# ANALYSIS OF THE COMPARATIVE PERFORMANCE OF ISLAMIC AND CONVENTIONAL BANKS: DOES GDP MATTER?

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## ABSTRACT

The aim of this study is two-fold. Firstly, it attempts to examine the comparative performance of 44 Islamic and 44 conventional banks from Asia, Africa, the Middle East, Gulf region, and Europe. This study covers the period from 2005 to 2016. Banks´ performance is proxied by banks´ efficiency scores estimated by the nonparametric Data Envelopment Analysis (DEA). Secondly, the study utilizes the censored Tobit regression approach to examine the effect of banks internal factors on banks performance. Most importantly, this study intends to examine the applicability of the 'finance-lead growth' and 'efficiency channel' hypotheses in the context of the relationship between GDP and banks overall performance over the entire period and pre, crisis, and post-crisis periods. t-Test is also applied to investigate the significance of differences in the results during the entire period and the 3 sub periods. Findings show that both Islamic and conventional banks appear to be relatively technically inefficient. Yet, Islamic banks are found to have less volatile efficiency scores than conventional banks in the pre, crisis, and post-crisis periods. In terms of the regression analysis approach, findings showed that new banks are found to have a lower efficiency performance, increased investment in labor negatively affect banks efficiency performance, banks with a higher level of profitability are more efficient, and higher lending intensity increases banks efficiency performance. The effect of the macroeconomic variable namely GDP on banks efficiency performance and vis-versa was inconclusive at 5% significance level over the entire period, pre and during the crisis of 2008. Accordingly, findings support neither 'finance-lead growth' nor 'efficiency channel' hypotheses. Therefore, it can be argued to some extent that the relationship between GDP and banks´ performance was overemphasized in the existing literature. Surprisingly, the relationship in both directions between the two variables is found negatively significant in the post crisis period. This indicates that the relationship between GDP and banks´ performance is only applicable because of economic shocks. The adverse association between variables can be partially explained by

factors other than banks´ technical efficiency performance such as the governments´ expenditures and banks´ stock prices.

**Keywords:** Islamic Banks, Conventional Banks, DEA, GDP, Regression Analysis

**JEL Classifications:** G21, G01, G29, G39

## 1. INTRODUCTION

Economic sectors provide financial services through the financial institutions (FIs) in organized markets. Financial institutions conduct, on a regular basis, a broad range of financial transactions. Banks are considered one of the major components of a financial system. Overall, the main purpose of bank financial institutions is to mobilize financial resources for use in productive investments (Choudhury, 2011). The role of banks as the primary source of financial services is being gradually increases over time. Basic banking works in a very simple way; conventional banks borrow from depositors and lend to investors against interest. Conventional banks generally use the interest rate modes of finance to perform their operational and financial tasks. By contrast, Islamic banks neither charge nor pay interest. The efficiency performance of the banking financial system and its association with banks internal factors and economic growth has drawn the attention of economists and researchers long time ago. This is particularly because of the crucial role of bank financial institutions in economic life. However, results concerning this issue are mixed. Schumpeter (1912) was among the first to propose the finance-led growth hypothesis or what so called supply-leading hypothesis. This hypothesis assumes that a favorable effect of banking operations positively affects economic growth. By contrast, Robinson (1952) proposed the efficiency channel hypothesis, which assumes that the growth of the economy might accelerate the development in the financial and banking sectors. Another link between financial performance and economic growth was proposed by Patrick (1966). This is referred to as "stage of development" hypothesis. This hypothesis argues that the supply-leading hypothesis holds only in the early stage of development in an economy. As the economy grows, the supply-leading hypothesis fades away and the demand-following hypothesis dominate. Some economists like Lucas (1988) and Dornbusch and Reynoso (1989) argued that the role of financial institutions in economic growth is overemphasized and have no influence on countries´ GDP.

While there is a large number of existing literature investigating the performance of conventional banking systems over recent years, the empirical evidence examining the efficiency performance of Islamic banks and its relationship with countries economy is still at its infancy. Nowadays, Islamic banking is expanding significantly to serve both Muslims and non-Muslims alike in the international financial markets. Islamic banking is the biggest contributor to the total value of

Islamic finance assets. Islamic banking's share of Islamic finance assets was about US$1.854 trillion in 2017. It is expected that Islamic banking sector will grow to reach US$2,825 trillion in 2021. The sector is attracting the non-Muslims who are looking for ethical financial products and services. Given the differential characteristics of Islamic banking, there has been a question about the long-term ability of Islamic banks to emerge as an effective source for financing development in the international financial markets. Efficiency performance is an important tool to show the levels of improvement in banks´ managerial performance to wisely utilize inputs to generate profit and/or to control costs. Accordingly, the efficiency performance of Islamic finance performance considered an important issue that needs more examination.

The concept of Islamic banking was discussed rarely and extremely from a religion point of view (e.g, Jobst (2007); Errico and Sundararajan (2002); Samad and Hassan, (1999). Moreover, limitations of existing empirical studies are; they commonly used the financial ratios as a proxy of performance, which expressed the performance and achievement in monetary terms; they primarily considered in Muslim majority countries. It is therefore uncertain as to whether the existing studies' findings about the banks performance are also applicable when applying nonparametric measures to examine banks ''efficiency'' performance.

Moreover, the global economic meltdown of 2008 has triggered financial failures of many international conventional banks. Islamic banks appeared to be immune to the global financial crisis (Abduh & Chowdhury, 2012; Alamer et al., 2015). By contrast, Kassim, (2016) showed that both Islamic and conventional banks had been largely affected by the global crisis. The mixed results of existing studies thus remain inconclusive and needs further investigation.

This study contributes to the literature by answering the following questions; 1) Do Islamic banks have better efficiency performance of Islamic versus conventional banks? 2) Is there any association between banks´ efficiency performance and economic growth proxied by GDP? 3) Can Islamic banks be the optimal substitute for conventional banks in the international financial markets outside Muslim majority countries? 6) What are the banks internal control factors that are contributing to the banks´ efficiency performance?

The results arise from this study could offer valuable implications for investors and portfolio managers who want to reflect a positive attitude toward religious values in their market investments. Moreover, information about the impact of Islamic banks on countries economic growth affects the priority that advisors attach to reforming financial sector policies.

The remainder of this paper is organized as follows. Section 2 provides a literature review with reference to the relationship between Islamic banking development and economic growth. The

data and the underlying methodology are given in Section 3, while Section 4 reports and discusses the empirical findings. Section 5 then concludes the paper.

## 2. LITERATURE REVIEW

There were some empirical attempts to analysis the performance of Islamic finance using the most widely used financial ratios (e.g., Metwally, (1997); Samad and Hassan (1999); Rosly and Bakar (2003); Samad (2004); Kader and Asarpota (2007); Čihák and Hesse (2008); Moin (2013); and most recently Khan et al, (2017)).

Empirical researches on the efficiency performance for Islamic banks are still few in Muslim majority countries and very rare in Europe. This is because of the lack of sufficient and accurate data and the short global presence of Islamic banks. However, the literature on Islamic finance has obviously grown recently with the bulk of the academic work discussed theoretically the regulatory and supervisory challenges related to Islamic banking (e.g. Khan and Shah, 2015).

Modern empirical studies have sought to estimate Islamic bank performance outside their traditional borders using various data envelope analysis (DEA) frontier functions and econometric techniques. Abdul Rahman and Rosman (2013) estimated the efficiency of 63 Islamic banks along the period of (2006–2009) in Middle East and North Africa (MENA) region and Asian countries. Results showed that Islamic banks from Asian countries outperformed Islamic banks from MENA countries in terms of efficiency performance. Said et al., (2013) examined the cost efficiency of Islamic versus conventional banks in Malaysia for the period (2006-2009). Islamic banks are found to be technically efficient mainly due scale (size) of operation. Results showed that capitalization and bank sizes were significantly positively associated to efficiency while loan quality is found to be significantly negatively associated to efficiency. Allocative efficiency is found to be the main contributor for Islamic banks cost efficiency. Johnes et al, (2014) investigated the efficiency performance of conventional and Islamic banks in golf country region (GCC) over the period from 2004 to 2007. Findings showed that conventional banks appeared to be more cost efficient but less profit efficient than Islamic banks. While the DEA provided evidence that the average pure technical and overall technical of conventional banks is shown to be significantly higher as compared to Islamic banks. Yilmaz et al., (2015) used the (DEA) approach in order to measure the comparative technical performance of 4 Islamic banks and 28 conventional banks in Turkey over the period of 2007-2013. The results indicated that during all years of study, Islamic banks were found to be more technically efficient than conventional banks. As compared to conventional banks, scale inefficiency dominated the pure technical inefficiency in determining the technical efficiency of Islamic banks.

Bukhari et al, (2015) employed (DEA) to examine the efficiency performance for both Islamic and conventional banks in the GCC over the period from 2006 to 2012. Results showed that the efficiency performance of both Islamic and conventional banks efficiency are the same in Saudi Arabia (KSA), Kuwait and Qatar. While conventional banks are found to be more efficient than Islamic banks in Bahrain and Emirates. Most recently, Romdhane & Alhakimi, (2018) used the Malmquist index (MPI) to analyze the efficiency and productivity of 36 Islamic banks in 15 countries over the period from 2003 to 2011. Findings show that banks productivity fluctuated over time and varied from region to another. Banks from the Gulf region are found the most efficient. Eventually, Islamic banks technical efficiency was the main driver of improving banks productivity.

In spite of the favorable views on the effect of Islam and Islamic financial operations on economy, these views unfortunately have not received a serious empirical analysis for a long time. It is, however, only recently those researchers have started to empirically examine the Islamic finance-economic growth relationship.

Several economists (e.g. Abduh & Chowdhury, 2012; Alamer et al., 2015) argued that the Islamic financial system significantly contributes to the health of the economy. They also revealed that Islamic financial system is better compared to the conventional system particularly during the global financial crisis. Furqani and Mulyany (2009) employed the Cointegration test and Vector Error Model (VECM) to investigate the interactions between total Islamic bank financing and economic rates of growth in Malaysia over the period of (1997–2005). Findings showed that it appears to be a bi-directional causality between both variables in the long run. Barjas et al., (2010) found a smaller effect of Islamic banking on economy in oil producing countries as compared to the non-oil countries. Goaied and Sassi (2011) revealed an insignificant association between banking sector performance and economic growth. Abduh and Chowdhury (2012) found that Islamic banks financing in Bangladesh has a significant positive effect on economic growth. Abduh and Omar (2012) found a significant association between Islamic finance development and economic growth in Indonesia. Farahani and Hossein (2012) found a bi-directional relation between both variables in Indonesia and Iran. Hassanudin et al., (2013) found also a strong bi-directional causality between Islamic banks and GDP in Bahrain. Similarly, Farahani and Dastan (2013) showed that Islamic financing is significantly positively correlated with economic growth in short /long run in Malaysia, Indonesia, Bahrain, UAE, KSA, Egypt, Kuwait, Qatar and Yemen. Tabash and Dhankar (2014) suggested that the long-term development of Islamic financing is positively associated with economic growth in the short term in Qatar. Hakim and Akther (2016) supported the Growth-Islamic finance led hypothesis in Malaysia. Most recently, Ali and Azmi (2017) examined the impact of the Islamic banking development on economic growth. The sample consists of 21 Organisation of Islamic

Cooperation (OIC) member countries and includes both Islamic and traditional banks for the time period from 2007 to 2013. Findings reveal that Islamic banking is found to a significant impact on economic growth.

This study is intended to fill the research gap and to examine the association between banks´ performance on the one hand and both economic growth and banks specific factors on the other hand.

## 3. DATA AND EMPIRICAL METHODOLOGY

### 3.1 Data

As the number of Islamic banks worldwide is still relatively few, in this research, the analysis covers all "fully fledged" Islamic commercial banks with complete data for the whole period of analysis. The study is based mainly on panel data for 44 Islamic banks and 44 conventional banks from Asia, Africa, the Middle East, Gulf region, and Europe. The list of banks is from 20 countries namely; United Arab Emirates (UAE), Qatar, Bahrain, KSA, Egypt, Malaysia, Thailand, Turkey, Singapore, Jordan, Palestine, Bangladesh, Pakistan, Sudan, Yemen, Syria, Gambia, Iran, U.K, and Bosnia to analyze the link between efficiency performance of Islamic financial sector and countries economic growth[1].

Data are *collected from the Bankscope database. In some cases where the necessary banking data were not available on BankScope, the researcher refers to banks' annual financial reports.* Furthermore, in order to collect the percentage changes in the countries' GDP the researcher uses the World Bank Database.

### 3.2 Empirical Methodology

The primary goal of this study is to examine the relationship between banks performance and economic growth. As a first step, the study starts with calculating banks performance metrics for both Islamic and conventional banks. This study utilizes efficiency scores as a proxy of banks´ performance because the most common and popular performance measure of financial ratios has some limitations. Among others, the number of financial indicators is big and the therefore make interpretation of results more difficult. Moreover, they are limited in considering different financial aspects of banks. This study applies the non-parametric approach of DEA to examine the banks efficiency performance over the sample period from 2005 to 2016.

### 3.2.1 DEA Analysis

A bank efficiency could be best described as the performance of a bank given its minimum resources (inputs) and the highest possible results (outputs) relative to other banks (Violeta &

Gordana, 2017). There is no consensus in the literature as which of the two approaches of DEA and SFA is better as each one of the two approaches has its own pros and cons. Iqbal and Molyneux (2005) argued that the parametric measures need assumptions about the form of cost and/or profit function. On the other hand, the non-parametric approaches do not require such specification of the functional form.

DEA is the best non-parametric approach to estimate efficiency performance of banks (Svitalkova, 2014). DEA shows how a particular bank technically operates in a relative base to other best practice banks operating in the same tested sample. Based on DEA estimates a bank is considered efficient if no other bank produces the same amount or more outputs given a certain level of inputs, or uses less inputs given the output level of production. DEA does not need a large number of observations thus works

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[1]list of banks and data are available upon request

properly with small bank samples. DEA helps to determine the causes of inefficiency, which are not apparent from financial analysis (Cooper et al., 2007). DEA provides stability of measured efficiency over time (Huang and Wang, 2002). Consequently, the researcher adopts the DEA approach in order to measure the efficiency performance of Islamic versus conventional banks over the period from 2005 to 2016.

### 3.2.1.1 The Empirical Models for DEA Approach

The DEA model estimates banks´ technical efficiency under both the Constant-Returns-to-Scale (CRS) and the Variable-Returns-to-Scale (VRS). The CRS explains the process of production where the output increases or decreases simultaneously by the same proportion as inputs are changed. The CRS is used commonly when DMUs are optimal in their scale level of operations. By contrast, VRS applied when an increase in inputs *does not* cause a change in the outputs. However, Factors like for example imperfect competition and constraints on finance are likely to make banks not to be able to operate in an optimal level (Coelli et al. 2005). Accordingly, this study compares Islamic banks to benchmarks mainstream banks using DEA approach under the assumption of VRS (Cooper et al., 2007).

DEA approach is applied based on the intermediation output- oriented model because it fits better with the equity-like nature of Islamic banks (Yudistira, 2004). To illustrate the applications of DEA, this study follows the model suggested by (Coelli, 1996) thus; the researcher estimates the following empirical fractional model of DEA:

$$\theta_{it} = \sum_{i=1}^{m} v_{i1} T_{iLO} + v_2 N_{iIO} / \sum_{j=1}^{n} w_{j1} DS_{jFI} + w_{j2} O_{jEI} + w_{j3} P_{jEI}, \tag{1}$$

$$\text{for } i = 1, \dots, m \text{ and } j = 1, \dots, n$$

For a particular Islamic and conventional bank, the efficiency performance ($\theta_{it}$)is the sum of the ratio of the banks outputs to the sum of the ratio of the banks inputs. Where $w_{j1}$ is the weight of the quantity of the first input produced (i.e. total deposits and short term funding, ($DS_{jFI}$) for each bank (b). $w_{j2}$ represents the weight of the quantity produced from the second input, the other operating expenses ($O_{jEI}$) for each bank (b). While $w_{j3}$ is the weight of the quantity produced from ($P_{iEI}$), the third input namely the personal expenses for each bank (b). In the second part of the equation, $v_{i1}$ represents the weight of the quantity produced from the output ($T_{iLO}$), the banks total loans. Whereas $v_{i2}$ is the weight of the quantity produced from the second output ($N_{iIO}$), namely banks net income. $\theta_{it}$ is maximized to guarantee non-negative weights as follow:

$$\theta_{it} = \sum_{i=1}^{m} v_{i1} T_{iLO} + v_{i2} N_{iIO} / \sum_{j=1}^{n} w_{j1} DS_{jFI} + w_{j2} O_{jEI} + w_{j3} P_{iEI}, \dots \tag{2}$$

$$\leq 1, \text{for } r = 1, \dots, N \text{ and } u_i \text{ and } v_j \geq 0$$

The first empirical equation ensures that the efficiency ratios are at most one and the second empirical equation guarantees that inputs and outputs have positive weights. A DMU is considered efficient if it has a score of 100 percent. The DMU may be termed weakly efficient if it is found to be efficient with some slacks, overuse of inputs or under production of outputs (Berger & Humphrey, 1997).

### 3.2.1.2 *Testing the Measurement Model of the Regression Approach*

The researcher needs before applying the regression approach to evaluate the reliability and validity of the measurement model to make sure that all the assumptions of regression analysis are satisfied. Reliability refers to the stability of findings, whereas validity refers to the truthfulness of findings (Altheide & Johnson, 1994).

The validity of the tests depends in part on the extent to which the regression model assumptions are met. Among the assumptions of the regression model; normality, linearity, non-collinearity,

and heteroscedasticity after regression which occurs when the error variance has non-constant variance (Carroll & Ruppert, 1988). The Shapiro-Wilk W test is used to examine the normality assumption. The variance inflation factor (VIF) is used to test for multi-collinearity. While to test for heteroscedasticity, the researcher use Breusch-Pagan test. If non-normality is dedicated then lognormal regression model can be effectively utilized (Amemiya, 1973).

### 3.2.1.3 Internal and External Determinants of Bank's Performance

This study examines the relationship between banks efficiency performance resulting from DEA and countries economic growth. Reviewing literature shows that most of the previous works used the different econometrical measures in order to achieve this goal. Regression analysis is one of the most useful statistical methods. It is reliable to use in order to determine whether certain variables affect the banks efficiency scores.

Before proceeding with the regression analysis, the researcher first uses the unified US ($) in the analysis to adjust the differences among countries. Moreover, the researcher deflates variables in the model by the Consumer Price Index (CPI) for each country to account for macroeconomic differences. Furthermore, the researcher performs the second-stage of DEA method to account for variables other than inputs and outputs (Coelli et al., 2005). After solving for DEA, the efficiency scores will be then regressed upon set of external variables, particularly the percentage change in the GDP per capita, as a proxy of the countries' economic growth.

Two main types of regression models are applied in economic researches, the Tobit regression model and the Ordinary Least Squares (OLS). The use of a particular type depends upon the nature of data. Literature provides opposing arguments with respect to the use of OLS and Tobit in the DEA-based analysis. Hoff (2007) advocate using Tobit regression when the dependent variable is continuous, non-negative, and has a constrained rage. The advocators of using Tobit in DEA argue that efficiency measures range between 0 and an upper limit of 1, and therefore is a censored variable, it is thus appropriate to use a censored (Tobit) regression model to explore factors correlated with inefficiency. By contrast, McDonald (2009) argued that Tobit estimation is inappropriate in the DEA approach while the OLS is a consistent estimator because researchers have to deal with biases caused by inefficiency.

The basic model for Tobit regression is similar to that for OLS. Nevertheless, the most commonly used model in previous studies is the Tobit model because it can handle the distribution effects on (in)efficiency measures and therefore provide results that can used by policy makers to improve performance (Batir et al. 2017). To investigate the determinants banks´ efficiency, the Tobit statistical model proposed by James Tobin (1958) (known also as censored regression model) is employed in this study. The standard Tobit model can be defined as follows:

$$y_{i*} = \beta' x_i + \varepsilon_i, \; y_i = y_{i*} \; if \; y_{i*} \geq 0 \; and \; y_i = 0, otherwise \tag{3}$$

Where εi ∼ N (0, σ2)3, xi and β are vectors of explanatory variables and unknown parameters, respectively. The yi∗ is a latent variable and yi is the DEA score. The likelihood function (L) is maximized to solve β and σ based on all observations (banks) of $yi$ and xi is:

$$L = \prod_{y_i=0}(1 - F_i) \; \prod_{y_i>0} \frac{1}{(2\prod\sigma^2)^{1/2}} \; X \; e^{-[1/(2\sigma^2)](y_i-\beta x_i)^2} \tag{4}$$

$$F_i = \int_{-\infty}^{\beta x_i} \frac{1}{(2\Pi)^{1/2}} \; e^{-t^2/2} \; dt \tag{5}$$

The first product is over the observations for which the banks are 100% efficient (y = 0) and the second product is over the observations for which banks are inefficient (y >0). Fi is the distribution function of the standard normal evaluated at β′xi/σ. Using the efficiency scores as the dependent variable, we estimate the following regression model # 1:

$$\theta_{jit} = \varphi + \delta_1 GDP_{jit} + \delta_2 SU_{jit} + \delta_3 TyB_{jit} + \delta_4 Log(A)_{jit} + \delta_5 TD_{jit} + \delta_6 LnI_{jit} + \delta_7 Age_{jit} \tag{6}$$
$$+ \delta_8 Bpf_{jit} + \delta_9 FLv_{jit} + \delta_{10} Reg_{jit} + \delta_{11} BLQ_{jit} + \omega$$

Where the subscript "$j''$ refers to a bank, ''$i''$ refers to a country, while the subscript "$t$" refers to a sample year. The dependent variable "$\theta_{jit}$" represents the bank's efficiency performance. The mean variable that is considered important to be analyzed in the DEA second stage as an independent variable is the country's economic growth proxied by the percentage change in the countries' GDP per capita. However, the researcher uses also 10 control variables that are related to the dependent variable ($\theta_{jit}$) to remove their effects from the equation namely; 1) Personal expenses ($SU_{jit}$) as a proxy of skills utilization measured by total amount of wages and salaries to total assets. 2) $TyB_{jit}$ represents the type of the bank dummy factor, where 0 illustrates that the bank is Islamic while 1 describes conventional banks. 3) Banks' size is proxied by the logarithm of total assets. 4) Banks' customers deposits ($TD_{jit}$) as a proxy of banks' market share, 5) The proxy of lending intensity ($LnI_{jit}$) which is equal to net loans to total asset. 6) Age as a dummy variable where coded zero (old) if the bank $j$ was established before the 21st century (January 1, 2001), and 1 otherwise (Skinner, 2017). 7) Banks' profitability ($Bpf_{jit}$) measured by ROA. 8) Financial leverage (FLv) = total liabilities/equity. 9) The region as a dummy variable where, 0 if the bank is located in Muslim majority countries,1 otherwise. Eventually, 10) the banks liquidity

($BLQ_{jit}$) measured by the ratio of liquid assets to total deposits and short term funding. Eventually, $\omega_i$ is the error term.

Moreover, the researcher intends to measure the effect of banks´ efficiency performance and banks´ internal factors on countries´ economic growth in order to explore if there is any effect of both banks´ performance and banks´ specific factors on countries' economic growth. In this model, economic growth measure set as a dependent variable while the banks´ efficiency performance ($\theta_{jit}$) and banks internal factors are set as independent variables. The new regression model No. 2 is stated as:

$$GDP_{jit} = \varphi + \delta_1\theta_{jit} + \delta_2 SU_{jit} + \delta_3 TyB_{jit} + \delta_4 Log(A)_{jit} + \delta_5 TD_{jit} + \delta_6 LnI_{jit} + \delta_7 Age_{jit} \qquad (7)$$

$$+ \delta_8 Bpf_{jit} + \delta_9 FLv_{jit} + \delta_{10} Reg_{jit} + \delta_{11} BLQ_{jit} + \omega$$

This study intends also to examine the effect of the most recent financial crisis of 2008 on banks´ performance, economic growth, and the association between both variables. To achieve this goal, the researcher replicate regression model no. 1 and regression model no. 2 for the three sub periods namely, pre-crisis from 2005 to 2007, during crisis from 2008 to 2010, and eventually the post-crisis period from 2011 to 2013.

### *3.2.1.4 Two-Sample t-Test for Equal Means*

In this research, the researcher regresses the dependent variable against the independent variables for the full period of 2005-2016. The researcher also separately regresses the variables for each sub period; pre-crisis (2005-2007), during crisis (2008-2010), and only three years post crisis from 2011 to 2013 to avoid having biased results due to the longer post crisis period. However, results regarding differences in the performance of banks obtained from analyzing separate periods are arbitrary. Accordingly, to measure the significance of the differences of banks performance pre, during, and post financial crisis of 2008, the two-sample T-Test for equal means is used to determine if the two population means are equal. The null hypothesis of $H_0$: $\mu_1 = \mu_2$ states that the variances for the two samples are equal. If $p \leq .05$, then difference is significant, null is incorrect and thus "reject the null".

## 4. EMPIRICAL FINDINGS

### *4.1 Banks efficiency scores over the period from 2005 to 2016*

In the DEA second stage, the regression analysis is applied to examine the possible effect of banks´ internal factors and macroeconomic factors on banks´ performance. This study intends to use the variable return to scale (VRS) efficiency scores as a dependent variable in the regression

model. This model is called the BCC model (Banker, Charnes, Cooper) and it is used to measure so called pure technical efficiency and are considered  "more" realistic because they take into account the existence of imperfect competition (Chen et al, 2009 ; Stefko et al, 2018).

Table 1 illustrates the efficiency performance scores of Islamic banks relative to counterpart's conventional banks. Under the assumption of variable return to scale (VRS), the findings appear to indicate that the average VRS scores for all Islamic banks over the sample period from 2005 to 2016 is 96.7%, which is relatively higher than the average scores of 95.1% recorded by the counterparty's banks. Accordingly, it seems that Islamic banks´ management is relatively better and highly efficient than conventional banks in choosing the best combination of inputs and outputs in their practical operations. Results so far indicates that Islamic banks can on average be efficient as conventional banks. Therefore, possess the ability to successfully compete with conventional banks. Moreover, results show that Islamic banks operating in some Muslim countries outperform conventional banks while some Islamic banks from Europe ranked ahead of some Islamic banks from Muslim majority countries. However, the argument of the impact of banks´ efficiency performance on economic growth and vice-versa is still inclusive and arbitrary and needs further empirical analysis. To achieve the goal of this study, the researcher utilizes the censored regression model of Tobit.

### Table 1: Average banks efficiency scores for the period 2005-2016

| Country | IS.* | VRSTE | CO. | VRSTE | Country | IS.* | VRSTE | CO. | VRSTE |
|---|---|---|---|---|---|---|---|---|---|
| UAE | 1 | 0.931 | 1 | 0.952 | | | | | |
| | 2 | 0.943 | 2 | 0.952 | Gambia | 25 | 1.000 | 25 | 1.000 |
| | 3 | 0.961 | 3 | 0.952 | Pakistan | 26 | 0.987 | 26 | 1.000 |
| | 4 | 0.967 | 4 | 0.952 | | 27 | 0.938 | 27 | 1.000 |
| Qatar | 5 | 0.976 | 5 | 0.896 | | 28 | 0.952 | 28 | 1.000 |
| | 6 | 0.983 | 6 | 0.871 | Bangladesh | 29 | 0.938 | 29 | 1.000 |
| Bahrain | 7 | 1.000 | 7 | 1.000 | Malaysia | 30 | 0.940 | 30 | 1.000 |
| | 8 | 0.979 | 8 | 0.938 | | 31 | 0.941 | 31 | 1.000 |
| K.S.A | 9 | 0.987 | 9 | 0.924 | | 32 | 0.951 | 32 | 1.000 |
| | 10 | 0.993 | 10 | 0.947 | | 33 | 0.955 | 33 | 1.000 |
| | 11 | 0.998 | 11 | 0.862 | | 34 | 0.960 | 34 | 1.000 |
| Jordan | 12 | 1.000 | 12 | 0.864 | | 35 | 0.964 | 35 | 1.000 |
| | 13 | 0.962 | 13 | 0.857 | Thailand | 36 | 0.983 | 36 | 1.000 |
| | 14 | 0.976 | 14 | 0.852 | Singapore | 37 | 0.871 | 37 | 1.000 |
| Palestine | 15 | 0.984 | 15 | 0.860 | Turkey | 38 | 0.967 | 38 | 1.000 |
| Syria | 16 | 0.985 | 16 | 0.862 | | 39 | 0.940 | 39 | 1.000 |
| | 17 | 0.983 | 17 | 1.000 | | 40 | 0.937 | 40 | 1.000 |
| Yemen | 18 | 0.981 | 18 | 1.000 | | 41 | 0.938 | 41 | 0.800 |
| Egypt | 19 | 0.982 | 19 | 0.938 | U.K. | 42 | 0.937 | 42 | 0.800 |
| Sudan | 20 | 0.983 | 20 | 0.944 | Bosnia | 43 | 0.938 | 43 | 1.000 |
| | 21 | 0.989 | 21 | 0.950 | Iran | 44 | 0.938 | 44 | 1.000 |

| | | | |
|---|---|---|---|
| 22 | **0.997** | 22 | **0.964** |
| 23 | **1.000** | 23 | **0.948** |
| 24 | **1.000** | 24 | **0.969** |
| **Average Islamic** | **96.7%** | | |
| **Average Conventional** | **95.1%** | | |

*\*List of banks is available upon request. Is represents Islamic banks; Co. represents conventional banks. Note: The size scale of operations for Islamic banks and conventional banks based on the constant return to scale are 91.7% and 95.6%, respectively and show a decreasing return to scale (drs). This indicates that both banks suffer also from the inappropriate size of banking operations. Therefore, banks´ inefficiency can be increased by shrinking down banking operations.*

### 4.2 Examining the relationship between banks´ performance and economic growth

In the second stage of analysis, the researcher aims at examining the internal (control) and external (economic) factors that could affect the efficiency performance of Islamic and conventional banks. In this stage of analysis, the researcher applies two models of the censored regression model of Tobit. In the first model, banks´ efficiency scores are set as dependent variable input (y-factor) while the growth rates on GDP and banks´ internal factors alike are set as independent variables in order to test the applicability of the "growth-led finance hypothesis'' on the context of banking system. Moreover, to examine the ''finance lead hypothesis'', a second regression model is tested where GDP is set as the dependent variable and banks´ efficiency scores are set the banks´ independent variables along with banks´ specific internal factors. Eventually, the Granger causality test is utilized as a statistical measure to test for determining whether GDP (banks´ performance) is useful in forecasting banks performance (GDP). This is primarily to examine the cause and effect relationship or what is known as the stage of development hypothesis.

As a preliminary analysis in the regression model, the researcher needs to check the following assumptions: normality, linearity, multi-collinearity, and homogeneity of the data. We used Shapiro Wilk (W) Test for normality. Results show that the p-values obtained in the test are less than 0.05; therefore, the researcher rejects the null hypothesis and accepts the alternative hypothesis that states there is normality. In terms of linearity, there was an indication of linearity between DI and IVs. The Variance Inflation Factor is used to test for Multi-collinearity, findings indicate that all the VIF values and the mean VIF (1.37) of the model are less than 10 thus it can be concluded that there is no multi-collinearity in the data. Most importantly, the Breusch Pagan test is used to test for the presence of heteroscedasticity. The p-value is 0.000 which is less than 0.05, therefore; the researcher does not reject the null hypothesis which states the equality of variance hence there is no heteroscedasticity. Eventually, the regression models are free of serial correlation problems[2].

This section intends to present the findings obtained from the regression analysis to answer the main questions where a statistical link is to be made between the results of analysis and the main hypotheses of this study.

### 4.2.1 Testing Tobit Regression Model No. 1

### 4.2.1.1 The Efficiency Channel (Demand Following) Hypothesis.

Tobit regression was used to assess the relationship between the banks' performance and the macroeconomic factor proxied by annual growth in GDP. It was utilized to test the following hypothesis; **$H_1$:** Countries' economic growth significantly and positively affects Islamic and conventional banks' performance during the entire period of study.

The results of the Tobit regression are illustrated in Table 2. The results show that the value where the right censoring started was 1 which is the upper limit while the value that showed the left censoring was 0.85 as the lower limit. The results show that the coefficient for GDP growth is not statistically significant because the p-value of the model is 0.761 which is greater than the alpha of 0.05. Therefore, the researcher failed to reject the null hypothesis thus concludes that the countries´ economic growth has no effect on the overall banks efficiency performance during the entire period from 2005 to 2016. Findings lead to reject **$H_1$** and are consists with Naceur and Ghazouani (2007) and Goaied and Sassi (2011). The findings are not supported by Ayadi, Arbak, Naceur, and De Groen (2015) who indicated that if there is economic growth as determined by the stock market sizes, investments, and liquidity, the efficiency performance of banks is expected.

**Table 2: Results of the Tobit regression analysis for the entire crisis period: Model #1**

| Performance | Coef. | Std. Err. | T | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| GDP growth Bahrain* | 0.000 | 0.000 | 0.300 | 0.761 | -0.001 | 0.001 |
| Bangladesh | 0.043 | 0.013 | 3.240 | 0.001 | 0.017 | 0.069 |
| Bosnia | 0.034 | 0.012 | 2.710 | 0.007 | 0.009 | 0.058 |
| Egypt | -0.004 | 0.011 | -0.390 | 0.699 | -0.027 | 0.018 |
| Gambia | 0.326 | .00 | .00 | .00 | .00 | .00 |
| Iran | 0.015 | 0.012 | 1.250 | 0.211 | -0.008 | 0.038 |

| | Coef | SE | | p-value | CI | |
|---|---|---|---|---|---|---|
| Jordan | 0.041 | 0.011 | 3.860 | 0.000 | 0.020 | 0.061 |
| K.S.A. | -0.053 | 0.008 | -6.810 | 0.000 | -0.069 | -0.038 |
| Malaysia | 0.045 | 0.008 | 5.510 | 0.000 | 0.029 | 0.060 |
| Pakistan | 0.071 | 0.011 | 6.730 | 0.000 | 0.051 | 0.092 |
| Palestine | -0.047 | 0.011 | -4.210 | 0.000 | -0.069 | -0.025 |
| Qatar | -0.011 | 0.010 | -1.130 | 0.258 | -0.030 | 0.008 |
| Singapore | 0.005 | 0.012 | 0.410 | 0.685 | -0.019 | 0.029 |
| Sudan | 0.018 | 0.009 | 2.050 | 0.041 | 0.001 | 0.036 |
| Syria | 0.077 | 0.011 | 6.870 | 0.000 | 0.055 | 0.099 |
| Thailand | 0.013 | 0.032 | 0.420 | 0.678 | -0.050 | 0.076 |
| Turkey | -0.031 | 0.008 | -3.810 | 0.000 | -0.046 | -0.015 |
| U.K. | -0.125 | 0.032 | -3.870 | 0.000 | -0.188 | -0.061 |
| UAE | -0.022 | 0.008 | -2.780 | 0.006 | -0.038 | -0.006 |
| Yemen | 0.082 | 0.014 | 5.790 | 0.000 | 0.054 | 0.110 |
| 1.Non-Islamic region bank size small | 0.059 | 0.031 | 1.920 | 0.055 | -0.001 | 0.120 |
| Medium | 0.010 | 0.006 | 1.570 | 0.118 | -0.002 | 0.022 |
| Large dummy age old banks | -0.004 | 0.008 | -0.480 | 0.633 | -0.019 | 0.012 |
| 1. new banks | -0.045 | 0.004 | -10.230 | 0.000 | -0.054 | -0.036 |
| Market Share | 0.001 | 0.002 | 0.580 | 0.561 | -0.003 | 0.006 |
| Profitability | 0.001 | 0.001 | 2.010 | 0.045 | 0.000 | 0.002 |
| Skills Utilization | -0.002 | 0.000 | -4.900 | 0.000 | -0.002 | -0.001 |
| Lending Intensity | 0.000 | 0.000 | -2.500 | 0.013 | 0.000 | 0.000 |
| Leverage | 0.000 | 0.000 | -0.810 | 0.416 | 0.000 | 0.000 |
| Liquidity | 0.000 | 0.000 | 0.700 | 0.486 | 0.000 | 0.000 |
| _cons | 0.965 | 0.010 | 92.150 | 0.000 | 0.944 | 0.985 |
| /sigma | 0.043 | 0.001 | | | 0.041 | 0.045 |

*Note:*

*Missing values for Bahrain and bank size small is because in the regressions they are used as a basis level for comparisons. For instance, Bahrain is used as a basis level to explain the coefficients of other countries i.e Bangladesh country coefficients of 0.043 is significant because of the p-value that is 0.001 which is less than 0.05. Therefore, Bahrain is used as a comparison in that the researcher can say that the predicted value of efficiency performance for Bangladesh is 0.043 points higher as compared to Bahrain. On the other hand, Gambia has missing values because on the tobit regressions the researcher set the upper limit to be 1 and the lower limit to be 0.85 for the efficiency performance. This seems to be an issue for Gambia because all its value of efficiency performance equal exactly the upper limit of 1, so it does not fall in the tobit censoring limit. Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

An analysis was also done to establish if the difference between the banks' performance and economic growth for the three sub-periods, pre (2005-2007), crisis (2008-2010), and post-crisis (2011-2013), was significant. The following hypothesis was tested. $H_2$: There is a significant positive effect of economic growth on banks' performance pre, during, and post financial crisis of 2008.

The results for the pre-crisis period are presented in Table 3. The result shows that the coefficient for GDP growth is not statistically significant because the p-value of the model is 0.874 which is greater than the alpha of 0.05. Therefore, the researcher can

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[2] Original STATA outputs are available upon request.

conclude that the effect of economic growth on banks efficiency performance in the pre-crisis period was inconclusive (insignificant) at 5%. This indicates obviously that annual growth percentage on countries' GDP is not a significant driver of Islamic and conventional banks performance alike and that other factors like for example political stability could play an important role in the economic growth.

**Table 3: Results of the Tobit regression for the pre-crisis period**

| Efficiency | Coef. | S.E. | T | P>t | [95%CI | ] |
|---|---|---|---|---|---|---|
| GDP growth | 0.000 | 0.001 | 0.160 | 0.874 | -0.002 | 0.002 |
| Constant | 0.971 | 0.009 | 103.150 | 0.000 | 0.952 | 0.989 |
| Sigma | 0.064 | 0.005 | | | 0.054 | 0.073 |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

The results for the Tobit regression for the during the crisis period are presented in Table 4. The results show that the coefficient for GDP growth is not statistically significant because the p-value of the model is 0.109 which is greater than the alpha of 0.05. Therefore, the researcher can conclude that there was no significant the relationship between banks' performance and economic growth during the financial crisis.

**Table 4: Results of the Tobit regression during the crisis period**

| Efficiency | Coef. | Std. Err. | T | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| GDP growth | 0.001 | 0.001 | 1.610 | 0.109 | 0.000 | 0.003 |
| _cons | 0.967 | 0.006 | 175.710 | 0.000 | 0.956 | 0.978 |
| /sigma | 0.064 | 0.005 | | | 0.055 | 0.073 |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

The results for the Tobit regression for the post crisis period are presented in Table 5. The results surprisingly indicate that the coefficient for GDP growth is statistically significant because the p-value of the model is 0.000 which is less than the alpha of 0.05. Therefore, the researcher can conclude that there is a significant effect of economic growth on Islamic and conventional banks' performance in the post-financial crisis period. The coefficient for GDP growth was negative indicating the presence of adverse effect of economic growth on all banks´ efficiency performance. Results suggested that while the progress in the banking industry post the crisis period had its challenges and was vulnerable, the GDP annual growth showed a gradual positive trend and recovery. In theory, governments´ expenditure have major impacts on economic. During and post the crisis of 2008, the financial crisis had generated a decrease in government revenues and an increase in government expenditures in terms of GDP. Large and stable government expenditures had resulted in slight and gradual improvement in the economy. Empirical researches suggest that the larger government consumption the less developed will be the banking system due to the observable increase on the price of banks´ products which could in turn shrink the demand for deposits, negatively affect banks´ ability to procure funds for operations, and led definitely to a loss of investor confidence (Yong Tan & Christos Floros 2012); Petkovski and Kjosevski, 2014). Findings suggest that the policy makers should make arrangements to augment banking sector in and outside Muslim majority countries regardless of the level of development of the economy. Findings are consistence with Samargandi et al. (2014).

**Table 5: Results of the Tobit regression for the post-crisis period**

| Efficiency | Coef. | S. E. | T | P>t | [95%CI | ] |
|---|---|---|---|---|---|---|
| GDP growth | -0.004 | 0.001 | -3.850 | 0.000 | -0.006 | -0.002 |
| _cons | 0.986 | 0.006 | 155.880 | 0.000 | 0.974 | 0.999 |
| /sigma | 0.062 | 0.004 | | | 0.054 | 0.071 |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

Table 2 above shows also the results of examining if there is a relationship between the banks' performance and the economic growth across countries and regions. Bahrain has been used as a basis level for comparison with other countries[3]. The results indicated that most of the country coefficients are statistically significant because the p-values are less than the alpha of 0.05. The countries that show statistical significance effect include Bangladesh, Bosnia, Jordan, KSA, Malaysia, Pakistan, Palestine, Sudan, Syria, Turkey, UK, UAE and Yemen. Therefore, the researcher can conclude that there is a significant difference in the relationship between banks' performance and economic growth across the countries. This indicates that in those countries economic growth plays an important role in the development of the banking sector. In KSA, Palestine, Turkey, UK, UAE, economic scenario negatively and significantly affect the banks efficiency performance. While in the rest of countries, economic growth positively and significantly affects banks efficiency performance. Some strong economic countries were affected negatively because they are already developed so the economic GDP is stagnant. Researcher still however needs to test the hypothesis for the regions thus results partially support the hypothesis that; **H₃**: There is a significant difference in the effect of economic growth on banks' performance across countries and regions. The study that aligns with these findings was by Claessens and Horen (2014) that indicates an increase in the bank efficiency with an increase in a country's economy.

In terms of the differences in the relationship between banks performance and economic growth across regions, the results from table 4.2 above show that the coefficient is not statistically significant because the p-value of chi-square of the model is 0.055 which is greater than the alpha of 0.05. The Islamic region has been used as a basis level in the regression to compare with the non-Islamic region. The predicted value of efficiency performance of other regions (Non-Muslim countries) is 0.031 points lower compared to Islamic regions. Therefore, the researcher can conclude that there is a significant difference in the relationship between banks' performance and economic growth across the regions. Results suggest thus far that the effect of economic growth on banks efficiency performance is ''on average'' higher and statistically positively (or) negatively significant in Muslim majority countries over the entire sample period. The findings by Samargandi, Fidrmuc, and Ghosh (2015) support this study because it indicates that across

countries there is an inverted relationship between economic growth and financial development which is stimulated by efficiency performance. The study results confirm again hypothesis (**H₃**).

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[3]Any country can be used but Stata selects randomly mostly the country with the least values in this case it selected starting with the country with the first alphabetic order.

### *4.2.1.2 Examining the effect of banks-specific factors on banks´ efficiency performance*

Table 2 illustrates also the results obtained from examining the effect of banks specific factors on banks efficiency performance. The researcher tested the relationship between banks' size and banks' efficiency performance. The results show that the coefficients of

the bank sizes are not statistically significant because the p-values are greater than the alpha of 0.05. The bank sizes were classified into three categories; small ranges from the logarithm of the total assets from 0 to 2, medium size total assets range from 2 to 3, and large banks range from 3 to 4. The predicted value of efficiency performance is 0.010 points lower in medium banks as compared to small banks and -0.004 lower in large banks compared to small banks. Therefore, the researcher can conclude that there is no significant difference in the relationship between banks' sizes and the banks' efficiency performance. Thus, the size of the bank as an internal factor cannot contribute to the strength and direction of the relationship between economic growth and banks' performance. Results apply for both Islamic and conventional banks. Findings support the result revealed by Isik and Hassan (2002) who stated that asset size was found not highly related to technical efficiencies performance of banks.These findings disagree with the findings by Hadriche (2015) that state that large banks are more resourceful compared to small banks. The results fail to reject the null hypothesis and thus not confirm the hypothesis that; H₄: There is a significant positive relationship between banks' size and banks' efficiency performance.

The researcher also tested if there is a relationship between the banks' age and banks' efficiency performance. The results show that the coefficient of the banks' age is statistically significant because the p-value is 0.00 which is less than the alpha of 0.05. The old banks are those that were formed before the 21st century. The old banks that are represented by 0 which is used as a basis level or a comparison group to describe the new banks represented by 1. The predicted value of efficiency performance is 0.045 points lower for new banks compared to old banks. Therefore, new banks were found to have a lower efficiency performance. This may be due to the fact that new banks suffer from the risk of their loans, and also face the challenge that depositors will demand premium if they are to invest in their operations ( Gorton and Winton, 1998). The results align with the findings by Gorton & Winton (2016) stating that old banks are

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more efficient than new banks because they have acquired more assets over time. The following hypothesis is thus accepted; **H₅**: There is a significant positive relationship between banks' age and banks' efficiency performance.

The relationship between banks' market share and banks' efficiency performance was also tested as illustrated in Table 2. The results show that the coefficient for market share is not statistically significant because the p-value of the model is 0.561 which is more than the alpha of 0.05. Therefore, the researcher can conclude that there is no significant difference in the relationship between the banks' performance and market share. Thus, the market share of the bank as an internal factor cannot contribute to the strength and direction of the relationship between economic growth and banks' performance. The results do not support the findings by Jan & Marimuthu (2015) who indicate there is a significant relationship on performance indicators of banks like liquidity, profitability and economic growth. The results reject the alternative hypothesis that; H₆: There is a significant positive relationship between banks' market share and banks' efficiency performance.

Moreover, tests were conducted in order to establish if there is significant positive relationship between banks' financial performance (proxied by profitability) and banks' efficiency performance. The results show that the coefficient for profitability is statistically significant because the p-value of the model is 0.045 which is greater smaller than the alpha of 0.05. As such, the following alternative hypothesis is not rejected; H₇: There is a significant positive relationship between banks' financial performance (proxied by profitability) and banks' efficiency performance. Results indicates that Islamic and conventional banks with higher profitability are found significantly more technically efficient. Therefore, banks profitability is one of the drivers of banks efficiency performance. The findings are aligned with the study by Jan and Marimuthu (2015) that indicated that there is a significant relationship on performance indicators of banks like liquidity, profitability and economic growth. Thus, the profitability of the bank as an internal factor does contribute to the strength and direction of the relationship between economic growth and banks' performance. Alternatively, the study by Khediri, Charfeddine, and Youssef (2015) indicated that the profitability of the bank cannot be used to measure and differentiate the relationship between banks.

The relationship between banks' skills utilization and banks' efficiency performance was also tested. The results indicated that the coefficient for banks' skill utilization is statistically significant and negative because the p-value of the model is 0.000 which is less than the alpha of 0.05. Therefore, the researcher can conclude that skill utilization of the bank as an internal factor can contribute to the strength and direction of the relationship between economic growth and banks' performance. Because the coefficient is negative (-0.002) the researcher rejects the

hypothesis that; $H_8$: There is a significant positive relationship between banks' skills utilization and banks' efficiency performance. The study results contradicts with the assertion made by Frank and Obloj (2014) that the human capital on any firm, especially retail banking systems offers a productive effect to the firm. The logical explanation of the negative effect of skills utilization (expanding personal expenses on employees) and banks performances is that the increased investment in labor goes for poorly structured trainings for employees who lack appropriate skills and are not capable properly to perform tasks in an efficient manner. It also may suggest that banks prefer employees over technology thus, have higher costs (Schmitt, 2013; Athar et al. 2015).

An analysis was also done to establish whether there exists a positive between banks' lending intensity and banks' efficiency performance. The findings indicated that the coefficient for banks' lending intensity is statistically significant because the p-value of the model is 0.013 which is less than the alpha of 0.05. Therefore, the researcher can conclude that there is a significant positive effect of all banks´ lending intensity levels and banks´ efficiency performance demonstrated by the coefficient (0.000). Thus, the lending intensity of the bank as an internal factor can contribute to the strength and direction of the relationship between economic growth and banks' performance. The findings confirm the hypothesis that; $H_9$: There is a significant positive relationship between banks' lending intensity and banks' efficiency performance. Banks´ with higher lending intensity are found significantly more efficient. This support the idea that banks' ability to offer more loans results from their efficient operations primarily due to their ability to perform more efficiently with lower cost (Sufian and Zulkhibiri, 2007; Garcia-Escribano and han, 2015). However, results contradict those of Fahlenbrach et al. (2017) who stated that fast growing banks make worse loans than the loans offered by other banks. The higher the value of lending intensity, the lower cash available is and higher chance to liquidity crunch. Islamic banks fall within this group of banks thus their lending intensity negatively affected their performance over the sample period. However, adverse economic shocks on the other hand decrease the quality of the loans offered by conventional banks, which in turn adversely affected their performance, especially during and post crisis periods

The researcher also examined the relationship between banks' debt ratio (financial leverage) and banks' efficiency performance. The results established that the coefficient for the banks' debt ratio represented by leverage is not statistically significant because the p-value is 0.416 which is greater than the alpha of 0.05. Therefore, the researcher can conclude that there is no significant difference in the relationship between banks' performance and its leverage. Thus, the leverage of the bank as an internal factor does not contribute to the strength and direction of the relationship between economic growth and banks' performance. The study results reject the alternative hypothesis that; **$H_{10}$**: There is a significant positive relationship between banks' debt ratio

(financial leverage) and banks' efficiency performance. The results align with the findings by Sorwar, Pappas, Pereira, and Nurullah (2016) that the debt ratio of both types of banks, Islamic and conventional banks, put them at risk in the market.

Eventually, analysis was also done to establish if there is a positive relationship between banks' liquidity ratio and banks' efficiency performance. The results indicate that the coefficient for liquidity is statistically not significant because the p-value of the model is 0.486 which is greater than the alpha of 0.05. Therefore, the researcher concluded that the liquidity of the bank as an internal factor cannot contribute to the strength and direction of the relationship between economic growth and banks' performance. The results reject the hypothesis that; $H_{11}$: There is a significant positive relationship between banks' liquidity ratio and banks' efficiency performance. The findings contradict the assertion made by Waemustafa and Sukri (2016) that the liquidity of a bank can determine the direction of the bank in the assets, liability, and management of risk; any banking crisis can be detected from volatility of the risk of liquidity.

### 4.2.1.3 Testing Tobit regression Model no. 2: The Finance-led Growth Hypothesis

A linear regression was utilized to establish if Islamic banks' performance significantly and positively affect countries' economic growth as compared to conventional banks. The results of the regression are indicated in Table 6.

**Table 6: Results of the Tobit regression analysis for the entire crisis period: Model # 2 for Islamic banks**

| GDP growth | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| Efficiency Performance | 1.432 | 21.143 | 0.070 | 0.946 | -40.111 | 42.976 |
| 1.Dummy Age | 0.314 | 0.679 | 0.460 | 0.644 | -1.020 | 1.649 |
| 1.Dummy Region | -2.941 | 1.887 | -1.560 | 0.120 | -6.648 | 0.766 |
| Leverage | 0.004 | 0.019 | 0.190 | 0.851 | -0.034 | 0.041 |
| Profitability | 0.076 | 0.062 | 1.220 | 0.223 | -0.046 | 0.197 |
| Lending Intensity | 0.005 | 0.009 | 0.570 | 0.568 | -0.013 | 0.024 |
| Market Share | -0.570 | 0.276 | -2.070 | 0.039 | -1.113 | -0.028 |
| Skills Utilization | 0.024 | 0.036 | 0.660 | 0.512 | -0.047 | 0.095 |
| Liquidity Bahrain | -0.013 | 0.007 | -1.830 | 0.068 | -0.026 | 0.001 |
| Bangladesh | 2.296 | 2.014 | 1.140 | 0.255 | -1.662 | 6.253 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Bosnia | -1.587 | 1.869 | -0.850 | 0.396 | -5.259 | 2.085 |
| Egypt | -0.022 | 1.587 | -0.010 | 0.989 | -3.140 | 3.095 |
| Gambia | -1.450 | 1.573 | -0.920 | 0.357 | -4.541 | 1.641 |
| Iran | -1.286 | 1.936 | -0.660 | 0.507 | -5.089 | 2.517 |
| Jordan | 0.401 | 1.189 | 0.340 | 0.736 | -1.936 | 2.737 |
| K.S.A. | -0.257 | 1.278 | -0.200 | 0.841 | -2.768 | 2.254 |
| Malaysia | 0.197 | 1.298 | 0.150 | 0.879 | -2.353 | 2.747 |
| Pakistan | -0.888 | 1.533 | -0.580 | 0.563 | -3.899 | 2.123 |
| Palestine | -2.175 | 1.534 | -1.420 | 0.157 | -5.190 | 0.840 |
| Qatar | 6.882 | 1.335 | 5.150 | 0.000 | 4.259 | 9.505 |
| Singapore | 0.316 | 2.837 | 0.110 | 0.911 | -5.258 | 5.889 |
| Sudan | 0.807 | 1.159 | 0.700 | 0.487 | -1.470 | 3.084 |
| Syria | -8.785 | 1.438 | -6.110 | 0.000 | -11.610 | -5.959 |
| Thailand | 2.163 | 2.072 | 1.040 | 0.297 | -1.908 | 6.235 |
| Turkey | 1.013 | 1.450 | 0.700 | 0.485 | -1.836 | 3.862 |
| U.K. | 0.000 | .032 | -3.87 | 0.00 | 0.054 | .110 |
| UAE | -0.291 | 1.386 | -0.210 | 0.834 | -3.014 | 2.432 |
| Yemen | -5.330 | 1.786 | -2.980 | 0.003 | -8.839 | -1.822 |
| Bank size small | | | | | | |
| Medium | 1.282 | 0.734 | 1.750 | 0.081 | -0.160 | 2.724 |
| Large | 1.798 | 1.002 | 1.790 | 0.073 | -0.171 | 3.766 |
| _cons | 3.896 | 21.003 | 0.190 | 0.853 | -37.372 | 45.164 |

*Coef=Coefficient, SE=Standard error, Conf.=Confidence Interval*

The results shows that the efficiency performance of the Islamic banks does not affect significantly the annual GDP growth of the economy because of the p-value 0.946 which is greater than an alpha of 0.05. Therefore, the researcher concludes that the effect of the overall efficiency performance of Islamic banks on countries' economic growth was not significant over the entire sample period from 2005 to 2016. The findings of this study support results found by Goaied and Sassi (2011) but are not supported by Rabaa and Younes (2016) who showed that Islamic banks have better performances on economic growth. However, the efficiency performance stimulates the economic growth of some countries namely Qatar, Syria and Yemen. This is demonstrated by the p-values of the countries that are less than alpha of 0.05 as shown in the table; Qatar (0.000), Syria (0.000) and Yemen (0.003). Because only some (not all) banks´ performance affect some countries´ GDP, results therefore leads to reject the hypothesis that; **H$_{14}$:** Islamic banks' performance significantly and positively affects countries' economic growth as compared to conventional banks (finance-led growth hypothesis). The effect of Islamic banks internal factors (all factors) on GDP was found also inclusive at alpha of 0.05. Therefore, results

reject **H₁₃:** There is a significant positive relationship between all banks' internal factors and economic growth in the context of Islamic banking.

Table 7 below shows that efficiency performance of the conventional banks which does not affect significantly the annual GDP growth of the economy because the p-value of 0.916 is greater than an alpha of 0.05. However, the efficiency performance stimulates the economic growth of some countries namely Palestine, Sudan and UAE. This is demonstrated by the p-values of the countries that are less than alpha of 0.05 as shown in the table; Palestine (0.000), Sudan (0.000) and UAE (0.000). Therefore, the researcher concludes that the efficiency performance of conventional banks does not stimulate the majority of countries' economic growth, too. This result leads the researcher also to a rejection to **H₁₂** in the context of conventional banking. Results are supported by Iwedi and Igbanibo (2015). In terms of the effect of conventional banks internal factors on GDP, findings show mixed results. The empirical results reveal that skills utilization plays a

### Table 7: Results of the Tobit regression analysis for the entire crisis period: Model # 2 for conventional banks

| GDP growth | Coef. | S.E. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| Performance | 0.678 | 6.402 | 0.110 | 0.916 | -11.901 | 13.257 |
| 1.Dummy Region | 1.745 | 2.201 | 0.790 | 0.428 | -2.579 | 6.069 |
| Leverage | 0.047 | 0.028 | 1.660 | 0.098 | -0.009 | 0.103 |
| Profitability | 0.180 | 0.100 | 1.800 | 0.073 | -0.017 | 0.377 |
| Lending Intensity | 0.027 | 0.012 | 2.250 | 0.025 | 0.003 | 0.050 |
| Market Share | 0.121 | 0.335 | 0.360 | 0.719 | -0.537 | 0.779 |
| Skills Utilization | 0.522 | 0.154 | 3.380 | 0.001 | 0.219 | 0.825 |
| Liquidity | -0.011 | 0.006 | -1.870 | 0.062 | -0.023 | 0.001 |
| Bahrain | | | | | | |
| Bangladesh | 1.195 | 1.801 | 0.660 | 0.507 | -2.343 | 4.732 |
| Bosnia | -1.550 | 1.689 | -0.920 | 0.359 | -4.868 | 1.769 |
| Egypt | 0.015 | 1.622 | 0.010 | 0.993 | -3.172 | 3.201 |
| Gambia | -1.937 | 1.725 | -1.120 | 0.262 | -5.325 | 1.452 |
| Iran | -2.240 | 1.705 | -1.310 | 0.189 | -5.589 | 1.109 |
| Jordan | -0.348 | 1.115 | -0.310 | 0.755 | -2.539 | 1.843 |
| K.S.A. | 0.337 | 1.124 | 0.300 | 0.764 | -1.870 | 2.545 |
| Malaysia | -0.588 | 1.355 | -0.430 | 0.664 | -3.251 | 2.074 |
| Pakistan | -2.703 | 1.662 | -1.630 | 0.105 | -5.968 | 0.562 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Palestine | 6.808 | 1.300 | 5.240 | 0.000 | 4.255 | 9.361 |
| Qatar | 0.616 | 1.715 | 0.360 | 0.720 | -2.753 | 3.985 |
| Singapore | -0.103 | 1.382 | -0.070 | 0.941 | -2.819 | 2.613 |
| Sudan | -8.582 | 1.473 | -5.830 | 0.000 | -11.476 | -5.688 |
| Syria | -3.242 | 2.625 | -1.240 | 0.217 | -8.399 | 1.915 |
| Thailand | 0.998 | 1.071 | 0.930 | 0.352 | -1.106 | 3.101 |
| Turkey | -4.903 | 2.648 | -1.850 | 0.065 | -10.105 | 0.299 |
| U.K. | -0.445 | 1.118 | -0.400 | 0.690 | -2.641 | 1.750 |
| UAE | -7.178 | 1.834 | -3.910 | 0.000 | -10.782 | -3.574 |
| Yemen | | | | | | |
| Bank size small | | | | | | |
| Medium | 0.019 | 0.852 | 0.020 | 0.983 | -1.656 | 1.693 |
| Large | 1.004 | 1.066 | 0.940 | 0.347 | -1.091 | 3.098 |
| _cons | 2.027 | 6.089 | 0.330 | 0.739 | -9.937 | 13.991 |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

significant positive role in GDP growth (Ali et al. 2017) and also lending intensity for conventional banks drives the percentage growth on GDP (Garcia-Escribano and han, 2015). While banks´ liquidity adversely and significantly affected GDP growth because high liquid banks due to higher uncertainty are unable to provide loans for all customers, which in turn generates less returns to banks and less chance for investors to get money to start business in the market, representing thus an opportunity cost for developing the economy (Oseph et al. 2018; Tonzer et al. 2015). Findings lead to reject $H_{15}$ for conventional banks as not all banks´ specific factors positively and significantly affect GDP. Linear regression was employed to establish if there is a significant difference in the relationship between banks' performance and economic growth across countries. The results of the regression are indicated in Table 6 and 7. The results depict that the efficiency performance of some banks significantly affects the annual GDP growth of the economy across countries with coefficients of the p-value which are less than an alpha of 0.05. The countries include Palestine, Sudan and UAE for conventional banks and Qatar, Syria and Yemen for Islamic banks. Therefore, the researcher concludes that the efficiency performance stimulates the economic growth across those countries. Eventually, linear regression was also used to determine if there is a significant difference in the relationship between banks' performance and economic growth across regions. Table 4.6 and 4.7 above show that efficiency performance of the banks does not affect significantly the annual GDP growth of the economy across the Islamic and other regions because of the p-value 0.12 for Islamic banks and 0.428 for conventional banks which are greater than an alpha of 0.05. Therefore, the researcher concludes that the efficiency performance does not stimulate the economic growth

across both regions. The results reject ($H_3$) $H_5$ regarding the difference on the relationship between variables in different regions.

**Table 8: Pre-crisis effect of banks efficiency performance on economic growth**

| GDP growth | Coef. | S.E. | T | P>t | [95%CI | ] |
|---|---|---|---|---|---|---|
| Efficiency | 2.220 | 5.043 | 0.440 | 0.660 | -7.711 | 12.151 |
| _cons | 4.814 | 4.838 | 1.000 | 0.321 | -4.714 | 14.341 |
| number of observations | 256 | | | | | |
| F(1, 254) | 0.19 | | | | | |
| Prob>F | 0.6602 | | | | | |
| R-squared | 0.0008 | | | | | |
| Adj R-squared | -0.0032 | | | | | |
| Root MSE | 3.7501 | | | | | |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

### 4.2.3 The effect of banks performance on economic growth: Time window analysis

Analysis was also done to determine if there is difference in the relationship between both Islamic and conventional and economic growth across countries and regions for the period before the crisis (between 2005 and 2007), during the crisis (2008-2010), and post crisis (2011-2013).Table 8 shows the results for the pre-crisis period. The results indicate that the efficiency performance of the banks did not significantly affect the annual GDP growth of the economy at the pre-financial crisis because the p-value 0.660 which is greater than an alpha of 0.05. The R-squared value is 0.0008 which means that the efficiency performance explains 0.08% of the variability of the GDP growth of the economy. Therefore, the researcher concludes that the efficiency performance did not stimulate the economic growth during the pre-financial crisis.

The results of the linear regression of the relationship between efficiency performance and economic growth during the financial crisis are depicted in Table 9. The results indicate that the efficiency performance of the banks does not affect significantly the annual GDP growth of the economy during the financial crisis because the p-value 0.149 which is greater than an alpha of 0.05. The R- squared value is 0.0079 which means that the efficiency performance explains 0.79% of the variability of the GDP growth of the economy. Therefore, the researcher concludes that the efficiency performance does not stimulate the economic growth across during the financial crisis.

**Table 9: During financial crisis effect of banks efficiency performance on economic growth**

| GDP growth | Coef. | S. E. | T | P>t | [95%CI | ] |
|---|---|---|---|---|---|---|
| Efficiency | 9.036 | 6.238 | 1.450 | 0.149 | -3.247 | 21.319 |
| _cons | -4.997 | 5.982 | -0.840 | 0.404 | -16.777 | 6.782 |
| number of observations | 264 | | | | | |
| F(1, 254) | 2.1 | | | | | |
| Prob>F | 0.1487 | | | | | |
| R-squared | 0.0079 | | | | | |
| Adj R-squared | 0.0042 | | | | | |
| Root MSE | 4.7151 | | | | | |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

The results of the linear regression of the relationship between efficiency performance and economic growth for the post-crisis are depicted in Table 10. The results depict that the efficiency performance of the banks significantly affects the annual GDP growth of the economy across countries because of the p-value 0.003 which is less than an alpha of 0.05. The R-squared value is 0.0336 which means that the efficiency performance explains 3.36% of the variability of the GDP growth of the economy. The Coefficient of 23.544 is negative. Therefore, the researcher concludes that the banks´ efficiency performance significantly negatively affects the economic growth across countries in the post-financial crisis. This could be due to some other factors that are not directly related to banks efficiency performance. For example, the negative relationship could be partially explained by the fact that some banks with good financial results in terms of their efficiency performance (inputs and outputs) suffer low stock prices due to their improper announcements, which negatively affects GDP. This is because low prices for technically efficient banks forced them to cut costs and workers because existing debt becomes more onerous. This have a negative effect on GDP (Hall, 2018).

**Table 10: Post –crisis effect of banks efficiency performance on economic growth**

| GDP growth | Coef. | S.E. | T | P>t | [95%CI | ] |
|---|---|---|---|---|---|---|
| Efficiency | -23.544 | 7.800 | -3.020 | 0.003 | -38.902 | -8.186 |
| _cons | 25.655 | 7.480 | 3.430 | 0.001 | 10.926 | 40.384 |
| number of observations | 264 | | | | | |
| F(1, 254) | 9.11 | | | | | |
| Prob>F | 0.0028 | | | | | |
| R-squared | 0.0336 | | | | | |

| Adj R-squared | 0.0299 |
| Root MSE | 5.8956 |

*Coef=Coefficient, SE=Standard error, CI=Confidence Interval*

### 4.2.4 Significance of differences in the effect of banks performance on economic growth: t-test approach

A two-sample t-test is used to determine the significance of the results mentioned earlier in this paper regarding the effect of both Islamic and conventional banks´ efficiency performance on the GDP growth of the economy for the three periods, pre-crisis, during the crisis, and post-crisis. The test for equality of means provides a basis for examining the efficiency performance effect on economic growth of the two types of banks namely; Islamic and conventional banks. The most suitable test was the t-test for equality of means for the efficiency performance based on two groups which are the types of banks (Amry, 2014). The type of banks is represented by the variable dummy type whereby 0 symbolizes Islamic banks and 1 represents conventional banks. The computations have been categorized into the number of observations, the means, standard errors, standard deviations, and the confidence interval at 95% significance level for each type of bank. The efficiency performance is the independent variable and has an effect on the dependent variable economic GDP growth.

Table 11 illustrates the results of the t-test of the difference of means of the efficiency performance and the GDP growth of the economy for the two types of banks. The t-statistic of Islamic banks (-17.573) is greater than that of conventional banks (-18.517) leading to a conclusion that the effect of performance of the banks on economic GDP of the country is greater in Islamic banks compared to conventional banks. The p-value obtained is 0.00 which is less than an alpha of 0.05 which proves that there is a significant difference in the effect of Islamic banks performance on economic growth during the pre-crisis as compared to the effect on conventional banks.

The researcher can conclude with 95% confidence that the effect of the efficiency performance of the Islamic banks on economic growth is obviously higher than that of conventional banks (despite statistically insignificant as shown on table 4.8). The results are consistent with the findings by Miah and Uddin (2017) that Islamic banks are more efficient than conventional banks. In addition, other scholars are confident that there is a fast growth and development in the Islamic banks compared to the conventional banks because the former dominate in nations in which the Muslims' population is dominant and predominant (Pradiknas & Fathurohman, 2015).

**Table 11: Results of the sample tests for the pre-crisis period**

| Performance effect on GDP | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. | Interval] | t-statistic |
|---|---|---|---|---|---|---|---|
| Islamic | 124 | -5.987 | 0.341 | 3.794 | -6.662 | -5.313 | -17.573 |
| Conventional | 132 | -5.978 | 0.323 | 3.709 | -6.617 | -5.339 | -18.517 |

mean(diff) = mean(Efficiency – GDP growth)

Ho: mean(diff) = 0

Pr(|T| > |t|) = 0.0000

*Obs=observation, SE= standard error SD= standard deviation, CI= confidence interval*

Table 12 illustrates the results of the *t*-test of the difference of means of the efficiency performance and the GDP growth of the economy for the two types of banks. The *t*-statistic of Islamic banks (-6.414) is greater than that of conventional banks (-6.709) leading to a conclusion that the effect of performance on economic GDP of the country is greater in Islamic banks compared to conventional banks. The p-value obtained is 0.00 which is less than an alpha of 0.05. This indicated that there is a significant difference in the effect of Islamic banks performance on economic growth during the crisis as compared to the effect of conventional banks. The findings agree with Meslier, Risfandy & Tarazi, (2017) who indicated that Islamic banks are more competitive than conventional banks therefore, the more deposit rates they have the more efficient they become and have an impact on economic growth of the country.

**Table 12: Results of the ample *t*-tests during the crisis period**

| Performance effect on GDP | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. | Interval] | t-statistic |
|---|---|---|---|---|---|---|---|
| Islamic | 132 | -2.662 | 0.415 | 4.768 | -3.483 | -1.841 | -6.414 |
| Conventional | 132 | -2.739 | 0.408 | 4.691 | -3.547 | -1.932 | -6.709 |

mean(diff) = mean(Efficiency – GDP growth)

Ho: mean(diff) = 0

Pr(|T| > |t|) = 0.0000

*Obs=observation, SE= standard error SD= standard deviation, CI= confidence interval*

Table 13 illustrates the results of the *t*-test of the difference of means of the efficiency performance and the GDP growth of the economy for the two types of banks. The t-statistic of Islamic banks (-4.100) is greater than that of conventional banks (-4.109) leading to a conclusion that the effect of performance on economic GDP of the country is greater in Islamic banks compared to conventional banks. The p-value obtained is 0.00 which is less than an alpha of 0.05 which proves that there is a significant difference in the effect of Islamic banks performance on economic growth during the post crisis as compared to the effect of conventional banks. The findings agree with Meslier, Risfandy, and Tarazi, (2017) who indicated that Islamic banks are more competitive than conventional banks therefore, the more deposit rates they have the more efficient they become and have an impact on economic growth of the country.

**Table 13: Results of the sample *t*-tests for the post-crisis period**

| Performance effect on GDP | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. | Interval] | t-statistic |
|---|---|---|---|---|---|---|---|
| Islamic | 132 | -2.144 | 0.523 | 6.007 | -3.178 | -1.110 | -4.100 |
| Conventional | 132 | -2.143 | 0.523 | 6.005 | -3.177 | -1.109 | -4.101 |

mean(diff) = mean (Efficiency GDP growth)

Ho: mean(diff) = 0

Pr(|T| > |t|) = 0.0000

*Obs=observation, SE= standard error SD= standard deviation, CI= confidence interval*

## 5. CONCLUSIONS

This study examines first the comparative efficiency performance of 88 Islamic and conventional banks from UAE, Qatar, Bahrain, K.S.A, Egypt, Malaysia, Thailand, Turkey, Singapore, Jordan, Palestine, Bangladesh, Pakistan, Sudan, Yemen, Syria, Gambia, Iran, U.K, and Bosnia. The study covers the period from 2005 to 2016. Data Envelopment Analysis (DEA) is used to calculate banks efficiency scores. Also, the study utilizes the censored Tobit regression approach to examine the association between banks internal factors and the annual percentage growth on GDP on banks´ performance over the entire period and in the periods pre, crisis, and post crisis of 2008. *t*-Test is further applied to investigate the significance of differences in the results during the entire period and the three sub periods.

Findings show that all banks´ average efficiency scores was almost smaller than 1 throughout the entire period from 2005 to 2016. Inefficiencies are driven by both the inappropriate size of

banks´ operations and the poor management practices. Accordingly, Islamic and conventional exhibited a decreasing return to scale thus, can improve efficiency by shrinking down banking activities. Yet, Islamic banks seem to have on average a significant better efficiency performance than conventional banks during the entire period, pre-crisis, crisis, and post-crisis periods. They are better than conventional banks in employing banks´ inputs (total deposits and short-term funding, other operating expenses, and personal or administrative expenses) to generate higher quantity of outputs (net income and total loans). Islamic banks have also lower volatility on their efficiency scores and have a proper room for improvement by using fewer resources than they employed or by controlling costs to sustain a competitive substantial advantage in the financial markets.

In terms of the regression analysis, analyzing the effect of banks specific factors revealed mixed results. Banks' age, banks' profitability, and banks' lending intensity showed a significant positive effect on banks performance. On the contrary, banks' expenses on employees are found to have a significant negative effect on banks performance. However, banks' market share, banks' size, banks financial leverage, and banks' liquidity were found to have insignificant effect on banks performance.

However, the overall effect of macroeconomic variable of GDP on Islamic and conventional banks´ efficiency performance was inconclusive at 5% significance level in the entire period, pre and during the crisis period. Examining the opposite direction of the relationship between the two factors reveals also that banks´ efficiency performance does not stimulate the majority of countries' economic growth in the entire period, pre and during the crisis. Accordingly, findings support neither 'finance-led growth' nor 'efficiency channel' hypotheses. Results are consistent with the view that the relationship between both variables is overemphasized (Lucas, 1988; Dornbusch and Reynoso, 1989; Ongore and Kusa, 2013; Simiyu 2015; and Dinson 2017).

Surprisingly, the relationship between the two variables in both directions is found negative and significant in the post crisis period. The effect of the efficiency performance of the Islamic banks on economic growth was obviously higher than that of conventional banks. Similarly, the effect of economic growth on banks´ efficiency performance was ''on average'' higher and statistically significant on Islamic banks´ performance and in some Muslim majority countries as compared to conventional banks and non-Muslim countries. The significant relationship between the variables in the post crisis period indicate that the relationship between GDP and banks´ performance is only applicable because of economic shocks. The adverse association between variables can be partially explained by factors other than banks´ technical efficiency performance such as the governments´ expenditures and banks´ stock prices. That is say; the financial crisis had generated an increase in government expenditures in terms of GDP resulting in slight

improvement in the economy. This action increases the price of banks´ products, which in turn shrink the demand for deposits and negatively affect banks´ ability to procure funds for operations. Moreover, banks´ performance also significantly negatively affects the economic growth across countries in the post-financial crisis. This could be due to other factors other than banks efficiency performance. For example, efficient banks with low stock prices negatively affect effect countries GDP. Results thus far applied for both Islamic and conventional banks for the same sample period.

Results thus far suggest that a new business model for the international banking system based on sharai´ah law transactions should be in practice. Countries and the financial institutions alike should encourage Islamic business activities to induce economy and link financial expansion to the growth of the economy.

### 5.1 Suggestions for future research

This study examines the significance effect of both percentage annual growth of GDP and banks specific factors on banks performance. The study also examined the proposed effect of bank´ performance on countries´ economic growth utilizing the regression analysis approach. To further examine differences in Islamic and conventional banks´ impact on economy and vice-versa, the researcher could utilize the Granger causality approach to examine the direction of causality between banks´ performance and the growth rates in economy. This will yield some additional insights and would be a completely new paper.

### REFERENCES

Abduh, M., & Chowdhury, N.T. (2012). Does Islamic banking matter for economic growth in Bangladesh? Journal of Islamic Economics, Banking and Finance, 8(3), 104-113.

Abduh, M., & Omar, M. (2012). Islamic banking and economic growth: the Indonesian experience. International Journal of Islamic and Middle Eastern Finance and Management, 5(1), 35-47.

Abdul Rahman, A. R., & Rosman, R. (2013). Efficiency of Islamic Banks: A Comparative Analysis of MENA and Asian Countries. Journal of Economic Cooperation & Development, 34(1), 63-92.

Afiatun, P. and Wiryono, S.K. (2010). Efficiency and productivity of Indonesian Islamic banking. Journal Manajemen Teknologi, 9 (3), 264-278.

Alamer, A.R.A., Salamon, H.B., Qureshi, M.I., & Rasli, A.M. (2015). CSR's measuring corporate social responsibility practice in Islamic banking. A review. International Journal of Economics and Financial Issues, 5(1S), 198-206.

Ali M., Azmi W. (2017). Impact of Islamic Banking on Economic Growth and Volatility: Evidence from the OIC Member Countries. In: Alam N., Rizvi S. (eds) Islamic Banking. Palgrave CIBFR Studies in Islamic Finance. Palgrave Macmillan, Cham

Ali, M., Egbetokun, A., and Memon, M. H. (2017). Human Capital, Social Capabilities and Economic Growth, economies, MDBI This paper is an extended version of our paper published in 30th Annual General Meeting, Pakistan Institute of Development Economics, Islamabad, Pakistan and Working paper no. 2016-013 in Jena Economic Research Papers, University of Jena, Jena, Germany

Altheide, D. L., & Johnson, J. M. (1994). Criteria for Assessing Interpretive Validity in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.). Handbook of Qualitative Research, pp. 485-499. Thousand Oaks, CA: SAGE.

Amemiya, T. (1973). Regression analysyis when the dependent variable is truncated normal. Econometrica, 41, 997 – 1016.

Amry, A. B. (2014). The impact ofwhatsapp mobile social learning on the achievement and attitudes of female students compared with face to face learning in the classroom. European Scientific Journal, ESJ, 10(22), 116-136.Retrieved from: http://eujournal.org/index.php/esj/article/view/3909

Ayadi, R., Arbak, E., Naceur, S. B., & De Groen, W. P. (2015). Financial development, bank efficiency, and economic growth across the Mediterranean. In Economic and Social Development of the Southern and Eastern Mediterranean Countries (pp. 219-233). Springer, Cham.

Barajas, A., Chami, R. and Yousefi, S.R. (2010), "The finance-growth nexus re-examine: are there cross – region differences?", IMF working paper, Austin, TX.

Batir, T.E., ,Volkman, D. A., & Gungor, B. (2017). Determinants of bank efficiency in Turkey: Participation banks versus conventional banks. Borsa Istanbul Review, 17(2), 86-96

Berger, A.N., & D.B. Humphrey. (1997). Efficiency of Financial Institutions: International Survey and Directions for Future Research. European Journal of Operational Research, 175-212.

Bukhari M. S. S., & Harrathi N. (2015). Bank Efficiency Analysis: Islamic Banks versus Conventional Banks in the Gulf Cooperation Council Countries 2006 – 2012. International Journal of Financial Research, 6(4), 143-150.

Carroll, R. & Ruppert, D. (1988), Transformation and Weighting in Regression, Chapter 4, Taylor & Francis.

Casu, B., Girardone, C. (2009). Testing the Relationship between Competition and Efficiency in Banking: A Panel Data Analysis, Economics Letters, 105, 134-137.

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Chen Y, Cook WD, Li N, Zhu J. (2009). Additive efficiency decomposition in two-stage DEA. Eur J Oper Res, 196: 1170-1176.

Choudhury, M. A. (2011). Islamic Economics and Finance: An Epistemological Inquiry, 1st ed. Emerlad Group Publishing.

Čihák, M., & Hesse, H. (2008). Islamic Banks and Financial Stability:An Empirical Analysis. IMF Working Paper No. 08/16. Washington: International Monetary Fund.

Claessens, Stijn, and Neeltje Van Horen. (2014) "Foreign Banks: Trends and Impact," Journal of Money, Credit and Banking 46(S1), 295–326.

Coelli, T. (1996). A Guide to FRONTIER Version 4.1: A Computer Program for Stochastic Frontier Production and Cost Function Estimation. CEPA Working Paper 96/08, http://www.uq.edu.au/economics/cepa/frontier.php , University of New England

Coelli, T.J., Rao, D.S.P., O'Donnell, C.J., Battese, G.E. (2005). An Introduction to Efficiency and Productivity Analysis. Spring (2nd ed), 349.

Cooper, W.W., Seiford, L.M., & Tone, K. (2007). Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software. Second Edition, Springer, New York.

Dornbusch, R., Reynoso, A. (1989), Financial Factors in Economic Development. American Economic Review, 79, 2, pp. 204-209

Errico, L. & Sundararajan, V. (2002). Islamic Financial Institutions and Products in the Global Financial System: Key Issues in Risk Management and Challenges Ahead. IMF Working Papers, 1-27. Available at SSRN: https://ssrn.com/abstract=1930788

Escribano, M. G., and Han, F. (2015). Credit Expansion in Emerging Markets: Propeller of Growth?. International Monetary Fund, WP/15/212.

Fahlenbrach, R., Prilmeier, R., and Stulz, R. (2017). Why does fast loan growth predict poor performance for banks?, The Review of Financial Studies, 31(3),1014–1063, https://doi.org/10.1093/rfs/hhx109

Farahani, G. Y., and Hossein, S. S. M. (2012). Analysis of Islamic Bank's Financing and Economic Growth: A case study of Iran and Indonesia. Journal of Economic Cooperation and Development, 33, 4 (2012), 1-24

Farahani, Y.G., & Dastan, M. (2013). Analysis of Islamic banks' financing and economic growth: Apanel cointegration approach. International Journal of Islamic and Middle Eastern Finance and Management, 6(2), 156-172.

Frank, D. H., & Obloj, T. (2014). Firm-specific human capital, organizational incentives, and agency costs: Evidence from retail banking. Strategic Management Journal, 35(9), 1279-1301.

Furqani, H., & Mulyany, R. (2009). Islamic banking and economic growth: Empirical evidence from Malaysia. Journal of Economic Cooperation and Development, 30(2), 59-74.

Garcia-Escribano, M. and Han, F. (2015). Credit Expansion in Emerging Markets: Propeller of Growth?, IMF Working Paper WP/15/212. Available at: https://www.imf.org/external/pubs/ft/wp/2015/wp15212.pdf

Goaied, M., & Sassi S. (2011). Financial development and economic growth in the MENA Region: What about Islamic banking development. Int. J. Bus. Manage. Sci., 4, 1-23.

Gorton, G. and Winton, A. (1998). Banking in transition economies: Does efficiency require instability? Journal of Money, Credit and Banking, 30(3), 621-650

Gorton, G. B. and Winton, A. (2016). Liquidity Provision, Bank Capital, and the Macroeconomy. Available at SSRN: https://ssrn.com/abstract=253849. or http://dx.doi.org/10.2139/ssrn.253849

Hadriche, M. (2015). Banks performance determinants: Comparative analysis between conventional and Islamic banks from GCC Countries. International Journal of Economics and Finance, 7(9), 169.

Hakim B., & Md Akther U. (2016). Does Islamic bank financing lead to economic growth: An empirical analysis for Malaysia. MPRA Paper No. 69075. Available at: https://mpra.ub.uni-muenchen.de/69075/

Hall, M. (2018). How does the stock market affect gross domestic product (GDP)?, available at: https://www.investopedia.com/ask/answers/033015/how-does-stock-market-affect-gross-domestic-product-gdp.asp , accessed on 01.07.2018

Hassanudin, T., Yousof, H., Hanafi, H., & Ebrahim. (2013). Do islamic banks contribute to the economic growth than conventional banks? The empirical investigations of bahrain dual banking. International Journal of Science Commerce and Humanities,1(3), 86–116.

Hoff, A. (2007). Second stage DEA: Comparison of approaches for modelling the DEA score. European Journal of Operational Research. 181(1), 425-435.

Huang, T. & Wang, M. (2002). Comparison of Economic Efficiency Estimation Methods: Parametric and Non-Parametric Techniques. The Manchester School 70 (5), 682-709

Iqbal M., Molyneux P. (2005). Efficiency in Islamic banking. Thirty years of Islamic banking. Palgrave Macmillan, UK, 88-104

Isik, I and Hassan, k. (2002). Governance, corporate control and efficiency of the Turkish banking industry, paper presented at ERF eight annual conferences, Cairo, Egypt.

Iwedi, M., & Igbanibo, D.S. (2015). The Nexus between Money Market Operations and Economic Growth in Nigeria: An Empirical Investigation. IIARD International Journal of Banking and Finance Research, 1(2), 1-17.

Jan, A., and Marimuthu, M. (2015). Sustainability Profile of Islamic Banking Industry: Evidence from World Top Five Islamic Banking Countries. International Journal of Economics and Finance, 7(5), 125–139.

Jobst, A. (2007). The economics of Islamic finance and securitization. Journal of Structured Finance, 13(1), 6-27.

Johnes, J., Izzeldin, M. & Pappas, V. (2014). A comparison of performance of Islamic and conventional banks 2004–2009. Journal of Economic Behavior & Organization, 103, 93–107.

Joseph Kwadwo Tuffour, Patience Asante Owusu and Kenneth Ofori-Boateng, 2018. Profitability of Listed Ghanaian Banks Determined by the Stylized Facts. The International Journal of Applied Economics and Finance, 12: 1-8.

Kader, J.M., & Asarpota A.K. (2007). Comparative Financial Performance of Islamic vis a vis Conventional Banks in the UAE. Paper presented at 2006-2007 Annual Student Research Symposium & First Chancellor's Undergraduate Research Award at UAE University

Kassim, S. (2016). Islamic Finance and Economic Growth: The Malaysian Experience,

Khan, A., & Shah, A. Q. (2015). A Comparative Analysis of Regulatory and Supervisory Islamic Banking: Evidence from Pakistan, Malaysia, Bahrain, and the UK. The Lahore Journal of Business, 4(1), 37–60

Khan, I. Khan, M., Tahir, M. (2017). Performance comparison of Islamic and conventional banks: empirical evidence from Pakistan. International Journal of Islamic and Middle Eastern Finance and Management, 10(3), 419-433

Khediri, K. B., Charfeddine, L., & Youssef, S. B. (2015). Islamic versus conventional banks in the GCC countries: A comparative study using classification techniques. Research in International Business and Finance, 33, 75-98.

Lucas, R. E. (1988). On the Mechanics of Economic Development. Journal of Monetary Economics, 22, 3-42.

Meslier, C., Risfandy, T., & Tarazi, A. (2017). Dual market competition and deposit rate setting in Islamic and conventional banks. *Economic Modelling*, *63*, 318-333.

Metwally, M. (1997). Differences between the financial characteristics of interest-free banks and conventional banks. European Business Review, 97(2), 92–98.

Miah, M. D., & Uddin, H. (2017). Efficiency and stability: A comparative study between Islamic and conventional banks in GCC countries. Future Business Journal, 3(2), 172-185.

Moin, M. S. (2013). Financial Performance of Islamic and Conventional Banking in Pakistan: A Comparative Study. International Journal of Innovative and Applied Sciences, 1(1), 1-22.

Naceur, S.B. and Ghazouani, S. (2007): Stock markets, banks and economic growth: empirical evidence from the MENA region, Research in International Business and Finance, 21(2), 297-315

Patrick, H. T. (1966). Financial development and economic growth in underdeveloped countries. Economic Development and Cultural Change, 14(2), 174-189.

Petkovski, M. & Kjosevski, J. (2014). Does banking sector development promote economic growth? An empirical analysis for selected countries in Central and South Eastern Europe. Economic Research-Ekonomska Istraživanja, 27(1), 55-66

Pradiknas, T. Y., & Fathurohman, T. (2015).Efficiency of Islamic banking compared to conventional banking: Evidence from Indonesia banking sector. Journal of Business and Management, 4(5), 540-551. Retrieved fromhttp://journal.sbm.itb.ac.id/index.php/jbm/article/view/1763

Rabaa, B., Younes, B. (2016). The impact of the Islamic banks performance on economic growth.: using panel data. *International Journal of Economics and Finance Studies, 8 (1), 101-111.*

Robinson, J. (1952).The Generalization of the General Theory. In The Rate of Interest and Other Essays, London: Macmillan, pp. 69-142

Romdhane, M. & Alhakimi, S. S. (2018). Productivity and Technical Efficiency in Islamic Banks: Cross - Country Analysis. Asian Journal of Economic Modelling. Asian Economic and Social Society, 6(1), 1-7.

Rosly, S.A., & Abu Bakar, M.A. (2003). Performance of Islamic and Mainstream Banks in Malaysia. International Journal of Social Economics, 30 (12), 1249-1265.

Said, R., Daud, M. M., Radjeman, L. A. & Ismail, N. (2013). Probing Corporate Ethical Identity of Shari'ah Compliant Companies. Procedia Economics and Finance, 7, 230-235.

Samad, A. (2004). Performance of Interest-Free Islamic Banks vis-a-vis Interest-Based Conventional Banks of Bahrain. IIUM Journal of Economics and Management, 12 (2), 1-15.

Samad, A., & Hassan M (1999). The performance of Malaysian Islamic bank during 1984–1997: an exploratory study. International Journal of Islamic Financial Services, 1(3), 1–14.

Samargandi N.Fidrmuc, J. Sugata Ghosh S. (2014). Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia. Economic Modelling, 43, 267-278

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. World Development, 68, 66-81.

Schmitt, J. (2013). 12 Ways To Alienate A New Hire. Forbes. Available on line at: https://www.forbes.com/sites/jeffschmitt/2013/08/08/12-ways-to-alienate-a-new-hire/ , Accessed on 30.06.2018.

Schumpeter, J. A. (1912). The Theory of Economic Development. Leipzig: Dunker & Humblot, translated by R. Opie. Cambridge, MA: Harvard University Press, 1934.

Sorwar, G., Pappas, V., Pereira, J., & Nurullah, M. (2016). To debt or not to debt: Are Islamic banks less risky than conventional banks?. Journal of Economic Behavior & Organization, 132, 113-126.

Stefko R, Gavurova B, Kocisova K (2018). Healthcare efficiency assessment using DEA analysis in the Slovak Republic. Online: www.ncbi.nlm.nih.gov/pubmed/29523981

Stefko R, Gavurova B, Kocisova K (2018). Healthcare efficiency assessment using DEA analysis in the Slovak Republic. Health Econ Rev., 9;8(1):6. doi: 10.1186/s13561-018-0191-9.

Sufian, F. (2007). Malmquist indices of productivity change in Malaysian Islamic banking industry: foreign versus domestic banks. Journal of Economic Corporation, 28 (1), 115-150.

Svitalkova, Z. (2014). Comparison and evaluation of bank efficiency in selected countries in EU. Procedia Economics and Finance, 12, 644 – 653

Tabash M. I., and Dhankar , R. S. (2014). Islamic banking and economic growth: An empirical evidence from Qatar. Journal of Applied Economics and Business, 2(1), 51-67

Tobin, J. (1958). Estimation of relationships for limited dependent variables. *Econometrica*, 26 (1), 24–36. doi:10.2307/1907382. JSTOR 1907382.

Tonzer, Lena & Buch, Claudia M. & Buchholz, Manuel, 2015. "Uncertainty and International Banking," Annual Conference 2015 (Muenster): Economic Development - Theory and Policy 113072, Verein für Socialpolitik / German Economic Association.

Violeta C. & Gordana S. (2017). Efficiency of bank branches: empirical evidence from a two-phase research approach, Economic Research-Ekonomska Istraživanja, 30 (1), 318-333

Waemustafa, W., & Sukri, S. (2016). Systematic and unsystematic risk determinants of liquidity risk between Islamic and conventional banks, International Journal of Economics and Financial Issues, 6(4), 1321-1327.

Yong Tan & Christos Floros (2012) Bank profitability and GDP growth in China: a note, Journal of Chinese Economic and Business Studies, 10:3, 267-273, DOI: 10.1080/14765284.2012.703541

Yudistira D. (2004). Efficiency in Islamic Banking: An Empirical Analysis of Eighteen Banks. Islamic Economic Studies, 12(1), 1 – 19