0.488	0.512	0.925	0.075
	4	0.622	0.378	0.768	0.232	0.423	0.577	0.915	0.085
	5	0.606	0.393	0.762	0.238	0.442	0.558	0.918	0.082
	6	0.597	0.402	0.757	0.243	0.424	0.576	0.917	0.083
	7	0.592	0.408	0.754	0.246	0.428	0.572	0.917	0.083
	8	0.587	0.413	0.752	0.248	0.422	0.578	0.917	0.083
	9	0.584	0.416	0.750	0.250	0.422	0.578	0.917	0.083
	10	0.582	0.418	0.749	0.251	0.420	0.580	0.917	0.083
		Panel B: Response Variable = CG Variables							
Forecast Horizon	0	0	0	0	0	0	0	0	0
	1	0.120	0.880	0.033	0.967	0.164	0.836	0.918	0.082
	2	0.121	0.879	0.033	0.967	0.158	0.842	0.917	0.083
	3	0.121	0.879	0.033	0.967	0.160	0.840	0.917	0.083
	4	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	5	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	6	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	7	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	8	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	9	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083
	10	0.121	0.879	0.033	0.967	0.159	0.841	0.917	0.083

Table 10. Forecast-error variance decomposition – Conventional banks

<table>
<tr><td colspan="9" align="center">Panel A. Response Variable = Efficiency</td></tr>
<tr><td></td><td colspan="2">Impulse Variables</td><td colspan="2">Impulse Variables</td><td colspan="2">Impulse Variables</td><td colspan="2">Impulse Variables</td></tr>
<tr><td></td><td>Efficiency</td><td>Board independence (#)</td><td>Efficiency</td><td>Board independence (%)</td><td>Efficiency</td><td>Board attendance</td><td>Efficiency</td><td>Board committees</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>2</td><td>0.973</td><td>0.027</td><td>0.924</td><td>0.076</td><td>0.800</td><td>0.200</td><td>0.873</td><td>0.127</td></tr>
<tr><td>3</td><td>0.970</td><td>0.030</td><td>0.901</td><td>0.099</td><td>0.720</td><td>0.280</td><td>0.851</td><td>0.149</td></tr>
<tr><td>4</td><td>0.968</td><td>0.032</td><td>0.890</td><td>0.110</td><td>0.683</td><td>0.317</td><td>0.839</td><td>0.161</td></tr>
<tr><td>5</td><td>0.967</td><td>0.033</td><td>0.883</td><td>0.117</td><td>0.663</td><td>0.337</td><td>0.833</td><td>0.167</td></tr>
<tr><td>6</td><td>0.966</td><td>0.034</td><td>0.878</td><td>0.122</td><td>0.651</td><td>0.349</td><td>0.828</td><td>0.172</td></tr>
<tr><td>7</td><td>0.965</td><td>0.035</td><td>0.875</td><td>0.125</td><td>0.643</td><td>0.357</td><td>0.825</td><td>0.175</td></tr>
<tr><td>8</td><td>0.965</td><td>0.035</td><td>0.873</td><td>0.127</td><td>0.637</td><td>0.363</td><td>0.823</td><td>0.177</td></tr>
<tr><td>9</td><td>0.965</td><td>0.035</td><td>0.871</td><td>0.129</td><td>0.633</td><td>0.367</td><td>0.821</td><td>0.179</td></tr>
<tr><td>10</td><td>0.964</td><td>0.036</td><td>0.869</td><td>0.131</td><td>0.629</td><td>0.371</td><td>0.820</td><td>0.180</td></tr>
<tr><td colspan="9" align="center">Panel B: Response Variable = CG Variables</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>2</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>3</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>4</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>5</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>6</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>7</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>8</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>9</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
<tr><td>10</td><td>0.011</td><td>0.989</td><td>0.019</td><td>0.981</td><td>0.148</td><td>0.852</td><td>0.001</td><td>0.999</td></tr>
</table>

The leftmost axis label for both panels reads "Forecast Horizon".

Figure 1. Impulse Response Function (IRF) for bank efficiency and attendance – Conventional banks.
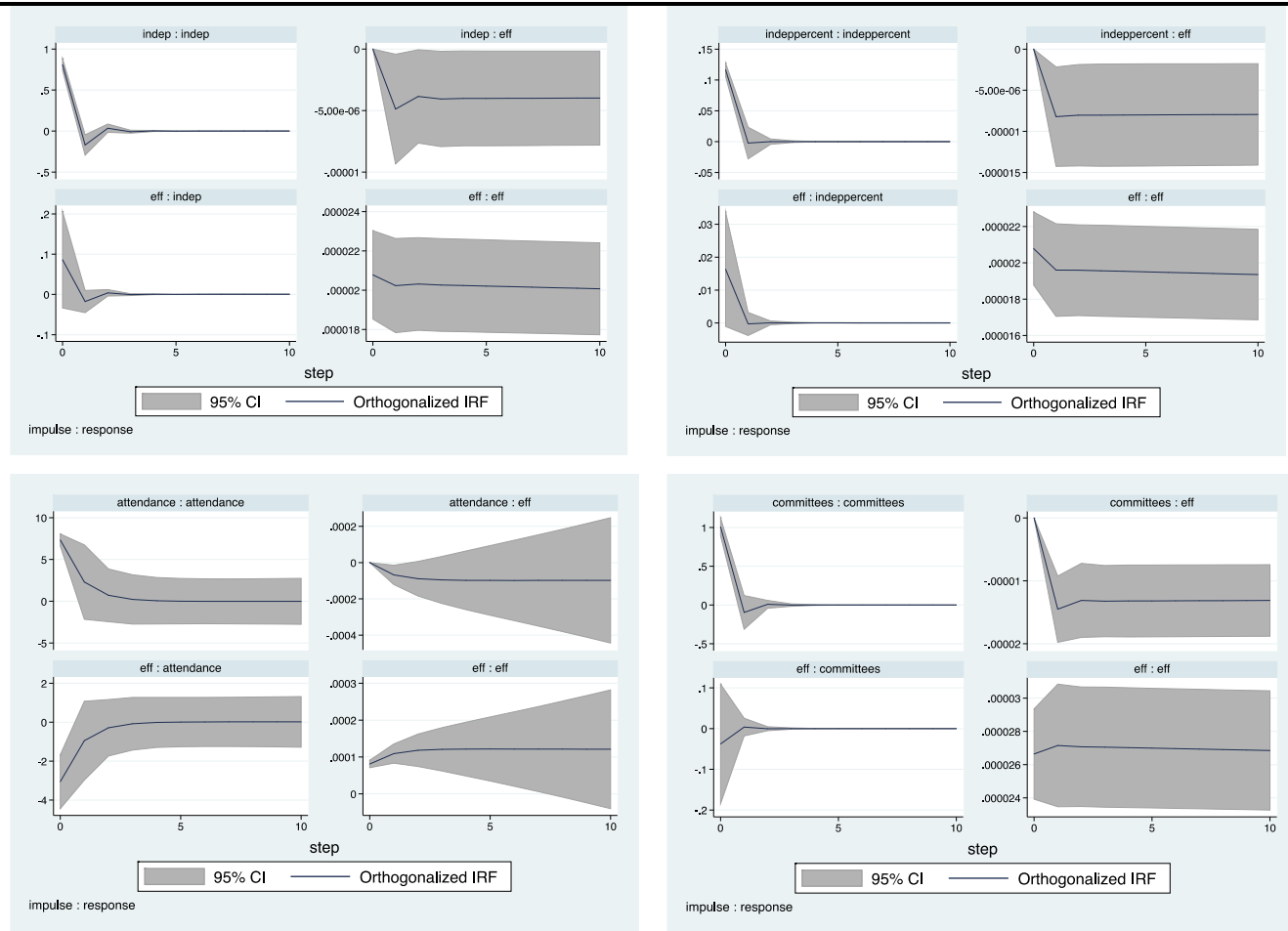
Notes: The figure show impulse response functions derived from the unrestricted panel-VAR of section 3. The plots show the response of each variable in the panel-VAR 'bank efficiency', and attendance to its own innovation and to the innovations of the other variables. *Eff* denotes Efficiency, *Indep*, *Indeppercent*, *Attendance* and *Committees* denote Board independence (#) and Board independence (%), Board attendance and Board committees respectively.

Figure 2. Impulse Response Function (IRF) for bank efficiency and attendance – Islamic banks.
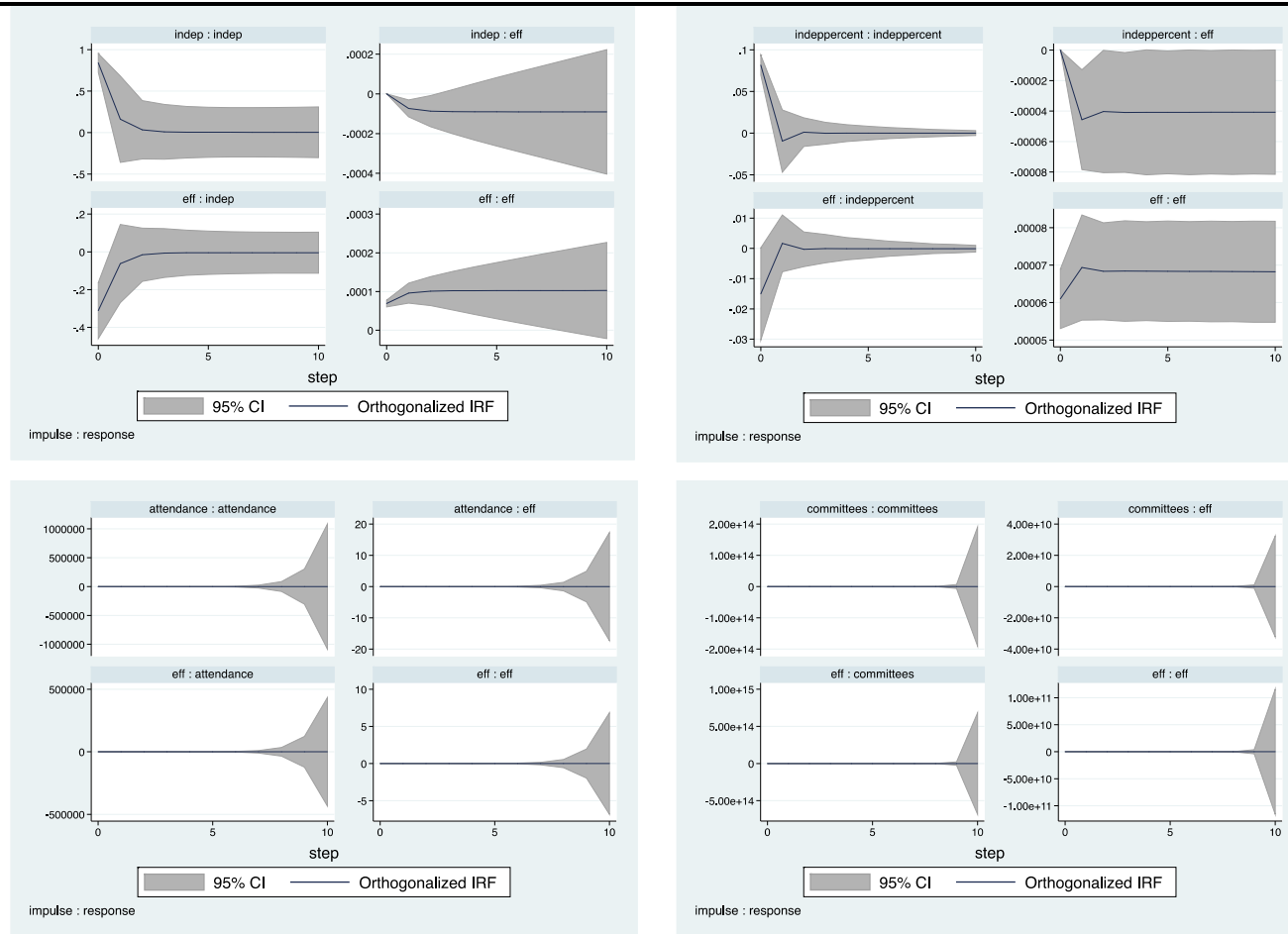
Notes: The figure show impulse response functions derived from the unrestricted panel-VAR of section 3. The plots show the response of each variable in the panel-VAR 'bank efficiency', and attendance to its own innovation and to the innovations of the other variables. *Eff* denotes Efficiency, *Indep*, *Indeppercent*, *Attendance* and *Committees* denote Board independence (#) and Board independence (%), Board attendance and Board committees respectively.

Table A1. Variable description

Variable	Type	Description
Panel A. Cost efficiency estimation		
Total Cost	Dependent	Total Interest Expenses + Total Non-Interest Expenses
Price of Funds	Independent	Total Interest Expenses / Total Funding
Price of Physical Capital	Independent	Other Operating Expenses / Fixed Assets
Price of Labour	Independent	Personnel Expenses / Fixed Assets
Output 1	Independent	Net Loans
Output 2	Independent	Total Earning Assets - Net Loans
Output 3	Independent	Net Fees and Commissions
Equity	Independent	Total Equity
Panel B. Corporate governance variables		
Board size	Independent	Hand-collected information
Board independence (#)	Independent	Hand-collected information
Board independence (%)	Independent	Hand-collected information
Female director	Independent	Hand-collected information
Board meetings	Independent	Hand-collected information
Board attendance	Independent	Hand-collected information
Board committees	Independent	Hand-collected information
Chair independence	Independent	Hand-collected information
CEO-Chair Duality	Independent	Hand-collected information
CEO-Internal	Independent	Hand-collected information
CEO-Qualification	Independent	Hand-collected information
CEO-Banking experience	Independent	Hand-collected information
CEO-Tenure	Independent	Hand-collected information
CGI-1	Independent	Board Size: Is the board size of this bank smaller than the median board
CGI-2	Independent	Independent Directors: Is the value of board's independence larger than
CGI-3	Independent	Female Director: Is there any female director on the board? If yes then
CGI-4	Independent	Board Meeting: Are the number of board meetings larger than the median
CGI-5	Independent	Board Attendance: Are the percent of board attendance larger than 75 %?
CGI-6	Independent	Board Committees: Are the number of board committees larger than the
CGI-7	Independent	Chair Independence: Is the chairman independent? If yes then one,
CGI-8	Independent	Chair/CEO Split: Are the roles of Chair/CEO split? If yes, then one,
CGI-9	Independent	Internal CEO: If the CEO is not internally recruited, then one, otherwise
CGI-10	Independent	CEO Qualification: MA or higher than one, otherwise zero.
CGI-11	Independent	CEO Banking Experience: If the CEO has more than the median years of
CGI-12	Independent	CEO Tenure: If the CEO has more than the median tenure in the sample
CGI index	Independent	The sum of all CGI 1-12 variables.
Panel C. Financial variables		
Islamic	Independent	Binary variable with 1 corresponding to an Islamic bank; zero otherwise.
Total Securities	Independent	Balance sheet information
Gross Loans	Independent	Balance sheet information
Fixed Assets	Independent	Balance sheet information
Total Assets	Independent	Balance sheet information
Equity	Independent	Balance sheet information
Total Interest Expense	Independent	Income statement information
Total Non-Interest Expense	Independent	Income statement information
Net Interest Revenue	Independent	Income statement information

Non-Interest Revenue	Independent	Income statement information
Personnel Expenses	Independent	Income statement information
Total Customer Deposits	Independent	Balance sheet information
Non-Performing Loans	Independent	Balance sheet information
Loan Loss Reserves	Independent	Balance sheet information
Loan Loss Provisions	Independent	Income statement information
Net Fees	Independent	Income statement information
ROA	Independent	Profitability ratio
ROE	Independent	Profitability ratio
Equity/Assets	Independent	Capitalisation ratio
Lerner index	Independent	Market power
Cost efficiency	Dependent	Estimated as in section 4
z-score	Dependent	Financial stability proxy

Notes: All variables are sourced from Bankscope. Corporate governance variables are hand-collected from financial statements.