

Profit efficiency of shariah banks in Indonesia and the determining factors: Using Stochastic Frontier Analysis Method

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ABSTRACT

This study aims to measure the efficiency of profit and examine the factors that affect the efficiency of shariah banks profit in Indonesia such as the size of banks, risk financing, and capital adequacy. This study used the Shariah banks in Indonesia, during the period of 2010-2014. These shariah banks were selected as the sample Commercial shariah banks and Shariah Business Units. This study uses three stages of research. First, it measures the efficiency of profit using a parametric approach that is Stochastic Frontier Approach (SFA). Secondly, it uses regression profit efficiency scores with various determinants of profit efficiency. The third phase is testing the efficiency score during the global crisis (2008-2009) and after the global crisis period (2010-2014). It shows that in overall there occurred profit efficiency in the shariah banks in Indonesia as it was indicated by the score of profit efficiency that is less than one. The inefficiency occurred in both Shariah banks and shariah business units. Bank size has a positive impact on profit efficiency. The bigger the bank, the better profit efficiency is. It can be implied that this research provides the managers the clues that shariah banks should improve their profit efficiency management. For Bank Indonesia, they can use this evidence to design policies that can encourage profit efficiency in shariah banks.

ABSTRAK

Penelitian ini bertujuan untuk mengukur efisiensi profit dan menguji faktor-faktor yang mempengaruhi efisiensi profit perbankan syariah di Indonesia, meliputi faktor ukuran bank, risiko pembiayaan, dan kecukupan modal. Obyek penelitian ini adalah perbankan syariah di Indonesia, dengan periode penelitian 2010-2014. Perbankan syariah yang dijadikan sampel adalah Bank Umum Syariah dan Unit Usaha Syariah. Penelitian ini menggunakan tiga tahap penelitian, pertama, mengukur tingkat efisiensi profit dengan pendekatan parametrik yaitu Stochastic Frontier Approach (SFA). Tahap ke dua, meregresikan skor efisiensi profit dengan berbagai faktor penentu efisiensi profit. Tahap ketiga, menguji skor efisiensi pada masa krisis global (2008-2009) dan setelah masa krisis global (2010-2014). Hasil analisis menunjukkan bahwa, secara keseluruhan masih terjadi infisiensi profit pada perbankan syariah di Indonesia yang ditunjukkan dengan skor efisiensi profit yang kurang dari satu. Ketidakefisienan tersebut terjadi baik pada bank umum syariah maupun unit usaha syariah. Ukuran bank mempunyai pengaruh positif terhadap efisiensi profit. Semakin besar bank efisiensi profit akan semakin baik. Implikasi dari penelitian ini adalah manajer bank syariah hendaknya meningkatkan efisiensi profit bank yang dikelolanya. Sedangkan bagi Bank Indonesia, hasil penelitian ini dapat digunakan untuk membuat desain kebijakan yang dapat mendorong efisiensi profit bank syariah di Indonesia.

1. INTRODUCTION

The economic phenomenon that needs to be paid attention is the interaction of Muslims with the

banks. The conventional banks have recently offered a system of interest, which in Islam, it is synonymous with *riba* (usury). Islam prohibits usury,

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and any violation of this provision is a sin to God. Therefore, shariah banks are required for they are free from the practice of usury. In this case, all Muslims can invest their money according shariah of Allah.

The presence of shariah banks, in addition to conventional bank, is to mark the beginning of a new era in the legal system of national banks, namely the era of dual banking system. Furthermore, the government has also issued the latest regulations regulating shariah banks in particular, through the Act 21 of 2008. The support of the shariah banks can be both in Muslim societies, religious institutions and the government for triggering the development of shariah banks so rapidly. Over the last five years, the progress of the development of Shariah banks has shown an impressive result, reaching an average asset growth of more than 65% per year (Bank Indonesia, 2014).

Shariah banking and other shariah banking sectors in general are the financial intermediary institutions, operating by collecting funds from the public in the form of savings and channelling them to other communities who need credit or financing. As a financial institution, the bank is an institution that is complied with regulations, among others; the bank needs to maintain its performance in order to operate optimally. Shariah banks have to compete with conventional banks are dominant, and has been growing rapidly in Indonesia. Competition in banking industry, technological innovation, and consolidation must be supported by sound management in order to survive. One of the factors that must be considered by the bank in order to survive or compete with other banks is efficiency performance, including profit efficiency. Thus, the issue of profit efficiency and the factors that affect it is essential for analysis.

At the end of 2008, the national banking industry faced with a global crisis in various parts of the world. Global financial crisis caused many companies and financial institutions that have experienced losses and bankruptcy. This condition gave significant impact on the banking industry around the world, to mention the shariah banks in Indonesia. The phenomenon of the impact of the global crisis on the performance efficiency of Shariah banking is important to study. Therefore, this study also analyzes the impact of the global economic crisis on the efficiency of Shariah banking in Indonesia. At this stage, is expected to reveal the resilience of shariah banking industries, especially in the aspect of profit efficiency in facing the global financial crisis.

This study describes the writing as the following. First of all, an introduction that discusses the research background, research purpose and significance of this research. The second part discusses the theoretical framework and the development of hypotheses, the third part presents the research methods, including sample data and research, research and research model variables were developed. The fourth section describes data analysis and discussion of the research results. The last section describes the conclusions, limitations and suggestions for subsequent research.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Shariah Banking

Shariah Bank is a financial institution whose main function is to raise funds distributed to society or institutions that need the system without interest. In Indonesia, the pioneer of Shariah banking is Bank Muamalat Indonesia (BMI). BMI stands in 1991 were initiated by the Indonesian Ulema Council (MUI) and the Government and the support of the Association of Indonesian Muslim Intellectuals (ICMI) and several Muslim businessmen. Nowadays, the existence of Shariah banks in Indonesia have been set in the Act that is the Laws of 1998 on the amendment of Law No. 7 of 1992 on Banking and Law No. 21 of 2008 concerning Shariah Banking. June 2014, there were 12 institutions of Shariah banks in Indonesia. Meanwhile, commercial banks have had business units of Shariah such as 24 banks (Bank Indonesia, 2014)

Basically, the existing products on the same Shariah banking to existing products on conventional banking, which comprises products fund (funding), product distribution of funds (lending), and product services (fee-based product). The difference is that the existing products in Shariah banks should not practice any interest that are expressly forbidden in Islam, namely the elements of gambling (*maisyr*), uncertainty (*gharar*), the element of interest (*riba*), elements of bribery (*riys-wah*), and an element of falsehood. Instead can be applied traditional Islam agreement or commonly known Shariah principles in banking products.

Efficiency and Parametric Approach for Measuring the Bank Efficiency

Efficiency is defined as the ratio between output to the input or the amount generated from one input which is used. A company can be said to be efficient when using the number of units fewer than the number of input units used by other companies

to produce the same output, or use the same input units, can produce greater number of outputs (Muazaroh, 2012).

Measuring the level of bank efficiency can be done using a variety of approaches. Such approaches include the traditional approach such as by using financial ratios, mathematical approach (non-parametric), and an econometric approach (parametric approach). Others can be done for measuring bank efficiency ratio are the Net Interest Margin, Return on Assets, Return on Equity, and ratios Operating costs to operating income (ROA). The parametric approach for measuring the efficiency of the approach includes the Stochastic Frontier Approach (SFA), Thick Frontier Approach, and Distribution Free Approach. This study uses a parametric approach Stochastic Frontier Approach (SFA), which is often referred to as the Econometric Frontier Approach. SFA developed by Aigner et al. (1971) establishing a functional form relations costs, profit or production between input, output, and environmental factors. In these function, it allows the random error.

Previous Studies

Some studies measuring the performance of banks have been conducted by several researchers, with different approaches. They were conducted with more emphasis on measuring the performance of Shariah banks compared to the performance of conventional banks. Sanker (1999) conducted an analysis of financial ratios to see the performance of Shariah banks in Bangladesh, using Bank Efficiency Model. Sanker (1999) stated that Shariah banking products have different risk characteristics. It has consequences that must be implemented prudentially different from conventional banks. Bashir (2001) conducted a regression analysis to determine the factors that affect the performance of Shariah banking in the countries of Middle East. The results showed that the performance of Shariah banks are namely profitability, most produced from overhead, short-term funding, and non-interest earnings assets. Drake and Hall (2003) tested the efficiency of Japanese banks in the period after the crisis. Their results showed that there is a strong relationship between the size of banks and efficiency, and occurs in both the technical and scale efficiency.

Studies on efficiency on banks with non-parametric approach to Data Envelopment Analysis (DEA) were also done among others by Yudhistira (2004) that examines the performance efficiency of 18 Shariah banks in the world with the period

1997-2000. The results showed that the inefficiency of Shariah banks in the sample studied was low, i.e. not more than 10% compared to conventional banks and there are diseconomies of scale for small banks-medium. Yudhistira suggested the need for a merger between the banks to make them more efficient. Nursyirwan (2010) was to measure the performance of Shariah banks and conventional banks that have Shariah business in Indonesia for 2006-2008. The results showed that the Shariah Banks and Conventional Commercial Bank having Shariah business units in Indonesia operated efficiently of 41.2% and the inefficiently 58.8%.

Pratikno and Lewis (2011) did a study to evaluate the performance of Shariah banking in Indonesia before and after the global crisis. Their results showed that the variables of input and output are likely to experience increased growth. They also concluded that there is a performance difference between before and after the crisis with the model scale. Another one was by Wahyuni and Fakhrudin (2008) analyzing the factors that affect the efficiency of the performance of Shariah banks with sustainability ratio at Bank Muamalat Indonesia, the period from 1992 to 2007. Their results provided empirical evidence that the most dominant factor affecting the sustainability ratio Shariah bank in Indonesia is the Capital Adequacy Ratio (CAR).

Further, Wahyuni (2014) evaluated the impact of the global crisis on the sustainability ratio Shariah banking in Indonesia and concluded that the global crisis has affected the business continuity ratio of shariah banking in Indonesia. Marie et al. (2013) studied the differences in the quality of our operating performance and profitability conventional banks and Shariah banks in Dubai with Parallel Data Envelopment Analysis approach. Their results showed that there was no significant difference between profitability and operations of conventional banks and Shariah banks in Dubai. However, Shariah banks have a good operational quality compared to conventional banks/commercial.

In fact, the studies measuring the banks' efficiency with the approach of Stochastic Frontier Approach (SFA) were also conducted by Kaparakis et al. (1994). Muazaroh (2013) examine the determinants of efficiency 121 conventional commercial banks in Indonesia with SFA model of 2005-2009. Research results show that a score of the commercial banks in Indonesia in the study period was not efficient. Muazaroh (2013) also found that the size of banks, credit risk, bank risk, and the market share of banks have a potential impact on the efficiency of the bank, while the capital structure does

not have a significant impact.

Hypothesis Development

The hypothesis in this study was formulated based on the conceptual theory and on empirical findings in previous research.

The Effect of Bank Size on Profit Efficiency

Some studies on the bank efficiency included the bank size as the factor affecting profit efficiency, but the results are not yet consistent. Research by Berger and Mester (1997); Kwan and Eisenbeis (1997) and Akhigbe and McNulty (2003) found a negative result but the study Berger et al. (1993); Drake and Hall (2003); Muazaroh (2013), found positive results. Still other studies (Cebenoyan, Cooperman and Hudgins, 1993; Fukuyama, 1993; Mester, 1996) found no significant results.

Referring to Berger et al. (1993), Drake and Hall (2003) and Muazaroh (2013), this study argues that large companies would be able to save on the cost of capital and resources used to manage risk so that there is a tendency for the banks to earn higher profit. In addition, large banks have a good reputation trusted by the customers so that the cost of third-party funds is low.

Based on the references, the first hypothesis to be tested is as follows:

H1: Bank size has a positive effect on the bank profit efficiency.

The Effect of Credit Risk on Profit Efficiency

Risk management analysis in banking sectors is important to do. The main risk faced by the bank as an intermediary institution is credit risk (financing). Changes in credit risk will affect the overall performance of the bank (Cooper et al. 2003). The higher the risk of a bank financing will lead to low levels of bank efficiency. Research conducted by Kaparakis et al. (1994) found a positive relationship between the inefficiency of banks and the ratio of non-performing loans to total loans. However, Muazaroh (2013) found no significant negative influence between the credit risk of banks and efficiency. Based on the description above, the second hypothesis to be tested is as follows.

H2: Risk financing has a negative effect on profit efficiency

The Effect of Bank Capital on Profit Efficiency

Capital in the banking industry is an important factor for determining the soundness of banks. The bank capital has two functions, as a source of funding and as a reserve to absorb losses incurred. As a

source of bank capital funding, it can directly affect the cost of the bank. In bank funding, the sources of funding can be grouped into two main groups, namely the funding of debt (current accounts and savings) and financing from its own capital. Both alternatives can affect the cost of funding viewed from two sides, namely from the point of acquisition cost of funds and the fees paid to the owner of the funds.

The capital also serves as the bank's capital reserves to absorb losses arising from risks resulting from banking activities such as market risk, credit risk, operational risk and other risks. Therefore, the amount of capital banks should be sufficient to cover losses that may arise. Capital adequacy to cover losses is also an important concern for the banking regulator, in this case, Bank Indonesia (Muazaroh, 2013). Research by Casu and Molyneux (2003) showed a positive relationship between bank capitals and efficiency. Furthermore, research by Muazaroh (2013) found a significant positive effect on profit efficiency. Based on the description above, the third hypothesis is as follows:

H3: Capital adequacy has a positive effect on profit efficiency.

3. RESEARCH METHOD

Data and Sample

This study used secondary data consisting of financial statement and annual reports, the data of financial statements of the balance sheet and income statement and the notes to the financial statements. They were taken from the website of Bank Indonesia (BI) www.bi.go.id.

The population is shariah banks operating in Indonesia during the period 2008 to 2014, both the status of shariah Banks (BUS) and Shariah business units (SBU), with the sample obtained through non-probability technique by purposive sampling method.

Variable Definitions and Measurements

Variables include the dependent variable and independent variables. The dependent variable of this research is the bank profit efficiency.. The independent variables are bank size, risk financing, and capital adequacy.

Dependent Variable

Bank profit efficiency was measured using the method of Stochastic Frontier Analysis (SFA). The reason researchers use a parametric approach because it can correct the weaknesses of non-parametric testing, particularly DEA. In addition, research

Table 1
Process and Results of Sample Selection

Shariah banks operating in 2014	12
Reduced by: Shariah banks which did not have complete data	(2)
Shariah banks for research sample	10
Total observation of shariah business units	50
Shariah business unit operating in 2014	24
Reduced by: shariah business units which did not have complete data	14
Shariah business units for the research sample	10
Total observation of shariah business units	50

Table 2
List of Sample for Shariah Banks and Shariah Business Units

No.	Names of Shariah banks	Shariah Business Units
1.	BCA Syariah	Danamon
2.	BNI Syariah	BII
3.	BRI Syariah	HSBC
4.	Bank Jabar Banten Syariah	Permata
5.	Bank MayBank Syariah Indonesia	Sinar Mas
6.	Bank Muammalat Indonesia	BTPN
7.	Bank Panin Syariah	BDKI
8.	Bank Syariah Bukopin	BPD Jateng
9.	Bank Syariah Mandiri	BPD Jatim
10.	Bank Syariah Mega Indonesia	NISP

conducted in Indonesia for measuring the efficiency of shariah banking has not much used SFA models.

The concept of efficiency with SFA is the concept of alternative profit. The concept of efficiency profit alternative was used because this concept is more suited to the conditions of shariah banking in Indonesia where the banking market is not entirely a perfectly competitive market. They are the large banks that have the market power to set prices, and in circumstances where there are substantial differences that are not measured on the quality of bank services,

Profit function that will be used in this study has the shape of a log as in equation:

$$Alt\pi eff^b = \frac{a\hat{\pi}^b}{a\hat{\pi}^{maks}} = \frac{\left\{ \exp \left[\hat{f}(w^b, y^b, z^b, v^b) \right] \times \exp \left[\ln \hat{u}_{a\pi}^b \right] \right\} - \theta}{\left\{ \exp \left[\hat{f}(w^b, y^b, z^b, v^b) \right] \times \exp \left[\ln \hat{u}_{a\pi}^{maks} \right] \right\} - \theta} \quad (1)$$

Steps as done by Muazaroh (2013) such as to measure the profit efficiency as follows:

1. Specifying the inputs and outputs

There are three approaches to determine the input and output such as Intermediary Approach, User-Cost Approach, and Value Added Approach (Astiyah and Jardine A. Husman, 2006; 538). In this experiment, it is the intermediation approach so that the input used include: third party funds (DPK) and paid-up capital (DPS)

while the output includes: financing provided (PD), placements with Bank Indonesia (PBI) and placements with other banks (PBL)

2. Specifications of profit function

Profit function used this research is the translog stochastic frontier profit function (Coelli, 1996), as follows:

it it

$$\ln \pi_{it} = a_0 + \sum_{j=1}^J \beta_j \ln Q_{it} + \sum_{i=1}^I \delta_i \ln(R_{it}) + \mu_{it} + v_{it} \quad (2)$$

The calculation of profit efficiency is done using FRONTIER software version 4.1.

Independent Variable

Bank Size

Tire size in this study was measured using the logarithm of total assets.

Financing Risk

Financing risk is the risk that occurs as a result of the failure of the counterparty to meet its obligations. Reimbursing risk can be derived from various functional activities of banks, such as credit (provision of funds), treasury and investment, and trade finance, which were recorded in the banking book or the trading book. In this study, they were measured by using Non Performing Financing (NPF) is to divide the amount of financing that is categorized as substandard, doubtful and loss with the amount of financing provided.

Table 3
Comparison between Input, Output, and Bank Profit Efficiency Scores of Shariah Banks 2014 (%)

No.	Bank Names	Shariah Banks						
		POF	BOPL	TL	PPBIL	POPL	EBT	EP
1.	BCA Syariah	0.457	0.042	0.002	0.257	0.006	0.006	0.43
2.	BNI Syariah	0.270	0.115	0.043	0.114	0.057	0.011	0.81
3.	BRI Syariah	0.060	0.002	0.033	0.175	0.005	0.001	0.65
4.	MayBank Syariah	0.060	0.024	0.103	0.202	0.012	0.031	0.32
5.	BMI	0.534	0.030	0.030	0.150	0.051	0.002	0.83
6.	Bank Panin Syariah	0.042	0.021	0.668	0.202	0.109	0.015	0.72
7.	Bukopin syariah	0.087	0.002	0.010	0.181	0.082	0.002	0.84
8.	Mandiri Syariah	0.356	0.005	0.154	0.197	0.146	0.002	0.70
9.	Mega Syariah Indonesia	0.451	0.104	0.000	0.105	0.203	0.003	0.76
10.	Victoria Syariah	0.009	0.051	0.748	0.062	0.003	0.017	0.25
Shariah Business Units								
1.	Danamon Syariah	0.078	0.074	0.074	0.049	0.022	0.018	0.45
2.	BII Syariah	0.071	0.048	0.003	0.039	0.013	0.006	0.46
3.	HSBC Syariah	0.031	0.036	0.639	0.006	0.019	0.025	0.30
4.	Permata Syariah	0.077	0.023	0.852	0.001	0.011	0.011	0.74
5.	Sinar Mas Syariah	0.278	0.058	0.591	0.170	0.016	0.009	0.41
6.	BTPN Syariah	0.121	0.060	0.101	0.153	0.010	0.034	0.43
7.	DKI Syariah	0.216	0.027	0.398	0.001	0.086	0.046	0.92
8.	BPD JATENG Syariah	0.057	0.039	1.000	0.064	0.005	0.029	0.56
9.	BPD JATIM Syariah	0.039	0.050	0.0083	0.0875	0.0098	0.036	0.73
10.	NISP Syariah	0.089	0.006	0.0088	0.1093	0.0095	0.017	0.46

POF: Cost for income / third-party funds; BOPL: other operating costs beyond the income / total assets; TL: Total loans / total assets; PPBIL: placement on BI and other banks / total assets; POPL other than the operating income for the result / total assets; EBT: earnings before taxes / total assets; EP: Efficiency profit. Cost of Income / third-party funds; BOPL: other operating costs beyond the cost / total assets; TL: Total loans / total assets; PPBIL: placement on BI and other banks / total assets; POPL other than the operating income for the income / total assets; EBT: earnings before taxes / total assets; EP: profit efficiency.

Bank Capital

The bank's capital serves as a source of funding and reserves to cover losses due to the bank risk. In this study, the bank's capital ratio Capital Adequacy Ratio (CAR) is the equity or total assets.

Research Model

The research model to test the efficiency as referred Muazaroh (2013) used the regression equation as follows:

$$\text{Eff Prof} = \alpha + \beta_1 \text{Size} + \beta_2 \text{NPF} + \beta_3 \text{CAR} + \varepsilon \quad (3)$$

In this case:

Eff Prof : profit efficiency score

Size : log total asset

NPF : non performing financing

CAR : ratio of equity/ total asset

4. DATA ANALYSIS AND DISCUSSION

Data analysis and discussion include the sample selection and the results of the sample selection, the results of the measurement of profit efficiencies, the results of hypothesis testing on a variety of research variables that affect the efficiency of shariah banks as well as the results of a comparative analysis of

the bank profit efficiency before and after the financial crisis of 2008.

Process and Sample Selection

The process and the results of the sample selection are presented in Table 1. The selection process with the above sample, the study obtained 10 shariah banks and 10 for shariah business units as in Table 2.

Results of Bank Profit Efficiency Measurement of Shariah Banks in Indonesia

Profit efficiency profit was measured using the method of Stochastic Frontier Approach (SFA). The inputs were as referred to used to measure the efficiency of profit as referred to Muazaroh (2013) that includes cost of third party funds and other operating costs, excluding the cost Sharing. Banks are efficient in terms of profit in which they can optimize to produce output (total loans, placements with Bank Indonesia and other banks as well as operating income outside for the results). The results of the comparison input, output, and profit efficiency scores of shariah banks and shariah business units in 2014 are shown in Table 3.

Table 4
Profit efficiency of Shariah Banks in Indonesia Period 2010-2014 (%)

	2010	2011	2012	2013	2014
Shariah Banks					
Means	0.58	0.60	0.56	0.61	0.54
Minimum	0.33	0.25	0.17	0.39	0.16
Maximum	0.87	0.84	0.79	0.79	0.84
Shariah Business Units					
average	0.44	0.42	0.41	0.45	0.49
Minimum	0.16	0.14	0.17	0.19	0.15
Maximum	0.91	0.82	0.75	0.97	0.92

Source: Processed secondary data.

Table 5
Profit Efficiency of Shariah Banks during Global (%)

	2008	2009
Shariah Banks		
Means	0.44	0.41
Minimum	0.11	0.10
Maximum	0.95	0.99
Shariah Business Units		
Average	0.26	0.32
Minimum	0.12	0.12
Maximum	0.41	0.62

Source: Processed secondary data.

Table 3 above shows that the shariah bank of Bukopin has the highest profit efficiency score for they are able to utilize the existing input of third party funds amounted to 0.087%, operating expenses amounted to 0.002% and invest funds held for financing amounted to 0.001%, placements with banks Indonesia and other banks amounted to 0.181% and operating income expansion outside for a yield of 0.082%. Bank Bukopin shariah record a profit of 0.002% while the lowest profit efficiency in Bank Shariah Victoria of 0.25%. Table 3 also shows that Bank DKI shariah business unit is scored the highest efficiency of 0.92% for Bank DKI shariah units are able to utilize the existing input of third party funds amounted to 0.216%, operating expenses amounted to 0.027% and investing their own funds for financing amounted to 0.398%, placements with Bank Indonesia and other banks amounted to 0.001% and operating income expansion outside for a yield of 0.086%. Shariah business units of Bank DKI afford a profit of 0.046% of the total assets. The lowest score of efficiency for Islamic business unit occurred at the bank HSBC Shariah, amounted to 0.30%. Summary results of the measurement of profit efficiencies in shariah banks in Indonesia in 2010-2014 are presented in Table 4.

The average profit efficiency of shariah banks in Indonesia tends to fluctuate, up and down throughout 2010-2014. The efficiency increased in

2012-2013. The average increase in profit efficiency in shariah banks is likely caused by the intensified global economic condition.

For Shariah Business Unit (SBU) the largest decline was in 2013 and 2014. The decline is a result of the economy dynamics that was less conducive to the development of the real sector, especially entering the second quarter (Q2). Indonesia's economic growth in 2013 was estimated to be in the range of 5.5% -5.9% from the original estimate of 5.8% -6.2%, or as high as in previous years. The decline in growth was in line with a slowing global economy and global financial markets that are volatile, commodity prices are still in a downward trend. The process of rebalancing the economic growth conducted by Bank Indonesia is part of a process that is more in tune with the fundamental (Bank Indonesia, 2014).

The SBU decrease was in 2010-2011 i.e, from 0.44% to 0.42%. In addition, starting in 2013 and 2014 the SBU profit efficiency began to increase, in line with the policies implemented by Bank Indonesia.

Profit Efficiency during the Global Financial Crisis in 2008-2009.

Profit efficiency profit of shariah banks during the global financial crisis is shown in Table 5.

During the global financial crisis, the average

Table 6
Profit Efficiency Development of Shariah banks for ROA, ROE and SFA (%)

	2010	2011	2012	2013	2014
Shariah Banks					
ROA	1.48	2.03	1.80	1.65	0.78
ROE	9.59	10.21	15.66	11.78	5.89
SFA	0.58	0.60	0.56	0.61	0.54
Shariah Business Units					
ROA	2.54	2.64	2.59	2.71	2.07
ROE	20.92	19.05	21.28	19.03	13.21
SFA	0.44	0.42	0.41	0.45	0.49

Table 7
Profit Efficiency of Shariah Banks Based on Total Asset (%)

Size	2010	2011	2012	2013	2014	Rata-rata
Shariah Banks						
≤ Rp 1 Trillion	0.61	0.53	0.49	-	-	0.54
Rp 1 Trillion- 5 Trillion	0.74	0.68	0.51	0.69	0.43	0.51
> 5 Trillion-20 Trillion	0.58	0.62	0.63	0.55	0.62	0.60
> Rp 20 Trillion	0.50	0.44	0.58	0.56	0.46	0.51
Shariah Business Units						
≤ Rp 1 Trillion	0.17	0.14	-	-	-	0.16
Rp 1 Trillion- 5 Trillion	0.17	0.14	0.42	0.23	0.92	0.33
> 5 Trillion-20 Trillion	0.14	0.30	0.32	0.32	-	0.27
> Rp 20 Trillion	0.48	0.46	0.45	0.49	0.45	0.47

profit efficiency of shariah banks in 2008 amounted to 0.44% down to 0.41% in 2009. The shariah business units rose from 0.26% in 2008 to 0.32% in 2009. It shows the resilience of shariah banks in facing the global financial crisis.

The development of profit efficiency with ROA, ROE and shariah banks SFA are shown in Table 6.

Size of profit efficiency for Shariah Banks with ROA and ROE also shows the fluctuation. In 2010, the average ROA achieved by shariah banks in Indonesia was 1.48%. The increase in 2011 to 2.03%. However, beginning in 2012-2014,. The average ROA decreased respectively 1.80%; 1.65% and 0.78%. ROA experienced sharp decline in 2014 due to the high NPF throughout 2014 which led to declining profits of shariah banks. In terms of ROE, the average has increased for three consecutive years from the year 2010-2012, namely 9.59%; 10.21% and 15.66%. But, in 2013-2014 ROE values began to decline, from 11.78% in 2013 to 5.89% in 2014. The results of calculations of profitability with ROA and ROE are consistent with the calculation of the SFA to shariah banks.

Profit Efficiency of Shariah banks Based on Total Asset

Profit efficiency of shariah banks based on total

asset is shown in Table 7.

Profit efficiency by total assets showed a fluctuating value. In the shariah banks with total assets of between 5.20 trillion have an average efficiency of the highest profit. Then, the profit efficiency goes down on banks that have total assets of more than 20 Trillion. It means that the bigger the bank, the bank higher the profit efficiency, but at some point it will decline. Yet, the profit efficiency of shariah business units have the highest profit achieved by the bank which has total assets of more than 20 trillion. Thus, the Shariah banks are more efficient than smaller banks or going increasing returns to scale.

Research Variables in Descriptive Statistic

The results of the statistical description of variable in the study show that the factors that affect the efficiency are presented in Table 8.

The value of profit efficiency as measured by the SFA shows an average of 0.51%, with the highest efficiency value of 0.97% occurs in NISP bank in 2013 and the lowest 0.14% in Bank DKI shariah business unit in 2011. The efficiency of less than 100 percent means that the bank has not been efficient in terms of profit. The 0.14% Operating efficiency means that the bank is far from being efficient. Yet, the profit efficiency as measured by ROA shows an

Table 8
Descriptive Statistics of Research Variables Period 2008-2014

	EP	ROA	ROE	TA	NPF	CAR
Means	0.51	16.43	6.23	23.17	3.59	22.12
Minimum	0.14	-1.87	-17.61	334	0.19	1.95
Maximum	0.97	32.91	57.98	66.942	11.30	124.43
Deviation Standard	0.23	15.02	9.29	6.88	2.37	17.401

Table 9
Results of Profit Efficiency Estimation on 20 Shariah Banks in 2010-2014

$$EP = \alpha + \beta_1 \text{Size} + \beta_2 \text{NPF} + \beta_3 \text{CAR} + \varepsilon$$

Variables	Prediction	Coefficients	t- statistics	Judgment
Size	β_1 positive	0.014	3.838	Supported
NPF	β_2 negative	0.001	0.094	Not supported
CAR	β_3 positive	-0.001	0.952	Not supported
Adjusted R2				14.4%
F-Statistics				6.561
Observation				100

average of 16.43%, with the highest efficiency value of 32.91% in Bank Danamon Syariah in 2014 and the lowest was -1.87% occurred in Bank Syariah Victoria in 2014 with the efficiency. As measured by ROE, it shows the average of 6.23% with the highest value of 57.98% in bank Syariah Mega Indonesia in 2012 and the lowest -17.61% in Bank Syariah Victoria in 2014.

The total value of the highest bank assets in bank Mandiri Syariah Mandiri is 66.942 trillion in 2014 and the lowest in Bank Syariah Victoria in 2010 amounted to 334 billion. The average NPF ratio is 3.59, the highest ratio 11.30 at Bank BCA Syariah in 2011 and the lowest is 0.19 in Bank Panin Syariah in 2012.

From Table 8, it can be seen that the standard deviation for all variables (except ROE) is smaller than the average (mean) of each variable. It shows that the efficiency ratio of profit to the SFA, ROA, TA, NPF and CAR is good.

Results of Hypothesis Testing on the Effect of Factors Affecting Profit Efficiency

The test results for the factors affecting the profit efficiency are presented in Table 9.

Results of The Effect of bank Size on profit Efficiency

The first hypothesis predicts that the bank size has a positive effect on profit efficiency. The test results in Table 9 show that the coefficient of size has a positive value with the t-statistics 3.838 (significant at alpha 1%). Thus, the first hypothesis is supported indicating that the bigger the bank, the higher the profit efficiency is. It can be explained that the large

banks can save the cost of capital and resources used to manage risk and investments (Muazaroh, 2013). In addition, the large banks have a good reputation and get the trust from their customers so that it can make the third-party funding costs lower.

The results support the research by Berger et.al (1993) and Muazaroh (2013) who found a positive result with the size of the bank profit efficiency. Furthermore, Muazaroh (2013) found that the greater the size of the bank, the higher the bank profit efficiency is. But, at a certain point the size of the greater efficiency of bank profits will go down. In this case, the results of this study do not support research by Akhibge and McNulty (2003) who found empirical evidence that small-sized banks are more efficient than large banks.

The Effect Financing Risk on Profit Efficiency

The second hypothesis predicts that the financing risk has a negative effect on profit efficiency. The test results in Table 9 show that the financing risk coefficients have a positive direction and the t-statistics 0.094 (not significant). Thus, the second hypothesis is not successfully backed up, indicating that the risk of shariah banks financing does not affect the profit efficiency. This can be due to the financing problems that are not high enough so as not to affect the profit efficiency. This result is supported by descriptive statistics which shows the average NPF 3.69%. This may imply that the shariah banks in Indonesia can manage the financing provided by the well-managed in financing, because the financing problem is not more than 5%, according to the standard maximum stipulated by

Table 10
Results of ROA Estimation

$$ROA = \alpha + \beta_1 \text{Size} + \beta_2 \text{NPF} + \beta_3 \text{CAR} + \varepsilon$$

Variables	Prediction	Coefficient	t- Statistics	Judgment
Size	β_1 positive	1.913	16.855	Supported
NPF	β_2 negative	-0.164	-0.467	Not supported
CAR	β_3 positive	-0.001	-0.984	Not supported
Adjusted R2				79.8%
F-Statistics				137.407
Observation				100

Table 11
Estimation Results of ROE

$$ROE = \alpha + \beta_1 \text{Size} + \beta_2 \text{NPF} + \beta_3 \text{CAR} + \varepsilon$$

Variables	Prediction	Coefficient	t- Statistics	Judgment
Size	β_1 positive	0.896	7.011	Supported
NPF	β_2 negative	-1.404	-3.554	Supported
CAR	β_3 positive	-0.040	-0.837	Not supported
Adjusted R2				32.7%
F-Statistics				17.044
Observation				100

Bank Indonesia.

The result above supports the research by Muazaroh (2013) that which examined profit efficiency of conventional banks in Indonesia in 2005-2009. However, this study does not support the research by Kaparakis et al. (1994) that found a negative relationship between the risk of a loan and the banks' profit efficiency.

The Effect of Capital Adequacy on Profit Efficiency

The third hypothesis predicts that capital adequacy has a positive effect on profit efficiency. The test results in Table 9, shows that the capital adequacy coefficient has a negative value and the t-statistics 0.952 (not significant). Thus, the third hypothesis of this study is not successfully backed up, indicating that the capital adequacy of Islamic banks does not affect the efficiency of profit. This is due to the majority of banks capital which is used to cover operational failures such as bank financing bad debts or other financial problems.

In that case, this study does not either support the study by Casu and Molyneux (2003), and Muazaroh (2013) who found that capital adequacy has a positive effect on efficiency. It was stated that the higher the capital is, the higher the banks profit efficiency.

The Degree of Test Model for Profit Efficiency

To test the profit efficiency model, the researcher tested it using the approach measure of the effi-

ciency with Return on Assets (ROA) and Return on Equity (ROE). The results of the degree of model are presented in Table 10 and 11 about the test model for profit efficiency.

With ROA, the bank's ability can be shown to generate revenues from fixed assets they owned. ROE shows a company's ability to manage equity assets. ROA and ROE are commonly used by banks to measure the profit efficiency.

Based on the comparison of the regression test results, profit efficiency is measured by using SFA and ROA. There is a similarity in the results of the effect of independent variables on the dependent variable such as the bank size has a positive effect on profit efficiency as measured by ROA. On the other hand, the NPF and the CAR have variable coefficient corresponds to the direction as it was predicted, but it has no significant effect.

Based on the comparison of the regression test results, profit efficiency is measured by using SFA and ROE. There are similarities in the result of the effect of independent variables on the dependent variable. The different result is in NPF, which indicates the direction corresponding to the predicted and it has a significant effect.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

As overall, profit efficiency can be created in shariah banks in Indonesia, which is indicated by profit efficiency, score less than one. The inefficiency occurred in both shariah banks and shariah busi-

ness units. During the financial crisis of 2008-2009 the shariah profit efficiency tends to decline but it didn't in shariah business units. It shows the resilience of shariah banks when facing the financial crisis. Bank size has a positive effect on profit efficiency. This indicates that the bigger the bank is, the better the profit efficiency. Shariah banks experienced the economy of scale for profit efficiency, meaning that profit efficiency can increase with the bank size. But, it can decline at some point. Shariah business units have increasing returns scale, indicating that the higher the bank profit, the more profit efficiency the bank has. The analysis also showed that credit risk and capital adequacy have no effect on profit efficiency.

This study has some limitations that may affect the results such as 1) it used the bank total assets as a variable of the bank size; 2) it used inputs and outputs referring to conventional banks, while conventional banks have different characteristics compared to the shariah banks. For that reason, the researchers suggests for further studies, the researchers should: 1) use a proxy other than total assets such as equity capital or the total number of employees; 2) consider the factors of input and output to measure efficiency adapted to the characteristics of shariah banks.

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