The Impact of Efficiency on Islamic Banks' Performance: A Cross-Country Study

Khaled Hussainey
University of Portsmouth, UK

Elsayeda Ismail
Alexandria University, Egypt

Fatma Ahmed
Qatar University, Qatar

ABSTRACT

This paper contributes to Islamic finance literature by offering a large-scale evidence on the impact of efficiency on the performance of Islamic banks all over the world. Our initial sample includes all Islamic banks around the world. Using a sample of 151 Islamic Banks with financial years ending within the period January 2013 and December 2013, we examine, controlling for Bank-specific characteristics and country-specific characteristics, whether high efficiency leads to more profitability in Islamic Banks. We define higher efficiency as the lower Cost-to-income ratio. We find that higher levels of Islamic banks' efficiency banks (i.e. lower Cost-to-income ratio) are positively associated with banks' performance (measured by return on assets). In addition, our analysis shows that there is a positive association between risk-based capital adequacy and the existence of Sharia auditing department and the performance of Islamic banks. Finally, the analysis shows that three Hofstede culture dimensions (i.e. power distance, individualism; uncertainty avoidance) and the nature of the banking system positively influence the performance of the Islamic banks.

1. INTRODUCTION

Despite the extensive prior literature on the efficiency and the performance in the banking sector, there is little research on how higher levels of efficiency impact the performance of Islamic Banks. This paper aims to study the relationship between efficiency and performance of 151 Islamic banks for the year 2013. Our principal research question we consider is whether, controlling for bank-specific characteristics and country characteristic, Islamic banks' performance is affected by efficiency and related factors?

This work is motivated by the annual report issued by Dubai Center for Islamic Banking & Finance (DCIBF, 2014) on "*Islamic Banking: Growth, Efficiency and Stability*". The report shows a "*convincing evidence that Islamic commercial banking is not only competing well with other commercial banking but also excelling in efficiency and stability*" and "*the potentially of rapid expansion and growth in Islamic banking industry*" *(DCIBF, 2014: 19)*. The report also shows that Islamic commercial banks are rapidly growing. In addition, Islamic banks represent the majority of Islamic financial institutions around the world. These banks are now spread across both Islamic and non-Islamic countries. As explain by Sarea and Hanefah (2013:50), "*the emergence of Islamic banking is due to the increasing demand from Muslims communities worldwide for shariah's complied Islamic financial products, services, and the variety of modes of Islamic finance*". Empirical research shows that Islamic banks are more profitable than the conventional banks (Olson and Zoubi, 2011) and more efficient (Bourkhis and Nabi, 2013). Therefore, we test to see whether efficiency affects the profitability of Islamic banks.

Our paper offers three novel contributions to the Islamic Finance literature as follows. First, we use a large-scale sample of Islamic banks around the world to examine the impact of efficiency on Islamic banks' performance. Second, we considered a comprehensive set of bank-specific characteristics that might affect the performance of Islamic banks. Finally, we considered a comprehensive set of country-specific variables in our analysis.

Our analysis documents the following new findings. First, it shows that higher levels of Islamic banks' efficiency banks (i.e. lower cost-to-income ratio) are positively associated with banks' performance (measured by return on assets). Second, the analysis also shows that there is a positive association between risk-based capital adequacy and the existence of Sharia auditing department and the performance of Islamic banks. Finally, the analysis shows that three Hofstede culture dimensions (i.e. power distance, individualism; uncertainty avoidance) and the nature of the banking system positively influence the performance of the Islamic banks.

The remainder of the paper is organized as follows. The next section reviews the relevant literature and develops our empirical research hypothesis. Section 3 describes our empirical model. Section 4 describes the data and we present our regression results in section 5. Section 6 concludes the study.

2. LITERATURE REIEW AND RESEARCH HYPOTHESIS

In this section, we review the literature related to 'banks' efficiency' and 'banks' financial performance'.

Banks' efficiency literature

Banks' efficiency has attracted the major interest in the finance literature. Researchers focused on banks' efficiency from different angles as follows: In particular, they [1] compared the efficiency of the banking sector with other industry sectors (e.g., Ausina, 2002); [2] compared the variations between efficiency scores in the banking sectors over time (e.g., Yildirim, 2002; Chiu et al, 2009; Kraft et al, 2010; Shen and Chen, 2010; Shamsuddin and Xiang, 2012); [3] compared the efficiency of different types of banks or banks in different countries (e.g., Maudos et al, 2002; Hauner, 2007; Valverde et al, 2007; Burjki and Niazi, 2009); [4] examined the determinants of the efficiency of the banking sector (e.g., Ataullah et al, 2004; Weil, 2004; Huang and Wang, 2004; Fries and Taci, 2005; Damar, 2006; Girardone et at, 2007;

Ariff and Can, 2008; Hermes and Nhung, 2008; AlShamsi et al, 2009; Casu and Molyneux, 2010; Chelo and Manlagnit, 2011; Spulbar and Nitoi, 2914).

Looking at the Islamic finance literature, we noted that there is very limited empirical research on the efficiency of the Islamic banks. On one hand, Yudistira (2004), Hassan (2006) and Olson and Zoubi (2011) found that the Islamic banking industry is relatively less efficient than conventional banks. On the other hand, Hussein (2004) and Badar et al (2008) did not find any significant differences between efficiency levels of Islamic and traditional banks. In a related paper, Bourkhis and Nabi (2013) provided evidence that Islamic banks became more efficient in 2009 compared with the traditional banks because of the effect of the global financial crisis. The work of Abdul-Majid et al. (2010) complemented these studies by examining the potential reasons for the differences between efficiency levels of Islamic and traditional banks. In another related study, Sufian (2007) and Ab-Rahim et al (2013) found that Islamic foreign banks in Malaysia are more efficient than domestic banks. Another line of research examines the determinants of Islamic banks' efficiencies (e.g., Hassan, 2006; Srairi, 2010; Sardar et al, 2011; Azzam and Rettab, 2012).

Traditional cost to income ratio is a widely used because it is so easy and simplicity in estimation and its axiom character and usefully complementing to ROA because it is an income statement-based calculation and cost to income ratio overcomes the profitability measurement weakness of ROA as a balance sheet-driven measure (Davidson, 1997; Francis, 2004; Cocheo, 2000; Tripe, 1998). Moreover, it is a critical measure for bank's productivity and making predictions about the performance of these banks by giving a clear view of how efficient the bank is being and will be (Hussain, 2014).

A considerable number of studies used Cost to income ratio (CIR) to measure efficiency (Cocheo, 2000; Davidson, 1997; Bekier and Nickless, 1998; Al-Tamimi, 2010; Căpraru and Ihnatov, 2014; Mesa and Sánchez &Sobrino, 2013). Bekier and Nickless (1998) suggested that

to improve the bank efficiency, the bank change the payment way to electronic channels to reduce the transaction fees. They claimed that this may save up the third of US banks operating costs. Pasiouras and Kosmidou (2007) found that Cost to income ratio was the most significant determinant of profitability for foreign banks was negative so the increase (decrease) in these expenses reduces (increases) the profits of banks operating in the EU to a large extent. Cocheo (2000) argued that efficiency measured by the cost to income ratio is very important to the largest banks in USA. Using a sample of 143 commercial banks from Romania, Hungary, Poland, Czech Republic and Bulgaria, Căpraru and Ihnatov (2014) found that efficiency measured by cost to income ratio has strong statistical significance profitability measures such as ROA and ROE. Using a sample of 3952 banks in the European Union, Mesa et al, (2013) found direct relationship between bank size and efficiency.

On the other hand Francis, (2004); Berger and Moormann, (2008) and Căpraru & Ihnatov (2014) found a negative relation between efficiency and the cost-income ratio.

Căpraru & Ihnatov (2014) examined the main determinants of 143 commercial banks' profitability efficiency measured by the cost to income ratio. They found that this ratio is negatively associated with ROE and ROA. Moreover, Osborne (1995) found that no significant relationship between the cost to income ratio and ROE for a sample of US banks.

The cost to income ratio also was widely used in Islamic literature (Al-Tamimi, 2010; Bourkhis and Nabi, 2013). Al-Tamimi (2010) pointed out that the efficiency measured by the cost to income significantly influences Islamic and conventional UAE's bank performance. In the same vein Bourkhis and Nabi (2013) measured efficiency by the cost to income ratio of Islamic and conventional banks in 16 countries. Their result provided evidence that Islamic banks became more efficient than traditional banks.

Banks' financial performance literature

In the second area of research, banks' financial performance, we review empirical studies that are concerned with factors affecting Banks' financial performance. One such study

is Athanasoglou et al. (2008) which examined the effect of Greek bank-specific, industry-specific and macroeconomic determinants of bank profitability. It found that capital is important in explaining bank profitability. It also finds that labor productivity growth has a positive impact on profitability while operating expenses have a negative impact. The study also finds that macroeconomic control variables such as inflation and cyclical output, clearly affect the performance of the banking sector. Another related study is Pasiouras and Kosmidou (2007) which investigated whether banks' specific characteristics and/or macroeconomic variables and financial market structure affect the profitability of banks in 15 EU countries. The authors provided evidence that cost to income ratio was the most significant determinant of profitability for the banking sector.

In addition, a study by Figueira et al. (2009) found that there is no impact of the type of ownership on the banks' performance while the differences in performance were more related to the country characteristics like national regulatory and economic environment. Another study of interest is that of Căpraru and Ihnatov (2014). The authors found that bank-specific factors like size, credit risk and efficiency (measured by the cost to income ratio) were negatively associated with the performance if the banks (measured by ROE and ROA). They also found that the banking system-specific factors like market concentration had no impact on banks' performance, while macroeconomic factors (i.e. inflation and growth) have a positive impact. Furthermore, Ben Naceur and Kandil (2009) investigated the effects of capital regulations on the profitability of the banking industry in Egypt. They found that banks characteristics like capital adequacy; loans to customers and short-term funding have a positive impact on banks' performance. They, however, did not find any impact of the macroeconomic and financial structure variables on the banks' performance. Another related study by Westman (2011) examined the impact of ownership on profitability in banks for a sample of EU countries. They found that greater profitability is achieved by increasing the level of risk. They

also found that management ownership did not have a significant impact on profitability while board ownership tends to have a positive impact. Finally, Herrero et al (2009) found that better-capitalized banks and larger share of deposits tend to be more profitable, while a less concentrated banking system increases bank profitability. They also found that higher real interest rates on loans and inflation appear to foster profitability while the volatility of interest rates decreases it. Finally, they found that profitability is highly influenced by government decisions because of banks are given yearly targets for asset quality and capitalization.

Looking at the Islamic finance literature, we noted that there is very limited empirical research on the determinants of Islamic banks' financial performance. Hassan (2006) investigated the determinants of the efficiency of the performance of 43 Islamic banks in 21 Muslim countries over the 1995-2001 period. They found that efficiency measures are highly correlated with ROA and ROE. Another study of interest is Al-Tamimi (2010) which examined factors influencing UAE's Islamic and conventional national banks' performance during the period 1996-2008. He considered a set of internal and external factors such as GDP per capita, size, financial development indicator (FIR), liquidity, concentration, cost and number of branches as potential drivers for the performance of banks (measured by ROE and ROA). He found that cost and numbers of branches were important factors affecting conventional national banks' performance. Islamic banking performed better than conventional national banks in cost and number of branches.

Culture is one of the most important dimensions which may influence on an organization's Effectiveness (Halkos and Tzeremes, 2011). We used Hofstede et al. (2001) identifies four types of national cultures firstly the Power Distance Index (PDI) is the extent to which the employers oriented to the power distance and the level of flexibility in regulation. Secondly Individualism (IDV) on the one side versus its opposite, collectivism, which express the inclination for a work team.in addition to The Masculinity (MAS) culture orientation refers

to the firm tendency to achievement, confidence and compensation for success. A supervisory Masculinity-oriented culture is based on a strict identification of indisputable objectives and guidelines.and finally the Uncertainty Avoidance Index (UAI) express To what extent that firm avoiding the risks and uncertainty.

Literature showed an increased interest in the culture and its effect on performance and they clearly indicate that when firms pursue performance or efficiency in countries with different national cultures must take it into the account (Carretta et al, 2015; Halkos and Tzeremes 2011; Pagell, et al, 2005)

Halkos and Tzeremes (2011) in their sample of 282 multinational banks from 43 different countries tried to answer the question how different cultural values influence banks' global practices and thus their performances? They found that the uncertainty avoidance values have a direct positive impact on multinational bank's performance. Most recently, Carretta et al (2015) argued that the different supervisory cultures display different relationships with bank stability using ROA instability measurement by analyzing the 15 European banks. Their result conducted that the Collectivism-oriented supervisory culture reduces bank stability and the credit risk in banks' lending portfolios. They also found that supervisory authorities that have a Power Distance-oriented supervisory culture in banks tend to increase their risk-taking which affects the bank's performance positively. On the other hand, Gomez-Mejia and Palich (1997) analyzed 500 firms over a ten-year period (1985-1994), but they did not find any significant relation between culture and performance.

To summarise, prior research showed that Islamic banks are more profitable than the conventional banks (Olson and Zoubi, 2011). In addition, Bourkhis and Nabi (2013) showed that Islamic banks became more efficient after the period of the global financial crisis. We test to see, whether controlling for bank-specific characteristics and country-specific characteristics, Islamic banks' efficiency positively affect the performance of these banks. We

use the cost-to-income ratio as a proxy for banks' efficiency. Lower levels of the cost-to-income ratio indicate that Islamic banks are more efficient, while higher levels of this ratio indicate that Islamic banks are less efficient. We, therefore, hypothesize that:

There is a negative association between the cost-to-income ratio *and financial performance of Islamic Banks around the world*

3. EMPIRICAL MODEL

To test our research hypothesis, we use the following Ordinary Least Square (OLS) model:

$$ROA = \alpha_0 + b_1\ Efficiency + b_2\ STA + b_3\ AGE + b_4\ SIZE + b_5\ RISK + b_6\ LEV + b_7\ SDEP + b_8\ OWN + b_9\ POW + b_{10}\ IND + b_{11}\ MAS + b_{12}\ UNC + b_{13}\ LEG + b_{14}\ ADOPT + b_{16}\ CENT + b_{16}\ SYS + b_{17}\ GDP + b_{18}\ CORR + b_{19}\ LIT$$

ROA (return on assets) is our dependent variable. We use ROA as a proxy for banks' financial performance. Our independent variable is Efficiency. We use the Cost-to-income ratio as a proxy for Bank efficiency. We hypothesize the coefficient on our efficiency measure should be negative as lower levels of cost-to-income ratios indicate that banks are more efficient. We expect a positive association between efficiency and the financial performance of the Islamic banks.

We also follow prior research and consider all other bank-specific characteristics and country-specific characteristics that are more likely to affect the performance of the banking sector in general or the Islamic Banking sector in particular. Table 1 shows the definitions of our variables.

Insert Table 1 here

We also run Stepwise Backward Regression (SBR) to reduce the number of the insignificant control variables and to reach to the best model explains the relationship between the ROA and Cost with this a large number of the control variables.

4. DATA

We use the same sample collected by El-Halaby and Hussainey (2015; 2016) to examine the impact of efficiency on the performance of the Islamic banks around the world. El-Halaby and Hussainey (2015; 2016) provided a unique cross-country dataset that covers 151 Islamic banks around the world. The dataset covers 28 different countries. Their dataset covers the period between January 2013 and December 2013. They collected data on Islamic banks from different sources including banks' annual reports; Bankscope and the Bankers databases and the websites of central banks around the world. Table 2 shows the number of banks in each country.

Insert Table 2 here

Table 3 shows the descriptive analysis for our sample. It shows that Islamic banks, on average, are profitable. The mean ROA is 1.062. It also shows that there are significant variations in the efficiency levels of our sample. The mean cost-to-income ratio is 65.589. The minimum ratio for our sample is 10.5 and the maximum ratio is 574.5. Descriptive analyses of the bank-specific characteristics and country-specific characteristics also show variations between banks in our sample. For example, the descriptive for the AGE variable shows that some banks are too old (86 years), while others are still too young (2 years). Therefore, it would be of interest to examine the extent to which efficiency levels are positively associated with the performance of the Islamic banks. It would be also interesting to understand the impact of other bank-specific characteristics and country-level characteristics on the performance of the Islamic banks.

Insert Table 3 here

Table (4) shows the correlation analysis. It shows a small correlation between the independent variables shows no collinearity between the independent variables, In addition, we estimate the Variance Inflation Factors (VIFs). VIFs are a method of measuring the level

of multicollinearity between the repressors in the regression equation. Variance Inflation Factor (VIFs) values less than 10, Display no collinearity between all independent variables.

Insert Table 4 here

5. EMPIRICAL RESULTS

Table 5 shows the result of our attempt to relate our measure of efficiency to our measure of bank performance. In this exercise, we also consider other bank-specific characteristics and country-level characteristics. The table shows the effect of the cost to income ratio and the control variables (risk-based capital adequacy, the existence of Sharia auditing department, nature of the banking system and three of Hofstede culture dimensions: Power distance, Masculinity and Uncertainty avoidance) on ROA. The effect of these variables explains about 30% of the change in the dependent variable (ROA). The overall model is significant, F value = 2.991 with portability (0.0001). The diagnostic test on the residuals (standard errors) of this model shows no serial correlation, Durbin-Watson stat. = 2.457, and shows no heteroscedasticity, White F-statistic is not significant = 0.856 with probability (0.637), means no collinearity in the residuals.

The table shows that the cost-to-income ratio is negatively associated with ROA. The coefficient on the efficiency variable is negative (-0.025) and highly significant at the 1% level. This suggests that Islamic banks with high-efficiency ratios (i.e. lower the cost-to-income ratio) have also higher profitability ratios (i.e. ROA). Therefore, we conclude that there is a positive association between efficiency and the performance of Islamic banks around the world. This leads us to accept our research hypothesis.

The table also shows that some banks' characteristics affect the performance of Islamic banks. Our analysis provides evidence that risk-based capital adequacy positively affects the performance of Islamic banks. In addition, we find that the existence of Sharia

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auditing department in Islamic banks positively affects the performance of these banks. We did not find any statistical association other bank-specific characteristics (i.e. between the type of accounting standards; bank age; bank size' leverage and ownership) and the performance of Islamic banks.

Finally, our analysis shows that only three Hofstede culture dimensions (i.e. power distance, individualism; uncertainty avoidance) and the nature of the banking system positively affect the performance of the Islamic banks. Other country-level characteristics (i.e. masculinity; legal system; the full adoption of AAOIFI; GDP; corruption level and literary level) have no impact on banks' performance.

Insert Table 5 here

We run Stepwise Backward Regression (SBR) to eliminate the number of the control variables and to reach to the best model explains the relationship between the ROA and Cost with this a large number of the control variables. As shown in Table 5, stepwise backward regression shows three more significant variables than OLS, they are: role of central bank in SSB, GDP and literacy rate. It removed 8 variables of the analysis; they are full adoption of AAOIFI, corruption Index, leverage, size, masculinity, ownership, type of standards and Country legal system. The effect of all variables explains about 30% of the change in the dependent variable (ROA). The overall model is significant, F value = 5.344 with portability (0.000). The diagnostic test on the residuals (standard errors) of this model shows no serial correlation, Durbin-Watson stat. = 2.454, and shows no heteroscedasticity, White F-statistic is not significant = 0.970 with probability (0.477), means no collinearity in the residuals. To confirm these results we run again OLS for the selected variables by stepwise backward regression using OLS. The results are quantitatively similar to those reported in Table 6.

Insert Table 6 here

6. CONCLUSION

Our paper offers a comprehensive study of the impact of efficiency on the performance of Islamic banks around the world. Our sample covers 151 Islamic banks in 28 countries. We examine whether, controlling for bank-specific characteristics and country-level characteristics, the efficiency of Islamic banks are associated with their financial performance.

Our paper contributes to the Islamic banking literature by offering new empirical large-scale evidence that cost-to-income ratio is negatively associated with the performance of Islamic banks all over the world. Our findings indicate that Islamic banks with better efficiency levels are more likely to be more profitable. We also find that some bank-specific characteristics and some country-specific characteristics affect the profitability of Islamic banks around the world.

Our findings have a number of implications. First, it provides evidence to the sharia supervisory board of Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) on the main drivers of the profitability of Islamic banks around the world. It shows that the existence of the current accounting standards does not add value to the profitability of these banks. The findings highlight the importance of efficiency as a key driver for the profitability of the Islamic banking sector. Second, our findings also of interests to the managers; current and potential customers; current and potential shareholders and stakeholders who are interested see evidence of rapid growth and sustainable Islamic banking industry. Third, we provide a practical implications as our findings inform Dubai Center for Islamic Banking & Finance (DCIBF) on the key factors that improve the profitability of Islamic banks and hence increase their chance to compete well with traditional banks as well as to ensure rapid growth and sustainability in the future.

We have a number of limitations. We simply use cost-to-income ratio as a measure of efficiency and ROA as a measure of profitability. We also limit our analysis to the most recent year (i.e. 2013). We also did not consider the impact of corporate governance mechanisms on the profitability. Therefore, our study suggests a number of avenues for future research. First, it would be interesting to use different measures of efficiency and different profitability measures and then to re-investigate the association between efficiency and performance.

Second, future research could also consider a longer sample period. Looking at a longer sample period, researchers can examine the impact of the change in the efficiency levels on the change in the profitability of the Islamic banks. Third, it would be interesting to study the impact of corporate governance mechanisms (board characteristics; audit committee characteristics; ownership structure) on the efficiency-performance relationship. Finally, our analysis shows that the compliance with AAOIFI standards is not related with the performance of the Islamic banks; it may be interested to investigate potential reasons for these results using qualitative research methods (i.e. interviews).

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Table 1: Variables definitions and measurements

Variable	Acronym	Measurement
DEPENDENT VARIABLE		
Profitability	ROA_{it}	Return on assets (ROA)
INDEPENDENT VARIABLE		
Banks' Efficiency	Efficiency	Cost-to-income ratio equals a company's operating costs divided by its operating income.
BANK-SPECIFIC CONTROL VARIABLES		
Type of Standards	STA_{it}	1=Bank that use AAOIFI; 0=Bank that use IFRS or local standards
Bank Age	AGE_{it}	Age of bank from the foundation date
Bank Size	$SIZE_{it}$	The natural log of total assets
Risk-based Capital Adequacy	$RISK_{it}$	Tier 1 capital
Bank Leverage	LEV_{it}	Total liabilities (Debts)/Total assets
Existence of Sharia auditing department	$SDEP_{it}$	A dummy variable equal to 1 for banks that have Sharia auditing department and 0 otherwise.
Type of Ownership	OWN_{it}	1= Publicly-held Islamic bank; 0= Privately-owned Islamic bank
COUNTRY-LEVEL CONTROL VARIABLES		
Hofstede Culture dimensions	POW_{it} IND_{it} MAS_{it} UNC_{it}	1=Power distance; 2=Individualism; 3=Masculinity; 4=Uncertainty avoidance
Country legal System	LEG_{it}	1 = Sharia Law; 0 = Other non-Sharia Law (e.g. Civil Law, Common Law, or Hybrid Law)
Full adoption of AAOIFI	$ADOPT_{it}$	1 = Full adoption of AAOIFI; 0 = Not full adoption of AAOIFI
Role of central Bank in SSB	$CENT_{it}$	1 = Countries where the central bank has Central SSB; 0 = Countries where the central bank doesn't have Central SSB
Nature of the banking system	SYS_{it}	1 = Complete Islamic banking system; 0 = Non-complete Islamic banking system
Gross Domestic Product	GDP_{it}	GDP growth rate
Corruption Index	$CORR_{it}$	% of Corruption level for each county
Literacy rate	LIT_{it}	% of Literacy level for each county
Source: El-Halaby and Hussainey (2015; 2016)		

Table 2 : Number of banks in each country of the study

Country	No. of banks	Country	No. of banks
UK	4	KSA	5
UAE	8	Thailand	1
Pakistan	9	Bangladesh	9
Yemen	3	Syria	2
Egypt	2	Brunei	1
Bahrain	18	Lebanon	2
Qatar	6	Palestine	2
Sudan	11	Kenya	2
Kuwait	5	Oman	3
Srilanka	1	Iraq	5
Jordan	4	Philippine	1
Malaysia	16	Turkey	4
Iran	17	Nigeria	1
Indonesia	8	Maldives	1
Total		151	

Table 3: Descriptive statistics

	Mean	Maximum	Minimum	Std. Dev.
ROA	1.062	21.570	-13.390	3.096
Efficiency	65.589	574.500	10.500	51.357
STA	0.318	1.000	0.000	0.467
AGE	20.656	86.000	2.000	13.339
SIZE	7862.828	96532.000	15.000	15137.540
RISK	0.277	1.729	-0.380	0.249
LEV.	2.180	94.700	0.018	10.967
SDEP	0.523	1.000	0.000	0.501
OWN	0.735	1.000	0.000	0.443
POW	78.755	100.000	35.000	15.647
IND	32.821	89.000	14.000	12.846
MAS	51.073	66.000	10.000	7.853
UNC	64.305	85.000	35.000	14.894
LEG	0.669	1.000	0.000	0.472
ADOPT	0.278	1.000	0.000	0.450
CENT	0.232	1.000	0.000	0.423
SYS	0.252	1.000	0.000	0.435
GDP	19998.010	103900.000	1800.000	21968.660
CORR	3.778	7.700	1.100	1.728
LIT	0.769	0.990	0.431	0.149

Note: Sample: 151 Islamic Financial Institutions.
Period: January 2013 to December 2013.
Variables definitions are reported in Table 1.

Table 4: Correlation matrix for independent and control variables

VAR	VIF	Efficiency	STA	AGE	SIZE	RISK	LEV.	SDEP	OWN	POW	IND	MAS	UNC	LEG	ADOPT	CENT	SYS	GDP	CORR	LIT
Efficiency	1.220	1.00																		
SAT	7.049	0.08	1.00																	
AGE	1.437	-0.11	-0.09	1.00																
SIZE	1.848	-0.10	-0.250***	0.413***	1.00															
RISK	1.373	0.10	0.244***	-0.09	-0.10	1.00														
LEV.	1.278	-0.02	-0.10	0.351***	0.371***	-0.01	1.00													
SDEP	1.520	0.03	0.253***	-0.157*	-0.13	0.134**	-0.140155**	1.00												
OWN	1.467	0.03	-0.01	0.135**	0.171*	0.04	0.08	-0.06	1.00											
POW	2.698	-0.143**	0.163*	-0.10	-0.13	-0.186*	-0.174*	0.227***	-0.06	1.00										
IND	4.626	0.11	0.13	-0.08	0.05	0.318***	0.08	-0.152**	-0.07	-0.43	1.00									
MAS	1.869	0.159*	0.353***	-0.255***	-0.315***	0.149**	-0.140**	0.285***	0.00	0.160*	0.158*	1.00								
UNC	5.401	-0.09	0.278***	-0.03	0.00	0.07	-0.05	0.160*	-0.12	0.04	-0.258***	-0.08	1.00							
LEG	3.219	0.07	0.268***	0.12	0.02	-0.06	0.09	0.06	0.342***	0.01	-0.285***	0.06	-0.271***	1.00						
ADOPT	5.925	-0.06	0.877***	-0.08	-0.213***	0.260***	-0.09	0.207*	0.04	0.12	0.10	0.192*	0.288***	0.248***	1.00					
CENT	6.084	0.01	-0.374***	0.02	-0.11	-0.250***	-0.07	0.05	0.187*	0.159*	-0.491***	0.01	-0.495***	0.386***	-0.340***	1.00				
SYS	3.521	0.03	0.00	0.262***	0.243***	-0.03	0.227***	-0.301***	0.175*	-0.539***	0.04	-0.241***	0.01	0.408***	0.05	0.01	1.00			
GDP	3.764	-0.03	0.157*	-0.10	0.12	0.255***	-0.05	0.144**	0.13	0.207*	0.235***	0.211***	0.269***	-0.409***	0.205*	-0.259***	-0.332***	1.00		
CORR	4.873	0.10	0.09	-0.09	-0.04	0.271***	-0.12	0.241***	0.177*	0.183*	0.259***	0.199*	-0.13	-0.267***	0.149**	-0.04	-0.556***	0.658***	1.00	
LIT	5.012	-0.02	0.04	-0.05	0.152**	0.255***	0.00	-0.07	0.02	0.169*	0.380***	-0.09	-0.172*	-0.309***	0.11	-0.366***	-0.443***	0.482***	0.664***	1.00

Note:*** denotes 1%, ** denotes 5%, and * denotes 10% level of significance. Variables definitions are reported in Table 1.

Table 5: Empirical results: OLS regression analysis

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
Constant	-14.584	-2.270**	IND	0.085	2.253**
Efficiency	-0.025	-5.063***	MAS	0.016	0.405
SAT	-0.454	-0.354	UNC	0.088	2.489**
AGE	-0.018	-0.864	LEG	0.636	0.741
SIZE	0.000	0.217	ADOPT	0.003	0.002
RISK	2.173	2.042**	CENT	2.058	1.564
LEV.	-0.002	-0.077	SYS	2.020	2.075**
SDEP	1.087	1.956**	GDP	0.000	-1.305
OWN	-0.353	-0.572	CORR	0.016	0.054
POW	0.049	2.049**	LIT	3.638	1.071
R-squared	0.303		F-statistic	2.991	
Adjusted R-squared	0.2013		Prob(F-statistic)	0.0001	
White F-statistic	0.856				
Prob. F(19,131)	0.637		Durbin-Watson	2.457	

*Note***:** Dependent Variable ROA

Sample: 151 and included observations: 151

Variables definitions are reported in Table 1.

*** denotes 1%, ** denotes 5%, and * denotes 10% level of significance

Table 6: Empirical results: SBR analysis

Note: Dependent Variable ROA

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
Constant	-12.987	-2.468**	AGE	-0.017	-0.998
Efficiency	-0.024	-5.556***	POW	0.049	2.343**
UNC	0.080	2.472**	LIT	3.510	1.372
RISK	2.155	2.152**	IND	0.081	2.292**
SDEP	1.167	2.356**	CENT	2.179	1.902*
SYS	2.149	2.941***	GDP	0.000	-1.850*
R-squared	0.297		F-statistic	5.344	
Adjusted R-squared	0.242		Prob(F-statistic)	0.000	
White F-statistic Prob. F(11,139)	0.970 0.477		Durbin-Watson	2.454	

Sample: 151 and included observations: 151

Number of always included repressors: 1 (COST)

Variables definitions are reported in Table 1

*** denotes 1%, ** denotes 5%, and * denotes 10% level of significance