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Article

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Efficiency and stability: A comparative study between islamic and conventional banks in GCC countries

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Abstract

This research aims at examining the differences between Islamic and conventional banks in terms of business orientation, stability, and efficiency. Data for this research are collected from 48 conventional banks and 28 Islamic banks of the Gulf Cooperative Council (GCC) countries over the period 2005 to 2014. Collected data are analyzed using accounting ratios, Stochastic Frontier Analysis (SFA), and ordinary least square (OLS) regression technique. Results show that conventional banks are more efficient in managing cost than their Islamic counterparts. However, Islamic banks are more solid in terms of short-term solvency but no such difference exists as far as the long-term stability is concerned. Regression estimation further shows that the operations of Islamic banks are different from their conventional counterparts and the results remain statistically significant even after controlling for bank specific variables. Moreover, larger banks have less intermediation ratio which indicates diseconomies of scale. Results also indicate that highly capitalized banks are more stable but cost inefficient which proves that capital-rich banks have failed to capitalize on the leverage effect.

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1. Introduction

Comparative studies between Islamic and conventional banks have been growing with renewed interest especially after the recent worldwide financial meltdown that was triggered by the US subprime mortgage crisis. The crisis resulted in the collapse of large financial institutions, bailout of banks by national governments, and downturns in stock markets. Scholars, in the post-crisis period, are increasingly interested to assess if profit and loss sharing based Islamic banking is more stable than their conventional counterparts (Čihák & Hesse, 2010; Smolo & Mirakhor, 2010; Farooq & Zaheer, 2015). Stability of a bank can be defined as the ability to withstand against adverse internal and external economic and financial shocks or the ability to meet promised obligations without outside interference.

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In the conventional banking model, risks are reflected in both asset and liability sides of a bank's balance sheet. Banks collect funds by selling deposits and lend these funds to borrowers for investment. There is an inherent mismatch between banks sources and uses of funds. For instance, banks sell demand deposit to depositors which can be withdrawn by them without prior notice. On the other hand, banks use these funds particularly financing long-term projects of investors which cannot be liquidated instantly without losing much of their value. This mismatch in maturity can instigate bank run eventually (Farhi & Tirole, 2009). A study by OECD (2010) shows that banks which rely mostly on wholesale funds including funding from other banks and money markets have been severely affected by the recent financial crisis.

In contrast, banks which rely heavily on depository funding have been very resilient to financial crisis and are expected to be more stable. In this particular regard, Islamic banks can be considered more stable than their conventional counterparts because the former collect funds through two categories of deposits- demand deposits and investment deposits. For demand deposits, Islamic banks apply 100% reserve and are expected to be more stable (Khan, 1986). However, this stability may be achieved at the cost of their efficiency. Efficiency implies the ability of a bank to turn its resources into revenues. A bank is considered more efficient if it can produce a given level of output using minimum level of resources. Since Islamic banks employ larger amount of demand deposit which requires higher level of mandatory provision to be maintained, this cluster of banks thus, holds less available funds at its disposal for investment. As a result, Islamic banks are expected to be more stable but less efficient than their conventional counterparts.

The source of difference between Islamic and conventional banks in terms of stability and efficiency can be attributed to the nature of their business practices. Islamic banks are completely prohibited from dealing with interest and uncertainty, two dominant features embedded with the business practices of conventional banks. Instead, Islamic banks offer various financial products complying with *Shariah* principles which allow profit and loss sharing (PLS) based mode of financing instead of fixed-rate loans. For instance, *Musharaka* (joint venture) and *Mudharabah* (profit-sharing agreements) are purely PLS modes of financing. Under the PLS paradigm, assets and liabilities of Islamic banks are integrated in the sense that borrowers share profits and losses with the banks, which in turn share profits and losses with the depositors (Chong and Liu, 2009). There are other financial contracts permissible in Islam and are practiced by Islamic banks across the world. For example, *Murabaha* (mark-up) financing is most popular among Islamic banks whereas *Ijarah* (leasing), *Bai'-muajjal* (variant of Murabaha), *Bai'-salam* (forward sale contract), *Istisna* (commissioned or contract manufacturing) are also offered by Islamic banks. These products, although permitted in Islam, do not conform to the spirit of PLS based financing.

Despite theoretical differences, literature provides conflicting evidence on the difference between Islamic and conventional banks in terms of the above mentioned parameters. In respect of business orientation, Chong and Liu (2009), Ariff and Rously (2011) argue in the context of Malaysian banking system that Islamic banking is not very different from conventional banking. Similarly, Aggarwal and Yousef (2000) and Khan (2010) contend that Islamic banking activities in most instances are still functionally indistinguishable from conventional banking. In the same token, Suzuki, Miah, Wanniarachchige, and Sohrab (2017) raise the issue that although Islamic banks comply with *Shariah* principles, their mode of investment is dominant by *Murabaha* or mark-up lending which is close to conventional banking practice. On the other hand, Beck, Demirgüç-Kunt, and Merrouche (2013), drawing evidence from a large number of banks worldwide, find that Islamic banking activities are different from conventional banking. This finding is supported by many studies (Metwally, 1997; Olson & Zoubi, 2008) and by far the dominant argument among comparative analysis.

Differences between Islamic and conventional banks in respect of efficiency and stability are also evident in the existing literature. The conclusion of these studies however, varies. For instance, Srairi (2010) conducts a comparative study between Islamic and conventional banks of GCC countries in terms of their efficiency and finds that Islamic banks are less efficient than conventional banks. This finding is confirmed by Hassan (2006) in the context of OIC (Organization of Islamic Conference) countries, Beck et al. (2013), Abdul-Majid, Saal, and Battisti (2010) for international data, and Miah and Sharmeen (2015) for banks in Bangladesh. Contrasting to the above findings, Brown, Hassan, and Skully (2007) find that cost efficiency of Islamic banks is higher than the conventional banks in the dual banking system. Similarly, Pradiknas and Faturohman (2015) find that Indonesian Islamic banks are more efficient than conventional banks. Some studies (Bader, Mohamad, Ariff & Hassan, 2008; Hassan, Mohamad & Bader, 2009; Metwally, 1997; Mohanty, Lin, Aljuhani & Bardesi, 2016; Yahya, Muhammad & Hadi, 2012) however, find no significant difference between Islamic and conventional banks in terms efficiency.

Like efficiency, opinions are diverse in respect of stability between Islamic and conventional banks. [Khediri, Charfeddine, and Youssef \(2015\)](#) find that Islamic banks are more profitable, more liquid, better capitalized, and have lower credit risk than conventional banks. [Čihák and Hesse \(2010\)](#) however, specify that small Islamic banks are financially more stable than small conventional banks whereas large conventional banks are more efficient than large Islamic banks. [Beck et al. \(2013\)](#) show that Islamic banks are better capitalized, have higher asset quality which implies that this cluster of banks is more resilient to financial shock than their conventional counterparts. This finding is supported by [Abedifar, Molyneux, and Tarazi \(2013\)](#) for a data of 553 banks from 24 countries and [Rahim and Zakaria \(2013\)](#) for Malaysian case. In contrast, [Kabir and Worthington \(2017\)](#) find that Islamic banks are less stable than conventional banks. On the other hand, [Bourkhis and Nabi \(2013\)](#) show no significant difference in terms of the effect of the financial crisis on the soundness of Islamic and conventional banks.

Besides contradictory evidence, most of these studies draw conclusion based on international data. However, a focused analysis of banks in GCC countries is apparently absent except few studies which focus mostly on efficiency keeping stability and solvency issues largely unexplored. The current study is a humble attempt to fill this gap. The novelty of this study is manifold. First, this study considers a large number of samples from the GCC region covering the period of financial crisis to check the effects of crisis on both clusters of banks' efficiency and stability. Second, it applies both accounting ratio and other econometric techniques to assess efficiency, stability, and business models and then compares between Islamic and conventional banks in light of the above determinants. Third, based on the analysis, the research offers some policy prescriptions which are believed to be useful for banks' management and regulatory authority. The paper has been structured as follows: section two surveys the related literature. Section three discusses various methodologies applied in this research along with the definitions of variables. Section four analyzes the finding which is followed by conclusions and some policy recommendations.

2. Literature review

Efficiency of the banking system has been a theme of interest for the academia as well as decision makers for long time ([Andries, 2011](#)). However, the interest on the issue has heightened substantially in the recent time especially after the worldwide financial meltdown which has triggered many financial institutions towards the brink of bankruptcy. Thus, banks' efficiency and its relation with the stability and risk deserve rigorous academic discussion. With this expectation, the existing literature offers a good number of studies.

In regards to efficiency of the banking industry, two approaches - ratio analysis and frontier analysis- are widely seen in the literature. Although both approaches have their own pros and cons, [Iqbal and Molyneux \(2005\)](#) find that frontier approaches are superior to standard financial ratio analysis because the former approach uses statistical tools that remove outside factors affecting the standard performance of firms. Studies which apply frontier analysis consider cost efficiency ([Hall & Simper, 2013](#); [Fries & Taci, 2005](#)) and profit efficiency ([DeYoung & Hasan, 1998](#)). Cost efficiency gives a measure of how close a bank's cost is to what a best-practice bank's cost would be for producing the same bundle of output under the same conditions. Profit efficiency indicates how well a bank is predicted to perform in terms of profit relative to other banks in the same period for producing the same set of outputs ([Mohamad, Hassan & Bader, 2008](#)). Few studies focus on technical efficiency ([Miller & Noulas, 1996](#)) of banking industry. [Maudos, Pastor, Perez, and Quesada \(2002\)](#) and [Koetter \(2008\)](#) on the other hand, consider both cost and profit efficiency whereas [Shamsuddin and Xiang \(2012\)](#) apply all three - cost, profit and technical- efficiency measures in their study. In the parlance of these parameters, some studies focus on cross country comparison ([Yudistira, 2003](#); [Sufian, Noor & Abdul-Majid, 2008](#); [Casu & Molyneux, 2003](#); [Khan & Dewan, 2013](#); [Hassan, 2006](#)) whereas other studies concentrate on within country banking industry ([Hauner & Peiris, 2008](#); [Shamsuddin & Xiang 2012](#); [Reboredo, 2004](#); [Berger, Leusner & Mingo, 1997](#)).

These studies have identified various factors driving efficiency of banks. For instance, [Yudistira \(2003\)](#) attributes cost as a primary factor of banks' efficiency. [Hauner and Peiris \(2008\)](#) find competition that drives efficiency of banks in Sub Saharan African countries. [Perera, Skully, and Wickramanayake \(2007\)](#) [Hauner and Peiris \(2008\)](#) [Camanho and Dyson \(1999\)](#) identify bank's size as driver of efficiency due mainly to the existence of scale effects. Similarly, [Shamsuddin and Xiang \(2012\)](#) analyze bank efficiency using stochastic frontier analysis of 10 publicly listed Australian banks over the period 1985 to 2008. They find that efficiency of those banks has improved over the study period. Large banks have attained cost and technical efficiency over small banks but small banks have attained profit efficiency over large banks. They conclude that improvement of any kinds of efficiency contribute to increase the

market value of the bank. Ownership structure of banks is also associated with efficiency (Berger, Hasan & Zhou, 2009; Altunbas, Evans & Molyneux, 2001). For instance, Hauner and Peiris (2008) find that foreign-owned banks are more efficient than others whereas Altunbas et al. (2001) find evidence to suggest that privately owned banks are more efficient than their mutual and public sector counterparts. In contrast, Reddy and Nirmala (2013) show that state-owned banks in India are relatively more efficient than their private counterparts. Casu and Molyneux (2003) perform a comparative study of efficiency of European banks by taking a sample of five European countries (France, Germany, Italy, Spain and UK) over the period 1993 to 1997. Using DEA approach, they suggest that the EU's single market program has improved a small amount of bank efficiency in EU region. Reboredo (2004) analyzes if efficiency is related to solvency or solvency is related to bank's efficiency by taking a sample of 88 commercial banks of Spain for the period 1995–1999. This research finds that efficiency leads to greater solvency but solvency has no relation with efficiency.

Studies cited above focus mostly on the conventional banks. The vulnerability of this cluster of banks to the cyclical financial and economic bubbles on the one hand and the nascent pace of progress of Islamic finance on the other have attracted attention from scholars across the discipline to examine the differences between Islamic and conventional banks in respects of efficiency, stability, and risk. For instance, Sufian et al. (2008) analyze the efficiency of 18 Islamic banks from MENA and Asian region over the period 2001 to 2006. Applying DEA approach, they find that Islamic banks in MEAN region are more efficient than Islamic banks of Asian countries. Yudistira (2003) analyzes if 'region' can be an influencing factor of bank performance. Analyzing 18 Islamic banks in different regions the study finds that 'region' has a strong influence on Islamic bank performance. Hassan (2006) compares the cost and profit efficiency of 37 conventional and 43 Islamic banks in 21 OIC countries for the period 1995- 2001. The results indicate that Islamic banking industry is relatively less efficient compared to their conventional counterparts.

While comparative study between Islamic and conventional banks has been the concern of many studies, efficiency drivers and their relation with various other factors have been discussed in the literature as well. Beck et al. (2013) analyzing 88 Islamic banks and 422 conventional banks worldwide find that Islamic banks are less cost effective, have higher asset quality, and are better capitalized. Similarly, Ariss (2010) shows analyzing 58 Islamic banks and 192 conventional banks of 13 countries for the period 2000–2006 that Islamic banks are less competitive and better capitalized. Louati, Louhichi, and Boujelbene (2016) relate Islamic banks' efficiency to stability and argue that cost efficiency has a negative and significant effect on Islamic banks' risk. Bader et al. (2008) however, find no significant difference between Islamic and conventional banks in terms of efficiency by their analysis of 43 Islamic banks and 37 conventional banks.

In regards to stability, Kuran (2004) finds that Islamic banks are not superior over conventional banks. Similarly, Kassim, Majid, and Shabri (2009) show in the context of Malaysian banking industry that the balance sheet of Islamic banks is more sensible to monetary policy shocks than the conventional banks. Ergeç and Arslan (2013) find that Islamic banks in Turkey are visibly more sensitive to interest rate change than their conventional counterparts. Kabir, Worthington, and Gupta (2015) although find that Islamic banks are more risky than conventional banks, they find no difference in credit risk between these two clusters of banks during the global financial crisis. In another study Kabir and Worthington (2017) analyzing data from 16 developing economies over the period 2000 to 2012 show that Islamic banks are less stable than the conventional banks. In contrast, Beck et al. (2013) and Khediri et al. (2015) show that Islamic banks are more liquid and better capitalized which implies that this class of banks is more stable. This finding is supported by Abedifar et al. (2013) for a data of 553 banks from 24 countries and Rahim and Zakaria (2013) for Malaysian case. Louati and Boujelbene (2015) attribute higher stability of Islamic banks to increased competition and size. Similarly, Ghosh (2016) suggests that capital adequacy ratios and reserve requirements are the primary determinants of bank's stability.

In the context of GCC countries, Belanès Ftiti, and Regaïeg (2015) study the pure, technical, and scale efficiency of 30 Islamic banks for the period 2005–2011. One of the significant contributions of the study is that it checks the effects of financial crisis on the efficiency of those banks. Their findings indicate a slight decline in Islamic banks' efficiency with notable decline in 2009. Aghimien, Kamarudin, Hamid, and Noordin (2016) attribute inefficiency of Islamic banks in GCC countries to managerial inefficiency in resource use. Srairi (2010) however, performs a comparative study between Islamic and conventional banks in terms of efficiency for the period 1999–2007. The research applies SFA approach and shows that conventional banks on average are more efficient than Islamic banks. The study also finds a positive correlation between cost and profit efficiency with bank capitalization and profitability. Likewise, Hussein (2010) analyzes a sample of 194 banks of GCC countries and finds that conventional banks on

average are more liquid than Islamic banks but the latter class of banks tends to take more rigorous risk strategies during the crisis period than the former class.

Our study is different from these existing studies in the sense that it examines efficiency, stability, and solvency for both Islamic and conventional banks in the GCC region. GCC as an economic block retains a high profile on the global economic landscape as far as the Islamic banking and finance is concerned. The region accounts for the largest proportion of Islamic financial assets accounting for 37.6% of the total global Islamic financial assets (IFSB, 2015). In terms of banking sector assets, GCC alone contributes 38% which is second only to the Middle East and North Africa (MENA) region (excluding GCC) which accounts for 43% of the total Islamic banking assets. Moreover, banking system of the region has undergone tremendous changes owing to the gradual economic and financial deregulation, financial innovation and automation (Ariss, 2010) which are having a sweeping impact on the bank's stability and efficiency. In this sense, a comparative study that examines the efficiency and stability of Islamic and conventional banks of the region is expected to contribute to the existing literature by providing new evidence and information. Second, our study checks the effects of financial crisis on the stability and solvency for both clusters of banks which are not the focus of previous studies. Given the paucity of research in the concerned area, the research is expected to contribute to the existing literature by providing new information for regulators and policymakers.

3. Data and methodology

In this research we use an array of variables which are carefully selected based on the consultation with the existing literature. Our purpose is to examine the differences between Islamic and conventional banks in the GCC countries in respect of (i) business orientation (ii) efficiency, and (iii) stability. Differences in business model between conventional and Islamic banks are examined comparing the sources of income. Demirgüç-Kunt and Huizinga (2010) and Beck et al. (2013) argue that Islamic banks are likely to have more fee-based income generating through non-traditional banking activities including trading activity. In addition, they are expected to have higher intermediation ratio than the conventional banks (Beck et al. 2013). In line with these studies, we select fee-based and other operating income generated through the means other than the mainstream operation of a bank. Thus, we measure business orientation of a bank by the ratio of fee-based and other operating income to total assets. Also, we examine the intermediation ratio proxied by loans to deposit ratio. Unlike traditional banks, Islamic banks do not report 'loan' as an asset category in their balance sheet but they report financing and investment activities. Bankscope in its database however, groups investment and financing activities of Islamic banks as loans. Henceforth, 'loan' in the Islamic banking perspective refers to investment activities of this cluster of banks. We hypothesize that fee-based income and loan intermediation ratio will be higher for Islamic banks than the conventional banks.

Second, we estimate the efficiency of both clusters of banks. There are different competing approaches to determine the efficiency of banks. However, as discussed above, data envelopment analysis (DEA) and stochastic frontier analysis (SFA) are widely used in the literature. Data envelopment analysis technique avoids distributional assumptions by using linear programming techniques to estimate frontiers that connect the input requirements of the efficient firms. However, it does so through the *ad hoc* assumption that there is no random error; or in other words, all variations which cannot be attributed to inputs are considered as inefficiency. If random error does exist, it can have a large cumulative effect on aggregate inefficiency because this measure is determined by comparing the few fully efficient firms on the frontier with all other firms not on the frontier.

Unlike the non-parametric DEA approach, the parametric stochastic frontier method attributed to Aigner, Lovell, and Schmidt (1977) and Meeusen and van Den Broeck (1977) considers production frontier as a random shock. The models of stochastic production frontier address technical efficiency and recognize the fact that observed deviations from the production function could arise from two sources: productive inefficiency that would necessarily be negative; and idiosyncratic effects that are specific to the firm. A number of different functional forms such as Cobb-Douglas (linear logs of outputs and inputs), quadratic (in inputs), normalized quadratic, translog functions are used in the literature to model production function. However, translog function which is a generalization of the Cobb-Douglas function is commonly used. In this paper, the translog cost function is used to calculate the cost inefficiency of banks. The estimation of banks' relative efficiency using panel data is performed by estimating a cost function of the general form

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + \nu_{it} + v_{it} \quad (1)$$

where y_{it} is total cost in logarithm form of bank i in period t , X_{it} is a matrix of outputs and of input prices in logarithm form, v_{it} is a random error term and u_{it} is the technical inefficiency term which satisfies the condition $u_{it} > 0$. The specific form used for the cost function is a standard translog specification, which can be written as

$$\begin{aligned} \ln TC_{it} = & \alpha + \sum_{j=1}^2 \alpha_j \ln Q_{jt} + \sum_{m=1}^2 \beta_m \ln P_{mit} + \frac{1}{2} \sum_{j=1}^2 \sum_{k=1}^2 \delta_{jk} \ln Q_{jt} \ln Q_{kt} \\ & + \frac{1}{2} \sum_{m=1}^2 \sum_{n=1}^2 \gamma_{mn} \ln P_{mit} \ln P_{nit} + \sum_{j=1}^2 \sum_{m=1}^2 \rho_{jm} Q_{jt} P_{mit} + v_{it} \end{aligned} \quad (2)$$

where, TC is the natural logarithm of total cost, Q_j and Q_k are output quantities and P_m and P_n are input prices of bank i in year t . In estimating Eq. (2) with this specific functional form, we impose constraints on symmetry, $\delta_{jk} = \delta_{kj}$ and $\gamma_{mn} = \gamma_{nm}$ for all $j, k, m,$ and n . Any sensible cost function must be homogenous of degree 1 in input prices. This, in the translog function described above, requires that $\sum_{m=1}^2 \beta_m = 1$. The composite error term also takes a specific functional form. The random components, v_{it} are independently and identically distributed according to standard normal distribution, $N \approx (0, \sigma_v^2)$ while the bank inefficiency components, $u_{it} > 0$ are independently but not identically distributed according to a truncated-normal distribution. The SFA assumes that the inefficiency component of the error term is positive; that is, higher bank inefficiency is associated with higher cost.

For measuring efficiency using stochastic frontier model we need to identify output as well as input prices of banks in the right hand side of the equation and total cost in the left hand side. Depending on the measure of output and input, the components of total cost is determined. There is a long-standing disagreement among scholars in the question as to what it is that banks produce. Three major approaches are widely discussed in the literature (Berger & Humphrey 1992). These are: the asset approach or intermediation approach, the user cost approach, and the value-added approach. As per the intermediation approach, banks are considered only as financial intermediaries between liability holders and those who receive bank funds. In this approach banks are viewed as intermediary of financial services rather than producers of loan and deposit account services, and the value of loans and investments is used as output measures; labor and capital are inputs to this process, hence operating costs plus interest costs are the relevant cost measure whereas deposits may be either input or output (Colwell & Davis, 1992). In contrast, the user cost approach developed by Donovan (1978) and Barnett (1980) determines input and output based on its net contribution to bank revenue. If the financial return on an asset exceeds the opportunity cost of funds or if the financial costs of a liability are less than the opportunity cost, then the instrument is considered as financial output. Otherwise, it is considered as financial input. The value-added approach on the other hand, identifies any balance sheet item as output if it absorbs a relevant share of capital and labor; otherwise it is considered as an input or non-relevant output.

In this paper, we use intermediary approach in deciding output as well as input prices and total cost components. The logic is that this approach appears to be preferred to other approaches in inter-bank studies (Colwell & Davis, 1992; Fries & Taci, 2005). As such, total cost in the left hand side of the equation comprises of total operating costs and cost of deposit. We consider loans and securities as output whereas cost of labor and capital is used as input price to determine the cost efficiency of banks.

In addition to SFA estimation, we check another measure of bank efficiency, cost to income ratio, which is also used as a measure of bank's efficiency in many studies (Beck et al. 2013). An inefficient bank is likely to incur higher cost in comparison with its income than an efficient bank.

Third, we consider two proxies of banks' solvency which are (i) the ratio of liquid asset to deposit and short-term funding and (ii) z-score as a measure of banks stability. The ratio of liquid asset to deposit and short-term funding captures the strength of a bank in the short-term. It indicates how solvent a bank is to avoid any abrupt and unavoidable changes of banking environment in the short-term. The higher the ratio the larger is the strength of the bank and *vice versa*. Also, we use z-score as a measure of stability. Unlike liquidity ratio, z-score captures the distance of a bank from the default. Z-score as a measure of stability has been reported in many studies (Beck et al., 2013; Kabir et al., 2015). The benefit of z-score as a measure of stability is that it takes several critical elements – profitability, leverage, and volatility- of a bank into account. Z-score can be calculated as: $Z = \frac{(ROA + CAR)}{\sigma_{ROA}}$ where, ROA is the standard measure of return on asset, CAR is the capital to asset ratio, and σ_{ROA} is the fluctuation of ROA indicated by the standard deviation. In this model z-score indicates the number of standard deviation that a bank's return on asset has to drop before it evaporates bank's equity capital. Or in other words, z-score indicates the multiple

of a bank's equity buffer before it falls into the state of default. In this sense, the higher the z-score the lower is the bank's default risk.

Once these measures are estimated, we examine the differences between Islamic and conventional banks applying the following OLS regression model-

$$Bank_{it} = \alpha + \beta_1 I_i + \varepsilon_{it} \quad (3)$$

Where bank is one of the measures of business model, efficiency, and stability of bank *i* at year *t*. *I* is the dummy taking 1 for Islamic banks and zero otherwise and ε is the white noise error. Eq. (3) however, does not consider the bank specific variables which can also affect the efficiency, stability, and business orientation. Thus, we incorporate several bank specific factors to the above model which yields the following equation

$$Bank_{it} = \alpha + \beta_1 I_i + \beta_2 X_{it} + \varepsilon_{it} \quad (4)$$

Where, *X* is a vector of time varying bank characteristics which include bank's size, earning assets, and equity buffer. It is found in the literature that the size is measured either by the amount of loans or assets. In this research we use logarithmic form of bank's total assets as a proxy for size. The effect of size on banks' efficiency and stability cannot be known *a priori*. In general, if a bank is able to squeeze the benefits of economies of scale, size might appear positively associated with the cost efficiency. On the other hand, a larger bank might find it difficult to manage its excess capacity in a cost saving manner due to improper screening and monitoring of borrowers. The success of boutique banks in many countries bears the testimony of this proposition. In terms of stability, the proposition of 'too big to fail' might prompt a larger bank to assume more risk and hence the relationship between size and stability is expected to be negative. Similarly, banks with higher equity buffer are expected to be more stable but less efficient as funding is costly. Earning assets should be negatively related to bank's fee income owing to the fact that the higher the earning asset the larger is the income generated from mainstream business. In terms of cost efficiency, banks with higher earning asset might appear to be less efficient because income generated through fee and commission based services is less costly than income generated through lending businesses as they are involved with funding cost.

All the data for this study is collected from Bakscope for the period 2005–2014 (detail of data is provided in [Appendix A](#)). Period selection is driven by few factors. First, many Islamic banks are relatively new. Hence, recent data includes large number of Islamic banks which is required for reliable estimation and inferences. Second, the selected period covers the worldwide financial crisis allowing us to know the effects of financial crisis on these two clusters of banks. Only commercial banks are considered for this study and banks which have data available for at least two years are included. Also, observations which are deemed outlier are excluded. Finally, we have 48 conventional banks and 28 Islamic banks. Data descriptions are provided in [Table 1](#).

4. Results and analysis

4.1. Descriptive statistics

[Table 1](#) reports the descriptive statistics of our data. It shows that the fee income varies from 0.1% to 25.5% with an average of 2.2% for all banks. The mean fee-based income for Islamic banks is 2.4% whereas for conventional banks it is 2.1%. Conventional banks intermediate more loans as percentage of deposit (96.2%) than Islamic banks (94.3%). Intermediation ratio for all banks ranges from minimum 10.9% to maximum 196.2% with an average of 94.7%. In terms of efficiency, conventional banks on an average attain 85.1% cost efficiency and the respective measure for Islamic banks is 65%. It is to be further noted that the variation among Islamic banks in respect of efficiency is more (standard deviation 15.4%) than conventional banks (standard deviation 9.7%). This implies that conventional banks are more homogenous in achieving cost efficiency than Islamic banks. This is supported by the cost to income ratio which ranges from 9.77% to 97.2% with an average of 33.89% for conventional banks. The cost to income ratio for Islamic banks ranges from 12.23% to 159.39% with an average of 46.13%. The average z-score for all banks is 21.5 multiples with the minimum 0.94 multiples and the maximum 159.39 multiples. There seems no apparent difference between Islamic (20.42%) and conventional (21.84%) banks in terms of z-score. However, they vary greatly in terms of short-term liquidity represented by the ratio of liquid assets to deposit and short-term liability. The ratio ranges between 0.86% and 101.44% with an average of 27.42% for conventional banks. The liquidity ratio for Islamic banks

Table 1
Descriptive statistics.

	FEEINC	LDR	SFA	CIR	Z_SCORE	LADR	EQAR	PLL	ROAA	TA (mln USD)
All banks										
Mean	0.022	0.947	0.794	37.310	21.501	35.624	0.151	3.745	2.430	20,212.070
Median	0.019	0.934	0.842	33.140	16.376	25.540	0.135	3.030	2.000	12,535.910
Maximum	0.255	1.962	0.972	159.390	193.541	1373.000	0.902	19.480	101.000	459,689.000
Minimum	0.001	0.109	0.286	9.770	0.941	0.860	0.014	0.000	-8.600	442.600
Std. Dev.	0.017	0.212	0.146	16.683	17.961	88.221	0.070	2.862	5.567	28,322.110
Observations	499	499	499	499	499	499	499	499	499	499
conventional banks										
Mean	0.021	0.962	0.851	33.890	21.839	27.420	0.142	3.903	2.143	22,838.420
Median	0.019	0.961	0.871	32.210	17.695	23.835	0.131	3.030	2.085	14,635.510
Maximum	0.103	1.713	0.972	96.650	89.194	101.440	0.380	19.480	13.150	459,689.000
Minimum	0.001	0.109	0.327	9.770	0.941	0.860	0.014	0.200	-4.190	661.440
Std. Dev.	0.012	0.195	0.097	12.167	14.767	15.676	0.049	3.011	1.466	31,870.020
Observations	358	358	358	358	358	358	358	358	358	358
Islamic banks										
Mean	0.024	0.943	0.650	46.132	20.424	56.329	0.176	3.316	3.124	13,337.400
Median	0.020	0.889	0.661	43.780	13.659	29.745	0.151	3.075	1.665	8050.150
Maximum	0.255	2.845	0.913	159.390	193.541	1373.000	0.902	12.930	101.000	74,632.190
Minimum	0.001	0.174	0.286	12.230	1.250	4.340	0.063	0.000	-8.600	442.600
Std. Dev.	0.025	0.343	0.154	22.402	24.091	160.922	0.101	2.391	10.096	14,095.490
Observations	144	144	144	144	144	144	144	144	144	144

ranges from 4.34% to 1373% with an average of 56.33%. It shows that short-term solvency of Islamic banks is greater than conventional banks.

As expected, the average size of Islamic banks (US\$ 13,337.40 million) is just little more than half of the average size of conventional banks (US\$ 22,838.42 million). The asset of the largest conventional banks in our sample amounts to US\$ 459,689 million and the smallest bank amounts to US\$ 661.44 million. The respective amounts for Islamic banks are US\$ 74,632.19 million and US\$ 442.60 million. This provides with the evidence that conventional banks in the GCC countries are larger in size than their Islamic counterparts. Despite being small in size, Islamic banks are more profitable as shown by the mean return on average assets (3.12%) than their conventional counterparts (2.14%). The mean return on average assets for all banks is 2.43% with the standard deviation 5.56%. The point to note is that Islamic banks vary largely among themselves in terms of profitability (standard deviation of ROAA is 10%) in comparison with conventional banks (standard deviation of ROAA is 1.47%). The result postulates that conventional banks are more matured compared to Islamic banks. One reason for low profitability of conventional banks can be attributed to their high level of provisions for loans and leases (PLL). The average PLL for conventional banks is 3.9% and for Islamic banks 3.3%. Moreover, Islamic banks, on average, have more equity capital as percentage of total assets (17.6%) compared to conventional banks (14.2%). This result indicates that Islamic banks are more sound and stable than conventional banks in the GCC countries.

4.2. Regression results

Results of Eq. (3) are shown the Table 2. The results show that the business of Islamic banks is statistically different from conventional banks when we compare in terms of fee and other income as percentage of total assets. However, we cannot accept the hypothesis that the intermediation ratio of Islamic banks is higher than the conventional banks. The results further show that Islamic banks are less efficient than their conventional counterparts and the difference is statistically significant at 1% level. In regards to stability, Islamic banks are more solid in the short-term. However, z-score shows no statistically significant difference between Islamic and conventional banks.

Table 3 exhibits the result of Eq. (4). Both measures of business model (fee income and intermediation ratio) show that the business model of Islamic banks is statistically different from the conventional banks at 5% level of

Table 2
Difference between Islamic and conventional banks.

	Business orientation		Efficiency		Stability	
	Fee income	Inter. ratio	SFA	CIR	Z-score	LADR
Islamic bank dummy	0.008** (0.0026)	-0.024 (0.0197)	-0.1895*** (0.0099)	14.459*** (1.6271)	-0.8290 (1.9065)	44.924** (17.9070)
Constant	0.021*** (0.002)	0.981 (0.0197)	0.861*** (0.0056)	35.765*** (0.9086)	23.00*** (1.0897)	32.65*** (10.1070)
R-square	0.15	0.06	0.35	0.11	0.13	0.10
observation	576	666	678	651	704	656

***, **, * indicate significant at 1%, 5%, and 10% level respectively. Standard errors are given in the parenthesis.

Table 3
determinants of efficiency, stability, and business model.

	Business orientation		Efficiency		Stability	
	Fee income	inter. Ratio	SFA	CIR	Z-score	LADR
Islamic bank dummy	0.0054** (0.0026)	1.443** (0.6349)	-0.1572*** (0.0118)	12.152*** (1.6284)	-5.40*** (1.4886)	28.744 (18.30)
LnTA	0.000 (0.0018)	-3.2587*** (0.4509)	0.007 (0.008)	-4.244*** (1.1490)	2.103** (1.0422)	1.6938 (12.889)
Earning asset	-.0000 (0.000)	0.0001*** (0.0002)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0001** (0.0000)	-0.000 (0.000)
CAR	0.0890*** (0.01163)	-5.6196 (4.2252)	-0.5360*** (0.0572)	15.0926** (7.5714)	48.76*** (6.588)	356.26*** (88.39)
R-square	0.15	0.10	0.35	0.17	0.19	0.14
observation	568	657	661	650	678	654

***, **, * indicate significant at 1%, 5%, and 10% level respectively. Standard errors are given in the parenthesis.

significance even after controlling for bank specific variables. Size of the banks seems to be irrelevant for fee income. This makes sense because fees and commission based incomes are attracted by banks reputation instead of their size. Specially, customers who are seeking Islamic banking services (as this cluster of banks claim more fee income) tend to approach toward this type of banks even if they are small in size as well as in branch networks. Contrary to the common perception, size appears to be negatively related to intermediation ratio which proves that banks in the GCC countries are working with overcapacity. Or in other words, they have failed to materialize the benefits of economies of scale. As expected, earning assets are negatively related to fee income and positively associated with intermediation ratio. However, the coefficients are very small and the model shows no explanatory power. Capital to asset ratio positively affects fee income which again confirms the reputation theory. Banks with higher capital base are more secured and customers consider them their trustworthy partners in seeking fee and commission based services. Capital base on the other hand shows no significant effects on intermediation ratio.

The result of Eq. (4) confirms our earlier conclusion that Islamic banks are less efficient than their conventional counterparts. In regards to bank-specific factors, bank's size shows no significant association with the efficiency derived through SFA whereas it is negatively related to cost to income ratio. It implies that larger banks have lower cost to income ratio. This result appears to be contrary to our earlier findings that larger banks have less intermediation ratio or fail to benefit from their economies of scale. Explanation of this paradox lies on the result of SFA which shows no statistically significant association with the size. This indicates that large banks cannot reduce the cost through benefiting from their economies of scale but they charge higher prices than smaller banks again supporting the reputation hypothesis. Earning assets however, shows no relevancy to efficiency whereas capital adequacy is negatively related to efficiency (SFA). This result is confirmed by cost to income ratio (the relationship is positive). This finding indicates that banks with higher capital base in the GCC countries are less cost efficient which confirms the common perception that leverage is useful in reducing cost or increasing profits. It is reported in the literature that equity capital is costlier than debt. In the banking perspective it means that a bank which can fund its

assets through deposits and other such borrowings are better manager of cost than a bank which tends to finance by means of equity.

Although size of a bank shows no statistically significant impact on short-term liquidity, it however, shows a positive impact on stability measured through z-score. This result indicates that size of a bank does not matter for short-term solvency because bank which possesses more liquid asset can overcome any short-term adversaries regardless of its size. On the other hand, size matters for long-term stability because large banks have higher capital base and greater strength than a smaller bank. Moreover, larger banks experience less fluctuation in income and therefore, in the long run they are more stable. This result is confirmed by the fact that capital base is positively related to both short-term and long-term solvency.

There is however, a concern that banks from different countries may exhibit different economic and financial environments because of their respective policies. We have applied country dummy to capture the differences across countries in GCC. However, our regression results remain unchanged even after accounting for country differences (results are not shown). Also, the efficiency estimation does not show any significant difference between Islamic and conventional banks during the global financial crisis. Efficiency of both clusters of banks increased gradually over the study period. However, the z-score for conventional banks shows a declining trend during the financial crisis reaching its lowest point in 2008. In contrast, z-score for Islamic banks shows slight increasing trend over the study period which proves that Islamic banks are more resilient to financial crisis than their conventional counterparts.

5. Conclusion

The paper has attempted to examine the differences between Islamic and conventional banks of GCC countries in terms of their operation, level of efficiency, and short as well as long term stability. In so doing, the paper analyzes bank level data from 2005 to 2014 and applies accounting ratio as well as stochastic frontier analysis for determining banks' efficiency. Results thus, obtained are analyze using ordinary least square regression technique. The research shows several crucial findings as far as the banking industry of the GCC countries is concerned. First, the research shows that Islamic banks are functionally different from their conventional counterparts and the difference remains valid even after controlling for bank-specific variables as well as country dummy. Second, conventional banks are more cost efficient than Islamic banks. Moreover, Islamic banks are diverse in terms of cost efficiency whereas conventional banks are mostly homogenous. Third, Islamic banks are more stable in the short-term than conventional banks and no significant difference is found between them as far as the long-term stability is concerned. Fourth, large banks in the GCC countries experience diseconomies of scale but they are more stable. Fifth, banks with large proportion of equity capital are less efficient but more stable in both long and short-term. And finally, Islamic banks are more stable than their conventional counterparts during crisis period.

Based on the findings of this research some policy recommendations can be offered. First, there is a lot of room for Islamic banks to increase their productive efficiency. For doing so, Islamic banks need to identify cost drivers that are responsible for increasing cost of production. One possible way towards this can be an attempt to materialize the benefits from economies of scale. As shown by our analysis, average size of an Islamic bank is almost half of the average size of a conventional bank. Thus, they can strive to increase their investment and financing activities to new customers. While Islamic banking market (domain) has been still protected (or developing) in KSA and Qatar, it has been relatively matured in Kuwait and Bahrain where cut-throat competition between Islamic and conventional banks is pronounced. In Bahrain, there is only one Islamic bank (Al Baraka Bank) among the top five banks whereas there are 11 Islamic banks among the top 20 banks. This implies that the size of Islamic banks is smaller compared to conventional banks which makes it difficult for the former to capture a good market share. Mergers and acquisition among and between small Islamic banks can be a possible strategy to materialize the benefits of scale economies.

In regards to size, the prescription for conventional banks is just the reverse of Islamic banks. Conventional banks are suffering from diseconomies of scale due to their overcapacity. For instance, non-earning assets for conventional banks is 15% of total asset which is 11% for Islamic banks. As a consequence, their earning on asset is significantly less than that of the Islamic banks despite the fact that the conventional banks are more cost efficient than their Islamic counterparts. Thus, downsizing is required for conventional banks. An optimum size should lie above the average size of an Islamic bank but below the average size of a conventional bank. Moreover, banks in the GCC countries can reduce their equity exposure in the capital structure to realize the benefits of leverage. This recommendation is particularly important for conventional banks because their long-term stability is higher than Islamic banks but

profitability is low. Thus, an increase in equity multiplier will have a positive impact on their return on assets. However, an increase in equity multiplier will be associated with higher default risk. But it has to be noted that capital adequacy ratio of banks' in the GCC countries is well above the minimum requirement. According to the statistics provided by [KPMG \(2016\)](#), capital adequacy ratio averaged 18.1 percent in 2015. Oman had the highest level of capital adequacy ratio (20.9%) followed by Bahrain (18.2%), Kuwait and UAE (18.1%) and KSA (17.8%). Even the lowest level of capital adequacy ratio (15.5% in Qatar) in the region is almost double the minimum standard required by Basel III (8%). In addition, a countermeasure for conventional banks to suppress the increased risk that will result from increase in equity multiplier will be to focus on reducing their level of PLL. Since banks' size is negatively related to intermediation ratio, a larger conventional bank can simply reduce its loan exposure from risky sectors. This will help the bank to reduce the level of PLL and materialize the benefits of economies of scale.

Appendix A. List of banks covered in this study

Country		Conventional Banks		Islamic Banks
KSA	1	The national commercial banks	1	Bank Albilad
	2	The Saudi British Bank	2	Bank Al Jazira
	3	Saudi Investment Bank	3	Al Rajhi Bank
	4	Bank Saudi Francis	4	Alinma Bank
	5	Riyad Bank		
	6	Saudi Holland Bank		
	7	Arab National Bank		
UAE	1	National Bank of Abu Dhabi	1	Abu Dhabi Islamic Bank
	2	Abu Dhabi Commercial Bank	2	Sharjah Islami Bank
	3	Arab Bank for Inv and trade	3	Noor Islamic Bank
	4	Bank of Sarjah	4	Emirates Islamic bank
	5	Commercial Bank International	5	Dubai Isalamic bank
	6	Commercial bank of Dubai	6	Ajman Bank
	7	Emirates NBD bank	7	Al Hilal Bank
	8	First Gulf Bank		
	9	Invest Bank P S C		
	10	Mashreq Bank		
	11	The National Bank of R A K P		
	12	Union National bank		
	13	United Arab bank		
	14	Naitonal bank of Fujairah		
	15	National Bank of U A Q		
Kuwait	1	Al Ahli Bank of Kuwait KSC	1	Warba Bank
	2	Burgan Bank	2	Al Ahli United Bank KSC
	3	Commercil Bank of Kuwait	3	Boubyan Bank
	4	Gulf Bank	4	Kuwait Finance Houuse KSC
	5	National Bank of Kuwait	5	Kuwait International Bank
Qatar	1	Qatar National Bank	1	Qatar International Islamaic Bank
	2	Al Ahli Bank	2	Qatar Islamic Bank
	3	Internationa Bank of Qatar	3	Barwa Bank
	4	Al Khaliji Commercial Bank	4	Masraf Al Rayan
	5	Commercial Bank of Qatar		
	6	Doha Bank		
Bahrain	1	Ahli United Bank	1	ABC Islamic Bank
	2	Arab Banking Corporation	2	Bank ALKhair BSC
	3	Gulf International Bank	3	Khaleeji commercila Bank

	4	Bank of Bahrain and Kuwait B.S.C	4	Albaraka islamic Bank
	5	National Bank of Bahrain	5	Kuwait Finance House Bahrain, B S C
	6	BMI Bank	6	Bahrain Islamic Bank
	7	Future Bank	7	Al Salam Bank Bahrain
	8	United Gulf Bank	8	Al Baraka Banking Goup
	9	Alubaf Arab Intl Bank		
Oman	1	Bank Muscat		
	2	Bank Sohar		
	3	National Bank of Oman		
	4	Bank Dhofar		
	5	Oman Arab bank		
	6	HSBC Bank Oman		

Note: One bank each for KSA (Samba Financial Groups), UAE (Dubai Bank), Kuwait (Industrial Bank of Kuwait), and Qatar (Qatar Development Bank), two banks for Oman (Bank Nizwa, and Ahli Bank), and seven banks for Bahrain have been excluded from the study due to unavailability of data or if available, the data are spurious.

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