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Examining the impact of bank's risks to Islamic banks' profitability

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Article Info

Abstract

This paper analyzes the impact of banks' risk to the profitability of Islamic banks and to identify what risks play the non-trivial role. To this objective, 75 Islamic banks in 24 countries in 2015 have been studied. A series of bank risks, industry-specific and macroeconomic indicators are combined to explain the profitability of Islamic banking as measured by Return on Average Assets (ROAA), Return on Average Equity (ROAE), and Value Added (VA). The bank risks comprise credit risk, insolvency risk, liquidity risk, and operational risk. Having used robust linear regressions, the results indicate that all four types of risk influence bank's profitability. Operational risk is the risk that plays the most important role in influencing banks' profitability, whether measured by ROAA, ROAE or profit before taxes over the total asset (PBTTA). On the other hand, credit risk, liquidity, and insolvency do not conclusively increase or decrease Islamic bank profitability. Macroeconomic conditions, measured by inflation, actually has a positive impact on the profitability of Islamic banks. This indicates that operational risks and macroeconomic stability should be given primary attention in increasing bank's profitability.

Abstrak

Makalah ini mengidentifikasi dan menganalisis dampak risiko bank terhadap profitabilitas bank syariah. Untuk itu penelitian ini meneliti 75 bank syariah di 24 negara pada tahun 2015. Serangkaian risiko bank, indikator industri dan makroekonomi dianalisis untuk menjelaskan profitabilitas perbankan syariah yang diukur dengan *Return on Average Assets* (ROAA), *Return on Average Equity* (ROAE), dan *Value Added* (VA). Risiko bank terdiri dari risiko kredit, risiko insolvensi, risiko likuiditas, dan risiko operasional. Dengan menggunakan regresi linier, hasil penelitian menunjukkan bahwa keempat jenis risiko tersebut mempengaruhi profitabilitas bank. Risiko operasional adalah risiko yang berperan paling penting dalam mempengaruhi profitabilitas bank, baik yang diukur dengan ROAA, ROAE atau laba sebelum pajak atas total aset (PBTTA). Di sisi lain, risiko kredit, likuiditas dan insolvensi tidak secara meyakinkan meningkatkan atau menurunkan profitabilitas bank syariah. Kondisi makro ekonomi, yang diukur dengan inflasi, sebenarnya berdampak positif terhadap profitabilitas bank syariah. Hal ini mengindikasikan bahwa risiko operasional dan stabilitas makroekonomi harus mendapat perhatian utama dalam meningkatkan profitabilitas bank.

Introduction

Investigations into whether bank risks has a positive or negative effect on bank performance proliferated after the 2007/2008 subprime crisis. The existing empirical works mainly focus on the association between credit, insolvency and liquidity risk to banks' profitability. Fisseha (2015) in his meta-analysis on the determinants of profitability of commercial banks found most of the articles published after 2008 emphasized on the role of insolvency and credit risk but few portion of the focus on liquidity and operational risk.

In parallel to the increased interest in Islamic finance, the literature on Islamic banking profitability has been growing rapidly. The sizeable main body of research has explained the general feature of profitability of Islamic banks such as Samad & Hasan (2000). The second group of research evaluates whether it is possible to distinguish Islamic and conventional banks profitability such as Khediri, L., & Youssef (2016) and Zarrouk, H., Jedidia, K.B., and Moualhi (2016). However, the whole results are not conclusive whether Islamic banks are more profitable than conventional banks or not. The third category is more fo-

cused on looking at factors that affect profitability in Islamic banks, such as Bashir (2003), Ramlan & Adnan (2016), Aliyu & Yusof (2016), and Khediri et al. (2016). In general, those factors were divided into three categories, which are bank-specific financial factors, industry-specific factors, and macroeconomic factors. Some emphasized on capital market factors and country based factors (Bashir, 2003; Athanasogloua, Brissimis, & Delis, 2008).

However, there is limited research which specifies on linking profitability with bank risk-taking in Islamic banks. Most research on the profitability of Islamic banks is on the individual country and the sample is limited compared with that of conventional banks which have a huge panel data across country (Molyneux & Thornton, 1992; Petria, Capraru, & Ihnatov, 2015). This study plays a role in filling the gap of research on the role of banks risk taking on bank's profitability of Islamic banks cross country.

Following the previous study of Khediri et al. (2016), we focused on bank's risks as the main determinants of profitability instead of introduced some bank-specific factors, industry-specific factor, and macroeconomic factors. We perform a comparison between the different measures of profitability, namely Value Added (VA), Return on Average Assets (ROAA) and return on average equity (ROAE).

This study will investigate whether the profitability of Islamic banks is influenced by bank risk, which as it is believed that Islamic banks have different risk exposures compared with conventional banks (Greuning, Iqbal, Van Greuning, Iqbal, & Mondiale, 2008). In order to do so, we use recent data of 116 listed Islamic banks around the country available on the Fitch Connect database 2015. By applying robust OLS technique, it could be able to account for profit persistence and its determinants. Although most previous research use panel data with a common generalized method of moments (GMM) technique this study uses a simple robust OLS technique considering the limitations of cross-section data availability. Former papers also using a multi-country setup, including the study closest to ours from Demirguc-Kunt & Huizinga (1999), have used linear OLS methods, which however, lead to inconsistent results. Finally, we find new evidence that operational risks far play a more dominant role in influencing the profitability of Islamic banks compared to other risks such as liquidity, insolvency or credit risks. Macroeconomic factors also play more dominant role than the banking sector factors.

There is a wide literature dealing with determinant of the profitability of banks. There are some early investigations on bank profitability (Short, 1979; Smirlock, 1985; Bourke, 1989). Some empirical studies on the bank profitability are on individual country basis, while others have focused on a panel of countries or regions. Examples of single country studies are those for the US (Hoffmann, 2011), the U.K. (Saeed, 2014), Greece (Athanasogloua et al., 2008; Alexiou & Sofoklis, 2009), China (Sufian & Habibullah, 2009), Malaysia (Ramlan & Adnan, 2016), and Pakistan (Dawood, 2014). There are other important studies which assess bank profitability by groups of countries such as Europe (Molyneux & Thornton, 1992; Goddard, Molyneux, & Wilson, 2004), South Asia (Sufian, 2012), Sub Saharan Africa (Flamini, McDonald, & Schumacher, 2009), and Europe, North America and Australia (Bourke, 1989).

However, very limited research are available on bank profitability which focuses on specific groups or types of banks, such as investment banks, universal banks, conglomerate banks or Islamic banks. Some research emphasize on Islamic banking such as Bashir (2003), Ascarya & Yumanita (2010), Khediri et al. (2016), Zarrouk et al. (2016), Ramlan & Adnan (2016) and Aliyu & Yusof (2016).

Most of the research on the profitability of banks divides the important determinants into three factors, namely bank specific factors, industrial factors and macroeconomic factors. Bank specific factors could include bank size, capital adequacy or insolvency risk, credit risk, liquidity risk, operational efficiency or business model (Bashir, 2003; Athanasogloua et al., 2008; Curak, Poposki, & Pepur, 2012; Petria et al., 2015; Zarrouk et al., 2016). Industry factors could comprise market concentration, ownership structure or stock market capitalization (Bashir, 2003; Athanasogloua et al., 2008; Curak et al., 2012; Petria et al., 2015 Athanasoglou et al., 2008; Ćurak, et al., 2012; Petria et al., 2015). Macroeconomic factors that influence profitability include Gross Domestic Product (GDP) and its growth (GGDP) (Bashir, 2003; Curak et al., 2012; Aliyu & Yusof, 2016), inflation rate (Molyneux & Thornton, 1992; Bashir, 2003; Athanasogloua et al., 2008; Zarrouk et al., 2016; Aliyu & Yusof, 2016), or the exchange rate (Aliyu & Yusof, 2016) or money supply (Molyneux & Thornton, 1992).

To determine the role of risk factors, industry and country specific factors, most research use panel data between countries and some use time series data for a specific country. The most analytical method they use is the analysis of panel data, such as simple panel regression and the Generalized Methods of Moment (GMM) (Molyneux & Thornton, 1992; Bashir, 2003; Zarrouk et al., 2016). Some research use a simple OLS method (Ramlan & Adnan, 2016) and dynamic models such as Error Correction model (ECM) (Curak et al., 2012).

At first, the profitability measured by the ratio of return on average assets (ROAA) and or returns on average equity (ROAE) and examines the internal and external factors that affect the bank's profitability. Bourke (1989) adds a measure of profitability into three which are Return on Capital, return on Asset and value added return on total assets. Recently, those third indicators have been widely used and developed into a variety of indicators such as profit to capital and reserve ratio and total borrowing (Molynex and Thorthon, 1992), Profit Before taxes to Asset Ratio (Bashir, 2003), and net profit margin for Islamic banks (Zarrouk et al., 2016).

Research on the banks profitability generally does not provide the same conclusion. With regard to the risk models, most studies have found a positive relationship between capital ratio (equity to total assets) to profitability (Alexiou & Sofoklis, 2009; Ismail, Amin, Syaheri, & Hashim, 2014; Syafri, 2012; Dawood, 2014; Saeed, 2014). While others found a negative relationship between the ratio of capital to profitability (Hoffmann, 2011; Gul, Irshad, & Zaman, 2011).

Meanwhile, most of the research expect the negative relationship between credit risk to profitability as measured by the non-performing loan (NPL) or loan loss provision against total loans (LLPTL) (Molyneux & Thornton, 1992; Bashir, 2003; Zarrouk et al., 2016). But empirically, the results were not conclusive, whether its effect is positive (Sufian, 2012; Zarrouk et al., 2016), or negative (Ayanda, Christopher, & Mudashiru, 2013).

On the other hand, in general, liquidity risk is expected to play a positive significant effect on banks' profitability. This means that the higher the liquidity position of the bank will encourage banks to be more profitable (Sufian & Habibullah, 2010; Dawood, 2014; Saeed, 2014). However, some research found negative of liquidity risk to bank's profitability (Alexiou & Sofoklis, 2009; Nahang & Araghi, 2013).

The references above are not conclusive and this study will examine the determinants of profitability of Islamic banks as measured by three indicators as used by Bashir (2003) and Zarrouk et al. (2016). But we do not use NPM or NIM as a measure of profitability, but we use Value Added (VA) as used by Bourke (1989) and Molyneux & Thornton (1992). The independent variables were used overall risk relevant for Islamic banks, i.e. four types of risk. The credit risk is measured by financing loss provision to total financing (FLPTF) and financing to deposit ratio (FTA) as used by Zarrouk et al. (2016) and Khediri et al. (2016). We use liquidity risk measures following Khediri et al. (2016), as well as the risk of insolvency used. We add operational risk as used by Zarrouk et al. (2016).

Research Method

Following Bourke (1989) and other previous research, as dependent variables, this paper uses the return on capital, return on assets, and value added return on asset. Return on capital is measured by average return on equity (ROAE), while return on assets is measured by average return on assets (ROAA), and value added return on total asset is measured by the ratio of net profit before taxes plus staff expenses to total assets (PBTTA). The selection of explanatory variables and hypotheses used in this study are based on a sound theoretical framework and the results of previous research.

Credit risk

Credit risk refers to the risk that borrowers or debtors may not repay a loan or financing facilities and that the lender or the financier may lose the principal of the loan/financing or the interest/profit margin associated with it. Credit risk arises because debtors expect to use future cash flows to pay current debts. Mostly credit risk could be reflected from the loan loss provision to total loans (LLPTL), nonperforming loan (NPL), or total loan to total assets (Khediri et al., 2016; Bitar, Saad, & Benlemlih, 2016).. Those ratios measure loan quality with higher values indicating poorer loan quality or higher protection against credit default risk. For the robustness tests, we use nonperforming financing to total loans (FLPTF) and Financing to Total Asset ratio (FTA) as being used by Khediri et al. (2016).

We hypothesize that the higher the credit risk the lower profitability of the banks, as common opinion among scholars (Bourke, 1989; Molyneux & Thornton, 1992; Athanasogloua et al., 2008). All ratios expected decrease in asset quality and credit risk and in turn reduce bank's profitability.

Insolvency risk

Insolvency risk relates to the capital strength of the bank and it is considered to be an important factor in affecting and explaining bank profitability. Sufficient amount of equity, measured by ratio of equity to total asset (ETA) or Debt to Total Asset (DTA), allows bank to absorb any shocks that it may experience.

Higher capitalization, which serves as a safety cushion, implies lower insolvency risk (bank is safer) and according to the risk-return hypothesis, a lower profitability is expected (negative relationship) (Curak et al., 2012). However, creditworthiness of better capitalized and safer banks encourage the confidence of depositors which lowers interests as funding costs and the need for external financing, thereby lowering interest expenses. Therefore, higher equity to asset ratio (lower risk) would imply higher profitability (positive relationship). (Bitar et al., 2016; Athanasogloua et al., 2008).

We hypothesize that the risk of insolvency affecting important for Islamic banks, but could be positive or negative, given that some Islamic banks are quite new entries, but most of them are part of a development of conventional banks, such as opening Islamic windows or dual bank system whose have been good credit worthiness. This hypothesis was also made by previous researchers (Dietrich & Wanzenried, 2014; Petria et al., 2015; Khediri et al., 2016).

Liquidity risk

Liquidity risk refers to the risk stemming from the lack of marketability of an investment or asset that cannot be bought or sold quickly enough to prevent or minimize loss. The common rule of thumb is that the smaller the size of the marketable security or its issuer, the larger the liquidity risk. Some research used Loan to customer deposit (LTD) to show the liquidity risk considering that if this ratio increase, e.g., banks use less deposits to grant loans or grant more loans without increasing the deposits, then bank performance deteriorates (Petria et al., 2015). However the bank loan could be financed from other source of funding, not only deposit. Therefore this study consider the cash and due from bank to total asset (CTA) and the cash and due from bank to total deposit (CTD) as proxies for the liquidity risk. Both ratios reflect the short term funds available for liquidity purposes (Bashir, 2003). Lower CTA or CTD ratios reflect the higher liquidity risk which in turn lower the ability of bank to generate profit, and then we have a negative relationship hypothesis between the liquidity ratio and profitability.

Operational risk

Operational risk can commonly be defined as the risk of monetary losses resulting from inadequate or failed internal processes, people, and systems or from external events. Because the risks from internal problems will be closely tied to a bank's specific products and business lines, banks should be more firm-specific than the risks due to external events. There is no clearly established, single way to measure operational risk on a firm-wide basis. Instead, several approaches have been developed the operational risk could be identified form the operational cost efficiency. It is because operational cost comprises staff salaries, property costs, administrative costs, excluding losses due to bad and non-performing loans. Accordingly, we expect higher cost-income ratios to have a negative relationship with bank profitability.

In order to generate a robust estimator, we include some control regression variables, i.e. bank's size, industry specific factors and country specific factors. Size is introduced to account for existing economies or diseconomies of scale in the market. Smirlock (1985) finds a positive and significant relationship between size and bank profitability. But some argued that the effect of size depend on the bank capital adequacy (Short, 1979; Goddard et al., 2004). Therefore this study does not have expectation of positive relationship between size and profitability of Islamic banks, considering that the observed banks in this research is scattered in various countries with various capital adequacy.

External control variables comprise those that represent banking industry (market) and macroeconomic characteristics. Aiming to control for external industry features, previous studies (e.g. Bashir, 2003; Athanasogloua et al., 2008; Curak et al., 2012; Petria et al., 2015) include variables such as bank market concentration, bank ownership, and banking sector development, whereas variables such as GDP level or growth, inflation, interest rates, or financial system features are used to describe macroeconomic conditions. Two opposite hypothesis are prevalence. The positive relationship between market concentration and bank's profitability is supported the classical SPC (Structure-Performance-Conduct) hypothesis, while negative relationship is accepted considering that efficient firms increase in size and market share because of their ability to generate higher profits, which usually leads to higher market concentration. Thus, the positive relationship between profits and concentration is explained by lower costs achieved through either superior management or production processes (Goldberg & Rai, 1996).

Because data market concentration is limited, this study uses the ratio of bank credit to GDP to measure the Banking Sector Development (BSD) and the spread to measure the efficiency of the banking

sector. The high BSD reflects the growing banking sector and expected to boost the profitability of banks. The high spread reflects the inefficiency of the banking sector or the market concentration in the banking sector. The effect of spread to banks' profitability could be positive or negative.

Table 1. Definition, notation and the expected effect of the explanatory variables of the model

Variable	Measure	Notation	Expected effect	Source
Dependent variable:				
Profitability	Net profit before taxes/average assets	ROAA		Fitch Connect
	Net profit before taxes/average equity	ROAE		Fitch Connect
Value Added	(Profit before taxes + staff expenses)/ total assets)	PBTTA		Fitch Connect
Independent variables:				
Bank' Risk:				
Credit risk	Financing loss provision/total financing	FLPTF	Negative	Fitch Connect
	Financing/total assets	FTA	Negative	Fitch Connect
Insolvency risk	Equity/total assets	ETA	+/-	Fitch Connect
	Debt /total assets	DTA	+/-	Fitch Connect
Liquidity risk	Cash and cash-equivalent/total assets	CTA	Positive	Fitch Connect
	Cash and cash-equivalent/total deposits	CTD	+/-	Fitch Connect
Operational risk	Operational costs/comprehensive income	OCI	+/-	Fitch Connect
	Operational costs/total assets	OCTA	Negative	Fitch Connect
Size	Log (Total assets)	LgTA	+/-	Fitch Connect
Industry Specific:				
Banking Sector Development	Domestic Credit provided to private sector/GDP	BSD	Positive	Worldbank.org
Spread	Financing interest minus deposit interest	Spread	Positive	Worldbank.org
Macroeconomic Specific:		INF	+/-	Worldbank.org
Inflation	Inflation, average consumer prices per cent change			
Dummy variable:		Malaysia	Positive	
Country		Pakistan	+/-	
	Malaysia as a dummy variable	MosPop	Positive	Islamicweb.com
	Pakistan as a dummy variable			
	Moslem population proportion/total population (%)			

The focus independent variables are bank risks which include credit risk, insolvency risk, liquidity risk and operational risk, while controlling variables comprises of bank specific variable (bank's size), industry specific variables (banking sector development and deposit interest rate) and macroeconomic variables (inflation and economic activities). We also introduce Muslim population as a country specific variable, considering that most Islamic banks operate in Moslem majority countries. We include two dummy variables, which are the country aspect. Economic structure, historical background, social norms and cultural and religious values among countries are diverse in many ways. We use Malaysia and Pakistan as dummy variable considering 28 percent and 11 percent of sampling banks are head quarter in Malaysian and Pakistan.

We collect the data of Islamic bank in 2015 from the Fitch Connect database and we edit the data in order to use it for out statistical analysis. Given than our focus in on Islamic commercial banks, we exclude central bank, securities companies and non-bank credit or saving institutions. We limit only banks that provide complete data such as required variables.

Table 2. Islamic banks in sample by region category

Region	Total Islamic bank (Fitch Connect)	Investment & Securities companies	Islamic banks	complete data
MENA	58	10	48	30
Asia	48	2	45	41
Western Africa	4	1	3	2
Europe	6	1	4	2
Total	116	14	100	75

Bank-risks, industry specific factors and macroeconomics variables are used into an estimable model to capture their effect on Islamic bank profitability. The general model is specified as follow:

$$\Pi_i = c + \sum_{j=1}^{9} \beta_j BR_i + \sum_{j=1}^{2} \beta_j S_i + \sum_{j=1}^{3} \beta_j C_i + \varepsilon_i$$

Π_i is the profitability of bank i, with i = 1, . . ., N, c is a constant term, BR_i's are the bank-specific risks and S_j's are banking sector specific factors, C_i are country specific factors and ε_i is the disturbance. Bank risks (BR_i) comprises of four types of risk with 8 (eight) proxies variable as presented in table 1. We also include bank's size as measured by the logarithm of the total assets (LgTA). Industry specific factors (S_j) refers to the development of financial sector in a country and it is measured by two main proxies, i.e. Banking Sector Development (BSD) which is the contribution of banking credit to private sector in proportion to the Gross Domestic Product and Spread which is the difference between average lending interest and deposit interest. Country specific factor could be many but we choose inflation (INF) and moslem population (MosPop) as proxies variables.

Regarding estimation we use a robust linear regression panel estimator. It is a simple linear regression model which consider heteroscedasticy and normality issues. We choose this method because of the available data on cross-sectional basis, but we ascertain that this model could perform with BLUE estimators as suggested by Demirguc-Kunt & Huizinga (1999).

Results and Discussion

In the first step we carry out descriptive statistic and ANOVA univariate tests to identify some basic relationships between variables. In our second stage, analysis on ROAA, ROAE and VA will be discussed.

Univariate results

Table 3 provides descriptive statistics of each variable for 75 Islamic banks in 24 countries. Statistically, the profitability of Islamic banks on average is quite low, 0.64% and 8.15% measured by ROAA and ROAE respectively. The variation in profitability between banks is very high, because some, 11 sample banks, suffered losses during the observation period. On the other hand, Value Added (VA) of sample banks averaged 17.9% with a fairly high variant as well. VA shows the ability of banks to contribute to shareholders, investors and banks' staff. From Table 3 it can also be seen that some banks are experiencing negative capital or in high insolvency risk which is seen from negative values in Equity/total Asset ratio. Then it can be justified that the profitability conditions of sample banks are quite varied so it is reliable to be the object of profitability analysis of Islamic banks, although only limited to one year period.

Table 3. Descriptive statistics

Variable	Notation	Obs	Mean	Std. Dev.	Min	Max
Net profit before taxes/average assets (%)	ROAA	75	0.64	1.96	(8.29)	5.25
Net profit before taxes/average equity (%)	ROAE	74	8.15	11.40	(49.28)	48.10
(Profit before taxes + staff expenses)/total assets (%)	PBTTA	75	17.09	128.37	(5.23)	1,113.81
Financing loss provision/total financing (%)	FLPTF	75	6.20	9.37	0.02	46.98
Financing/total assets (%)	FTA	75	58.41	22.39	0.34	112.34
Equity/total assets (%)	ETA	75	15.88	25.57	(120.66)	97.80
Debt /total assets (%)	DTA	75	76.59	25.96	0	189.66
Cash and cash-equivalent/total assets (%)	CTA	75	12.30	11.35	0	66.79
Cash and cash-equivalent/total deposits (%)	CTD	72	34.22	97.04	0	820.00
Operational costs/comprehensive income (%)	OCI	75	8.49	22.78	(8.43)	184.82
Operational costs/total assets (%)	OCTA	75	5.74	4.58	1.09	35.43
Log (Total assets)	LgTA	75	7.19	1.77	2.08	10.79
Domestic Credit to private sector/GDP (%)	BSD	74	84.26	51.86	0	162.51
Lending interest minus deposit interest (%)	Spread	74	1.81	2.06	(2.09)	7.70
Inflation, average consumer prices % change	INF	74	3.53	4.74	(0.87)	16.91
Moslem population/ total population (%)	MosPop	74	77.22	25.66	2.70	100

Furthermore, Table 4 illustrates that the profitability of Islamic banks between regions is not different, but rather the differences occur between countries. Due to the differences between these countries, then in the regression analysis we include elements of the country, namely Malaysia and Pakistan, as explanatory variables. Malaysia contributes 21 Islamic banks while Pakistan 8 Islamic banks in this analysis. From the risk perspective, statistically the risk of Islamic banks in each country is different but few is not. Credit risk (FLPTF, FTA), liquidity risk (CTA, CTD) and operational risk (OCI) of each country tend to be different, but the risk of insolvency (ETA, DTA) tends to be the same. This is very relevant to the fact that every country has similar banking capital requirement as emphasized by Basel Accords. The average asset (TA) of observed Islamic banks also is not significantly differing among regions or countries.

Table 4. Analysis of variance (ANOVA) between regions and countries

Variable	ANOVA F-stat		Variable	ANOVA F-stat	
	Region	Country		Region	Country
ROAA	1.83	4.39***	CTD	0.68	69.89***
ROAE	0.75	1.91**	OCI	0.2	1.85**
PBTTA	0.52	21812.41***	OCTA	0.56	1.19
FLPTF	0.4	1.89**	TA	0.26	0.74
FTA	3.64**	3.26***	BSD	9.1***	~***
ETA	0.61	1.31	Spread	1.76	7.3E+32***
DTA	1.11	1.23	INF	1.66	~***
CTA	2.24*	4.6***	MosPop	23.74	~***

Regression results

Given the heterogeneity of our sample and normality issue, we carry out the following robustness tests to make sure that our results are not driven by extreme values in our data or specific data specification. First, our results might be affected by extreme values of certain explanatory variables, such as bank size, development of banking industry or other country specific explanatory variable, e.g., countries with very high inflation rates might drive the corresponding results. Therefore we include control variables gradually, starting from the bank size (LgTA in model A2 and RA2 in Table 5), industry specific factor (Banking Sector Development and interest spread) and country specific variables (inflation and number of Muslim population). Second, because we run a multiple linear regression model, we carry out a Ramsey-reset test to provide information about the linearity in explanatory variables. Low F-stat (without asterisks) shows that the linear model is appropriate. Based on the available data we do not find any issue of linearity on our estimation. Third, we also provide heteroskedasticity test using Breusch Pagan Chi-2 test. The low value of the Chi-2 stat (without asterisks) indicates the absence of the issue of heteroskedasticity in the model. We did not find any heteroskedasticity problems of our data, probably because our data are 75 Islamic banks in 24 countries, so there is no close correlation among the individual banks' performance. Fourth, we carry out the VIF tests for multicollinearity issue. Multicolinearity problem could be identified from the high value of VIF, which is commonly more than ten. We found that the maximum values of VIF are lower than 10.000 and it shows that there is no issues on multicollinearity. Fifth, we also present a normality test for the error term based on statistical skewness and kurtosis test. Unfortunately, we found normality issue. The models entirely (A1, A2, A3, A4 and A5) indicate the problem of normality, as shown in the figure 1a and 1b on the leverage point which indicate few banks that become outliers, such as Housing Development Finance and Syria International Islamic Bank. Considering normality issue, we do robust regression for each step, as indicated by the model RA1, RA2 to RA5. Therefore Table 5 shows the stable regression coefficients and these models could be the subject of analysis.

Empirical results for ROAA

Table 5 shows the results of the regression for the main variables, namely ROAA. The differences in each model column shows the difference in the independent variables used. The analysis of ROAE and PBTTA we present separately.

Of the four types of risks, three variables have stable or robust coefficients, namely credit risk (FLPTF), insolvency (DTA) and operational risk (OCTA). It is shown that stability of the magnitude and sign of the coefficients after the control variables included, either for the model of RA1 to RA5. FLPTF

have a negative association with banks' profitability. This is in accordance with the common hypothesis, such as Athanasogloua et al. (2008) and Bitar et al. (2016), whereas the higher non performing financing will erode banks' profitability.

The financing loss provisions relative to total financing (FLPTF) is a measure for credit quality and credit allocation. The results show that this variable has a statistically small but significant negative effect on the Islamic bank profitability in all models. Control of the impact of credit risk is quite big issue. Controlled by industry specific variables (e.g. BSD and spreads), the effect of the credit risk on ROAA decrease significantly from -0,074 to -0,065 (see Model RA1 and RA4). Much more interesting when the control variables on country specifics (e.g. inflation and Moslem population) are included, then the role of credit risk fell to -0.024. This shows the importance of the role of the banking sector and macro-economic stability on Islamic banks profitability. In line with the research Bitar et al. (2016), it is still relevant because until today the share of Islamic banks in the country is still very small compared to the conventional banks. While variable FTA, total financing to total assets ratio, does not have a significant role to the ROAA. This result is in line with the finding which was not conclusive. Some research find the FTA play a negative role on profitability (Curak et al., 2012) and others found a positive effect (Syafri, 2012). This means that the ratio of total financing may not be accurately reflect of credit risk on Islamic banks.

Table 5. Regression results ROAA on bank's risk, sector and country specifics

Dependent Variable: ROAA

Variables/Model		A1	RA1	A2	RA2	A3	RA3	A4	RA4	A5	RA5
Credit risk	FLPTF	-0.027	-0.074***	-0.032	-0.071***	-0.031	-0.065***	-0.010	-0.026***	-0.024*	-0.021***
	FTA	-0.017	-0.017**	-0.018	-0.017**	-0.011	-0.008	-0.006	-0.004	-0.009**	-0.0004
Insolvency risk	ETA	0.029*	-0.004	0.029*	-0.004	0.035**	0.001	0.038**	0.014***	0.037***	0.030***
	DTA	0.031*	-0.005	0.032*	-0.006	0.035*	-0.009	0.031*	-0.001	0.033***	0.013**
Liquidity risk	CTA	-0.019	0.003	-0.023	0.005	-0.027	0.030	-0.019	0.046***	0.0004***	0.032***
	CTD	0.002	0.001	0.002	0.001	0.002	-0.016**	0.000	-0.027***	-0.019*	-0.054***
Opera-tional risk	OCI	-0.001	-0.004	-0.002	-0.004	-0.004	-0.007	-0.003	-0.005***	-0.005**	-0.006***
	OCTA	-0.139***	-0.058**	-0.143***	-0.054*	-0.153***	-0.080***	-0.178***	-0.175***	-0.145	-0.168***
Size	LgTA			-0.051	0.034	0.081	0.039	0.088	-0.054	-0.043	
Sector specific	BSD					-0.011***	-0.007***	-0.007*	-0.002**	-0.008**	-0.008***
	Spread					0.054	-0.045	0.076	-0.025	0.026	-0.017
Country specific	INF							0.116***	0.127***	0.094***	0.126***
	Malaysia									0.679	0.689***
	Pakistan									-1.127	-0.517***
	MosPop									0.0132***	0.009***
	Constant	-0.011	3.007***	0.400	2.714**	-0.215	3.287***	-1.205	2.266***	-1.621	0.110
Number of Observation		72	72	72	72	71	70	71	70	71	70
F-stat		3.270	8.460	2.880	7.260	3.200	8.130	4.000	60.670	3.610	53.990
adjusted R-squared		0.204		0.193		0.257		0.340		0.359	
Ramsey reset F-stat		0.744		0.749		0.883		0.955		0.860	
Maximum VIF		5.030		5.590		5.760		5.800		5.820	
Breusch-Pagan Chi-2		1.550		1.160		0.400		1.500		0.180	
Normality chi-2		7.78***		7.09***		7.01***		11.93***		12.03***	

Note:
different observation on common model and robust model reflect the outlier exclusion on the robust model. Model with prefix R refers to a robust model, which already consider heteroscedasticity and normality problem. Before running robust regression, we evaluate the leverage of the model to find outliers.
* Coefficient that is significantly different from zero at the 10% level
** Coefficient that is significantly different from zero at the 5% level
*** Coefficient that is significantly different from zero at the 1% level

The capital risk, measured by the equity to total asset ratio ETA, has significant positive effects on the ROAA. This implies that the higher capital adequacy banks have in a country, the safer banks from bankruptcy and then the higher banks' profitability. This result is also in line with many previous research (Athanasogloua et al., 2008; Bitar et al., 2016; Molyneux & Thornton, 1992) On the other hand, the capital risk, measured by the ratio of debt to total assets DTA, also has a positive effect on the ROAA, especially when controlled by an industry and country specific factors (Model RA5). In contrast with Bashir (2003) who found a negative effect on the DTA to ROAA, the positive effect indicates that the higher the debt portion of Islamic banks actually lead higher profitability. This is because most of the debt is in the form of customer deposits and a small portion in the form of securities or other borrowing.
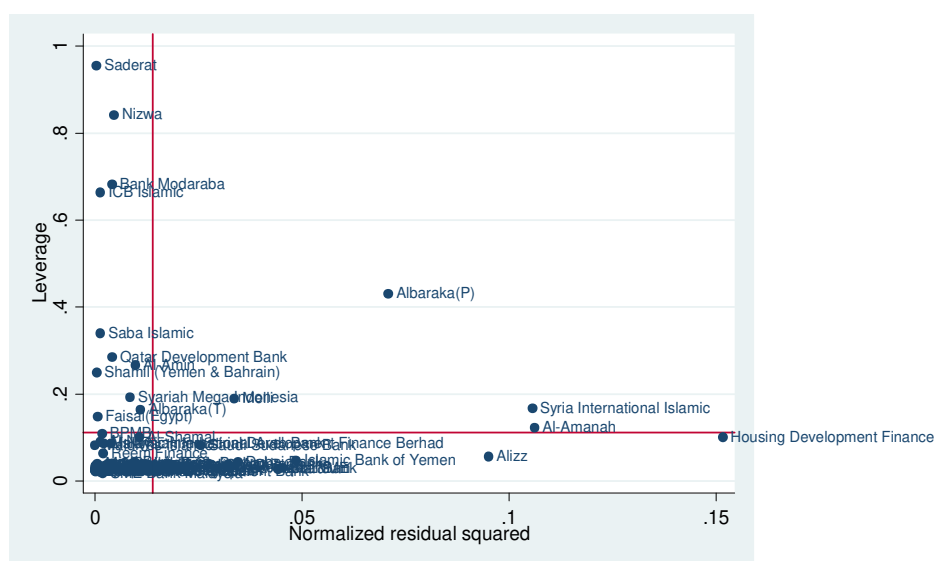
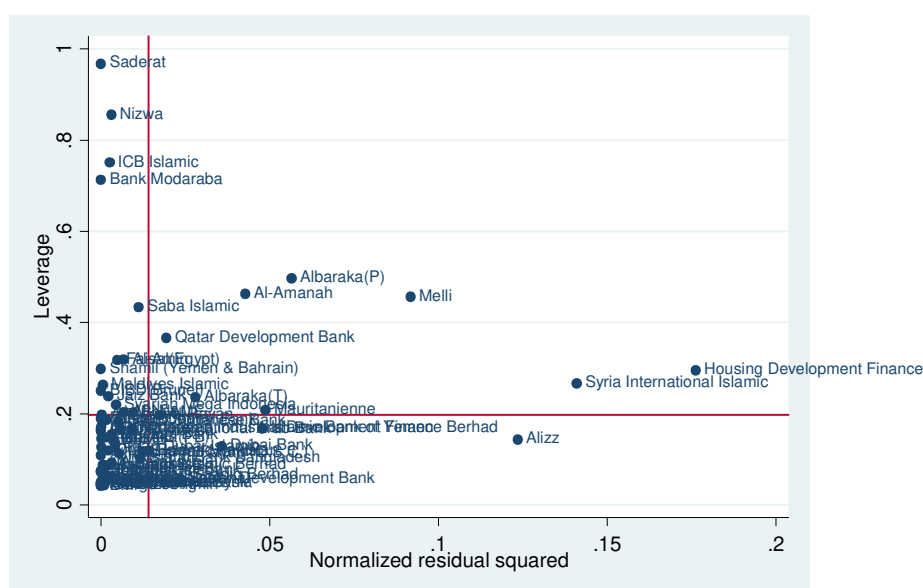**Figure 1a.** Leverage points in regression model A1

Figure 1.b. Leverage points in regression model A5

Liquidity risk, measured by the ratio of cash and due from banks on assets CTA, has a positive effect on ROAA after the control industry and country specific variables included. High CTA reflects the low liquidity risk and it contributes to the high profitability or ROAA. It is appropriate findings in line with Bashir (2003) , although contrary to the Molyneux & Thornton (1992), which found a negative effect. we find that high liquidity risk (or low liquidity ratio) in Islamic banks actually associated with a lower ROAA. This can be explained that in general Islamic banks have limited liquidity instruments and liquidity market, so there is a tendency to hold higher liquidity ratio in order to maintain the banks' business cycle. The ability to hold a high CTA can only be done by a bank with high profit. However, further research on the causality between profitability and liquidity risk is needed. We also found a negative relationship between the cash to deposit ratio (CTD) on the ROAA. This indicates that the higher deposit (relative to cash) push ROAA to rise. The more bank hold the deposit in cash (higher CTD) then the higher the potential for ROAA to fell, even though in small rate, i.e. 5.4 percent (look at model RA5).

The operational risk has significant negative effect on ROAA, either it is measured by cost-to-income ratio (OCI) or cost-to-total-asset ratio (OCTA), which confirm to our expectation. This result,

consistent with the results of Athanasogloua et al. (2008) clearly shows that an efficient cost management is a prerequisite to improve the profitability of banks around the world. Interestingly, we observe that operational risk has the greatest impact compared to other risks on the ROAA. Operational risk coefficient is -0,168, five to eight times greater than the effect of liquidity risk, capital risk and capital risk to the ROAA. It clarifies the importance of operational efficiency in Islamic banks.

As to size of the bank, we used a logarithmic of bank assets (LgTA), and found empirical evidence that there is no significant role of size to banks' profitability, either before or after controlled by industry or country specific factors. It asserted some previous research (Dawood, 2014) that Islamic banks do not enjoy the profit due to high product or financing diversification and/or economies of scale.

The industry specific factors, banking sector development (BSD) has a negative role and significance on the ROAA. BSD, we measure with the ratio of banking credit sector to the private sector to GDP, could indicate the level of financial literation of the country. This implies that the higher the financial literation precisely related to the lower ROAA of Islamic banks. It means that the high penetration of credit nationwide does not contribute positively to the ROAA of Islamic banks, although some found a positive relationship between financing growth in Islamic banks to their ROAA (Saeed, 2014; Syafri, 2012). Besides, the spreads, the difference between the loan interest to deposit interest in a country, we use it to describe the efficiency and competition level of the banking sector, due to limited data on market concentration. Low spreads could indicate the high level of competition in banking, and it has a positive effect on the ROAA. Both of these finding indicate that financial literacy is not a significant impact on ROAA while sector banking efficiency has the potential to increase the ROAA of Islamic banks.

Finally, we find that the country specific factor has a positive role to the ROAA, such as Inflation rate, as being found by Bashir (2003). The interesting thing is the positive role of the number of Muslim population of a country to the ROAA. Countries with higher Muslim population are higher in relation to the ROAA. Whether it is relates to the role of the Muslim as the main customers of Islamic banks need to be further investigated. On the other hand, as mentioned previously of the variation of ROAA among countries, we found that the ROAA Islamic bank in Malaysia on average was higher than other countries, and it can be seen from a positive and significant coefficient of Malaysia (Model RA5). Conversely, Pakistan experienced the lower average ROAA than that of the Islamic banking globally.

Empirical results for ROAE and VA

This section presents the results of regression with the dependent variable ROAA, ROAE and VA after passing the robustness test. The last column in table 6 shows stability of regression coefficients using three different variable of profitability.

In general, the variable ROAE confirms some similarities to the role of risks on the ROAA, where operational risk (OCTA) has the most dominant role also. Similarly, credit risk (FLPTF) also has a negative effect on profitability-ROAE.

The interesting thing is the difference in the role of liquidity risk and insolvency risk. While the insolvency risk has a negative impact on the ROAA, but this risk does not have significant effect on ROAE. Meanwhile, liquidity risk has the opposite effect on ROAA compared with ROAE. Model RA-5 found that the decrease in liquidity (CTA) tends to reduce profitability-ROAA, while the model R-ROAE found the opposite result, i.e. to increase the profitability-ROAE. This indicates that banks with low capital ratio (CTA) tend to enjoy the low liquidity rather than banks with high capital ratio. It can be shown from the two-sample t-test which indicates that bank with lower CTA has significantly higher ROAE than banks with higher CTA.[1]

On the other hand, the results of regression with VA as dependent variable confirm the identical results with ROAA model. The difference is in the role of the control variables, either in term of bank's size, industry or country specific factors. Size, BSD and Spreads have a significant role to the VA. In term of Size there is a diseconomy of scale, whereas small banks tend to get higher VA than large banks. This is reasonable, because VA is measured by the profit before taxes plus employee expenses. Other interesting thing is that the ROAA each country tend to different but not for ROAE and VA.

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[1]Two-sample t-test splits the observations into two according to the level of CTA. The test shows that the average of ROAE between two sample is significantly different, whereas ROAE for banks with low CTA below the average) is 9.97% on average, while that for banks with high CTA (above the average) is 2.90% on average. The t-stat is 3.015 and significant at the 1% level.

Table 6. Regression results ROAA, ROAE and VA on bank's risk, sector and country specifics

Variables /Model		R-ROAA RA5	R-ROAE	R-VA	Stability of coefficient
	FLPTF	-0.021***	-0.460***	-0.046***	-/-/-(s)
Credit risk	FTA	-0.0004	-0.114**	-0.008	0/-/0(ns)
	ETA	0.030***	*0.063*	0.058***	+/0/+(ns)
Solvency risk	DTA	0.013**	*0.052*	0.062***	**+/+/+(s)**
	CTA	0.032***	-0.178***	0.027***	+/-/+(ns)
Liquidity risk	CTD	-0.054***	0.428***	-0.069***	-/+/+(ns)
	OCI	-0.006***	*-0.011*	-0.007*	-/0/-(ns)
Operational risk	OCTA	-0.168***	-0.568***	-0.252***	-/-/-(s)
Size	LgTA	-0.043	3.188***	-0.331***	-/+/-(ns)
	BSD	-0.008***	*-0.020*	-0.022***	-/0/-(ns)
Sector specific	Spread	-0.017	*-0.738**	0.128**	0/-/+(ns)
	INF	0.126***	0.782***	0.146***	+/+/+(s)
Country specific	Malaysia	0.689***	*1.050*	*0.513*	+/0/0(ns)
	Pakistan	-0.517***	*-1.099*	*-0.492*	-/0/0(ns)
	MosPop	0.009***	*0.0444*	*0.005*	+/0/0(ns)
Constant		0.110	-13.280	1.860	0/0/0(s)
Number of Observation		70	70	69	
F-stat		77.810	18.33	43.23	
adjusted R-squared			0.4934	0.0541	
Ramsey reset F-stat			2.07	417.09***	
Maximum VIF			4.88	5.82	
Breusch-Pagan Chi-2			0	412.31	
Normality chi-2			21.28***	~***	

Note: all model in the above table already being estimated using robust method, due to heteroscedasticity and normality problem. As we can see the number of observation of model VA has been reduced due to outlier problem. Those models are estimated using Stata-13 software. The last column indicates the stability of the regression coefficient among three models. Zero (0) sign refers to insignificant coefficient or at the level of more than 10%.
* Coefficient that is significantly different from zero at the 10% level
** Coefficient that is significantly different from zero at the 5% level
*** Coefficient that is significantly different from zero at the 1% level

Conclusion

This study found that the effect of the risk on the profitability of Islamic banks tend to follow a common pattern. Islamic banks globally are a small part of the banking industry of each country. This study shows the importance of banks' risk to banks' profitability. While conventional banks have been to notice the importance of capital and liquidity risks, as highlighted in the Basel-3, Islamic banks are more influenced by the operational risk other than capital or liquidity risks.

Of the four hypotheses about the risk, this study confirmed the truth of all hypotheses, either relates to credit risk, operational risk and insolvency and liquidity risks which all have a negative impact on profitability. On the other hand, bank's size has no significant impact on profitability, while the macroeconomic environment contributes to encourage profitability as expected. The industry specific factors show that the role is less significant to profitability of Islamic banks.

Limitations of the data in this study also limit the estimation tools to choose from. The inability to explain causality requires time series data or panel for further study. However, the results of this study contribute to the findings of the role of risk in Islamic banks globally.

Further research is needed to identify in depth, the precise impact of each risk on banks' profitability. Similarly, some of our findings on the uniqueness of Islamic banks should be further studied whether this is merely an even case or long-term pattern. For example is about the ambiguous role of liquidity risk to banks profitability and high impact of operational risk or efficiency to Islamic banking profitability.

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