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# ASSESSING PROFIT EFFICIENCY OF ISLAMIC BANKS IN INDONESIA: AN INTERMEDIATION APPROACH

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## ABSTRACT

*Islamic banking industry has been growing more rapidly. Beside, the increasing number of Islamic banks force the Indonesian banking sector to be more competitive, which results in better performance and higher efficiency of the Islamic banking Industry. This study investigates the profit efficiency of Islamic banks in Indonesia. The Stochastic Frontier Approach (SFA) was adopted to evaluate monthly data released by full-fledged Islamic banks and Islamic window banks in Indonesia. The period of observation was March 2003 until March 2009. The efficiency of Islamic banks was assessed by employing the intermediation approach. Hypotheses concerning the relationships of the input and output variables were posited and tested. The result of the study indicated those full-fledged banks are more efficient in generating profit than their counterpart, Islamic window banks. The finding of this study highlights crucial information regarding the efficiency of Islamic banks in developing country. Islamic banks should continuously increase the amount of third party fund and financing volume and make it more efficient in generating profit. In addition, Islamic bank efficiency may have a great influence on the Indonesian government policy, which is expected to be in favor of the industrial sector instead of the monetary sector.*

***Key words:*** *efficiency, full-fledged banks, Islamic windows banks, and stochastic frontier approach.*

## INTRODUCTION

It has been noted that Islamic banking signifies a system of banking or banking activity that is coherent with Islamic law (Islamic) principles and guided by Islamic economics. For example, Islamic law prohibits usury and the collection and payment of interest, which is commonly called *riba* in Islamic discourse (El-Qorchi, 2005, Lewis and Algaoud, 2007, Rice and Mahmoud, 2001). Another example of Islamic system is that Islamic law prohibits investing in businesses that are considered unlawful, or *haraam* (such as businesses that sell alcohol or pork, or businesses that produce media such as gossip columns or pornography, which are against Islamic values).

In the late 20$^{th}$ century, a number of Islamic *banks* were created, to cater to this particular banking market. Hence, it is presumed that the service systems, the management system and values adhered to by Islamic banks is different from that of conventional banks. During the period of 1992 to 1998, there was only one Islamic commercial bank and 78 Islamic rural banks coming into operation. In 1998, the Act No. 10 of 1998 on the amendment of the Act No. 7 of 1992 concerning banking came into force to give stronger legal foundation for the existence of Islamic banking system.

The new Act No. 23 of 1999 concerning Bank Indonesia gives an authority to Bank Indonesia to conduct its task according to Islamic principles. Since then, Islamic banking industry has been growing more rapidly. The increasing number of Islamic banks force the Indonesian banking sector to be more competitive, which results in better performance and higher efficiency of the

Islamic banking Industry (Astiyah and Husman, 2006; Endri et al, 2010; Hadad et al, 2003). One important question arises whether the rapid development for both Islamic commercial banks and Islamic windows over the two-decade periods has performed efficiently.

This study examines the efficiency of the Islamic banking Industry in Indonesia from 2003 until 2009 by using Stochastic Frontier Approach (SFA) technique. Few researches have been performed to assess the efficiency of Islamic banks in Indonesia using SFA. For example, the work of Astiyah and Husman (2006) looked at the intermediary function of Islamic bank using profit function derivative. This study differs from previous work because several new variables are added in the equation and the observation periods are extended until December 2009.

This research is conducted to evaluate whether there are some changes occur in the efficiency of Islamic banks in performing its intermediary role after the two decades of operation. In other words, the problem of this study can be formulated as follows:" Is there difference between Islamic banks efficiency model with intermediation function and a model without intermediation function. The finding of the study is expected to enrich the literature on measuring Islamic bank efficiency in developing countries. The sections present all relevant literature review followed by methodology, analysis, discussion and conclusion.

## THEORITICAL FRAMEWORK AND HYPOTHESIS

### Development of Islamic banks in Indonesia

The development of Islamic banks in Indonesia was initiated by the establishment of Bank Muamalat Indonesia in 1992. To date, there are three classifications of Islamic banks operating in Indonesia: Islamic Commercial Banks; Islamic Banking Unit; and Islamic Rural Banks. Islamic Commercial bank is purely operating under Islamic laws while Islamic Banking Unit refers to a unit activity of a conventional bank operating under Islamic law. Meanwhile, Islamic Rural Bank is micro banks operating under Islamic principles.

Since 1992, the number of Islamic banks in Indonesia is continuously growing. The latest data published by the Central Bank of Indonesia showed that the number of Islamic banks operating in Indonesia consist of four Islamic Commercial Banks, 28 Islamic Banking Unit and 128 Islamic Rural Banks (Central Bank of Indonesia, November 2008). Another positive indicator is an increasing amount of third party deposit funds in Islamic Banks in Indonesia, from IDR 24,680,417 billion in September 2007 to IDR 32,898,049 billion by July 2008 (The Central Bank of Indonesia, July 2008)

The economic and monetary turmoil happening during the period 1997 to 1998 resulted in tremendous impact on the Indonesian economy. Thus, it can be traced that such an impact is crucial for the period when this condition had happened. For example, during the period of crisis, many financial institutions, including banking institutions, experienced financial hardship. This is of course able to bring something more serious thing. High interest rate has resulted in a high cost of capital to the entrepreneurs i.e. the real sector and finally caused low productivity. The quality of bank assets has deteriorated significantly while the banking system was burdened by a high cost of funds caused by high market interest rates. Furthermore, low productivity and high risk investments have prevented the banks from investing their funds in the real sector. As the consequence, the banking system started to loss its intermediary function as indicated by a low Loan to Deposit Ratio (LDR).

On the contrary, what has been described above may not the same as what is accounted fro in the following condition. For example, the situation during the economic crisis, Islamic banking could still perform better than the conventional banks as indicated by a relatively low level of non-

performing loans and the absence of negative spread in the operational activities. For another thing, Islamic banks are able to channel a relatively lower cost of funds to the entrepreneurs. These two indicators or evidences can support the argument above. It can also be described by another proponent, for example Warjito (2006). According to him, Islamic banking has unique properties and these properties are considered important things to be noted. To mention all these are such as the following. First of all, it can be noted that the cost of fund is always lower than its operational revenue. Besides that, the second important property is that there exists adoption of risk sharing between banks and its depositors during the financing activities. It can be identified that based on the evidence supported, it shows that Islamic banks are relatively more able to conduct lending as indicated by a relatively high LDR ratio i.e. it is between 99.75 and 112.37 percent between 2002 and 2007 (Bank Indonesia, 2007). For that reason, this experience has brought a hope by the public for the presence of Islamic banking as an alternative banking system. This can be said that such an effort directed to make them capable of both delivering economic benefits and ensuring compliance with Islamic principles.

It is important to see the fact that during the period of 1998 to 2008, Islamic banking system has grown quite rapidly. The growth of such banking system is at about 74 percent annually (in terms of asset size) from IDR 479 billion in 1998 to IDR 43,478 billion in 2008. This is identified by the role of the third party. For example, it is stated that the third party managed funds in which it has also increased from IDR 392 billion to IDR 17,264 billion in 2008. Despite of its rapid development, Islamic banking system still acquires a small portion of market share (approximately 1.83 % of the total asset size of the national banking system in 2007). This development is due to some efforts conducted by these parties through the banking system. It has been evidenced that there have been some steps have been taken to improve the operational quality of the Islamic banking in order to gain public confidence and customer satisfaction.

**Bank's Efficiency**

The concept of production efficiency was firstly introduced by Cobb and Douglas (1928) which refers to the relationship between input and output in production. This concept of efficiency is commonly used in economic literature (see for example Farrel, 1957). Other form of efficiency is known as X- efficiency (Leibenstein, 1966), in which it focuses on explaining why firms might not be achieving productive efficiency in their productive decision and behavior. In that case, it can be referred to other proponents. For example, Berger and Humprey (1997) defined efficiency in the banking sector by focusing mainly on financial sector efficiency, which highlights the importance of efficient allocation of financial resources to foster productivity. Thus, the two arguments above can be referentially combined to conceptualize what is meant efficiency. It refers to the relationship between input and out put in production in which the effort is to focus mainly on why firms cannot achieve productive efficiency in their decision and behavior.

A number of studies have been performed to assess the efficiency of Islamic banks worldwide. Nonetheless, each study placed different emphasis and used different tools in measuring banks' efficiency. A study on efficiency using frontier approach was initiated by Sherman and Gold (1985) by focusing on operating efficiency of the branches of savings banks. Several attempts had also been made by other researchers to apply the frontier approach in measuring banks' efficiency in developed countries (Berger and Humphrey, 1997 and Goddard et al, 2001, Mokhtar et al, 2006). Research in measuring efficiency of conventional banks are vast (Chang et al, 1998; De Young and Nolle, 1996; Mahajjan et al, 1996; Sathye, 2001) but only few studies has been

performed to measure Islamic banks' efficiency (Elzahi Said, 2002; Hussein, 2003, Kamaruddin et al, 2008; Mokhtar et al, 2006)

Research on efficiency of Islamic banks in the Muslim majority countries, such as Pakistan, Iran and Sudan, concluded that bigger sized banks have higher level of efficiency (Hassan, 2003; Brown and Skully, 2003). According to Hassan (2003), Islamic banks are relatively more efficient in containing costs but inefficient in generating profits. However, study by Furukawa (1996) on Japanese credit associations revealed the opposite. Similar research was performed in Asia. Suffian et al (2008) conducted research on Islamic banks' efficiency in 16 countries in MENA and Asia using Data Envelopment Analysis (DEA).

The result of the above study indicated that banks in MENA were more efficient and being dominated by efficiency frontier in each period. In addition Islamic banks context, pure technical inefficiency is greater than scale inefficiency. This fact has later impact on Islamic banks managerial inefficiency in utilizing resources. Similar study was also performed by Kamaruddin et al (2008) which confirm that local shariah bank are more efficient than foreign shariah bank in Malaysia. This finding did not support previous studies which claimed that foreign owned bank are more efficient than local bank (Abdul Majid et al, 2003; Hasan and Marton, 2001; Isik and Hassan, 2002; Mokhtar et al, 2006; Zaim, 1995). However, Kamaruddin's study supports the work of Sathye (2001).

Several attempts have also been made to assess the efficiency of both conventional banks (see for example Hadad et al 2003; and Rustam, 2006) and Islamic banks ( such as Abidin, 2007; Ascarya and Yumanita, 2006; Astiyah and Husman, 2006; Endri et al, 2010; Hidayat, 2006; Omar et al, 2007 and Suswadi, 2007) in Indonesia. Ascarya and Yumanita (2006) measured the Islamic banks efficiency using DEA during 2000-2004. They urged that Islamic banks in Indonesia experienced decreased in technical efficiency while increased in scale efficiency. Meanwhile Suswadi (2007) argued the efficiency of Islamic banks in Indonesia were quite volatile between January 2003 until October 2006. Astiyah and Husman (2006) conducted study on 20 banks and resumed that the average efficiency with intermediation model is lower as compared to the model without intermediation. Endri et al (2010) analyzed Islamic banks efficiency in 2005-2007 and concluded that the technical and scale efficiency score of the banks were improving but not optimal. A comparison on efficiency of Islamic banks with conventional banks was performed by Hidayat (2006) using DEA approach. The result of the study indicated that Islamic bank is less efficient than conventional banks.

## RESEARCH METHOD

The objects of the research were Islamic commercial banks and Islamic banking units that have been operating in Indonesia since March 2003 until March 2009. The type of data used in this study was secondary data obtained from the Central Bank of Indonesia. This study employs three input variables, which consist of total deposit; total overhead expense; and physical capital. While total deposits consist of third party funds and deposits from other banks, the total overhead expense includes the personnel and other operating expenses. In addition, the output variable is measured by the amount of profit before taxation and financing volume.

Stochastic Frontier Approach (SFA) was applied to test the Islamic banks' efficiency in this study. Profit is modeled to deviate from its best frontier approach due to random noise and inefficiency. In this method, profit is a function of input and output. Following Battacharrya et al (1997) approach, the study constructs a single grand frontiers which envelopes the pooled input-output data of all banks during the observed period. This approach has several advantages (Mok-

htar, 2006:43). First, it provides a single benchmark against which we can gauge the performance of other banks over a specific period. Second, by using his approach, it is possible to compare the relative efficiency of each bank in each year while at the same time observing the change in the performance of all banks during the period. Third, this grand frontier approach can also alleviate the problem related to unbalanced panel data. Finally, by pooling all the data into a single grand frontier, it gives reliable results, as the number of banks grows.

The standard function of the profit frontier is as follows:

$$\ln \pi_i = f(\ln X_i, \ln Y_i) + e_i \quad (1)$$

Where ln $\pi_i$ represent total profit of the bank i, f denotes some functional form, $X_i$ is input, $Y_i$ is output at time i, and e is random error is a function of $u_i$ and $v_i$ where u is controlled error factor and v is uncontrolled error factor.

Assume normal distribution is denoted by $N(0,\sigma_v^2)$ and half-normal distribution $|N(0,\sigma_v^2)|$, where $u_{it} = (u_i \exp(-h(t-T)))^3$ and *h* estimated parameter. The *indirect profit* function known as *indirect profit alternative* function is the solution to the following optimization function: (Astiyah and Husman, 2006; 535)

$$Max \quad \pi = P'Q = (p, r)(y, -x) \quad (2)$$

The alternative profit function is as follows:

$$\ln C = f(w, y) + \ln u + \ln v \quad (3)$$

Where π is profit or efficiency, while x is input, *y* is output and *v* and *u* is error

Thus the *alternative profit efficiency* can be written as follows:

$$\pi_{alt} EFF_n = \frac{\hat{\pi}_n}{\hat{\pi}_{\max}} = \frac{\exp\left[\hat{f}_\pi(x^n, y^n) + \ln(\hat{u}_{\pi_n})\right]}{\exp\left[\hat{f}_\pi(x^n, y^n) + \ln(\hat{u}_{\pi_{\max}})\right]} = \frac{\hat{u}_{\pi_n}}{\hat{u}_{\pi_{\max}}} \quad (4)$$

To assess the degree of Islamic banks' efficiency between 2003-2009 with intermediation model and without intermediation model the t-test of difference was used. In addition multiple regression analysis was adopted to test the second and third hypothesis

## ANALYSIS AND DISCUSSION

### Development of Islamic banks in Indonesia

Bank Muamalat Indonesia, established in 1992, is the first *Shariah* bank in Indonesia. To date, three types of IB coexist in Indonesia: Full-fledge Islamic banks, purely work-

**Table 1**
**Islamic Banks Development in Indonesia**

| Year | Full-fledged banks | Islamic windows | Islamic rural |
|---|---|---|---|
| 1992 | 1 | - | - |
| 1998 | 1 | - | 76 |
| 1999 | 2 | 1 | 78 |
| 2000 | 2 | 3 | 78 |
| 2001 | 2 | 3 | 81 |
| 2002 | 2 | 6 | 83 |
| 2003 | 2 | 8 | 84 |
| 2004 | 3 | 15 | 88 |
| 2005 | 3 | 19 | 92 |
| 2006 | 3 | 20 | 105 |
| 2007 | 3 | 26 | 114 |
| 2008 | 5 | 27 | 131 |
| 2009 | 6 | 25 | 139 |

Source: The Central Bank of Indonesia

ing according to *Shariah* ; Islamic Windows, a unit activity of a conventional bank working under Islamic law, and Islamic Rural Banks (IRB), micro banks working under Islamic principles. The Islamic banks development in Indonesia can be described as shown in Table 1.

**Result**

It is indicated in Table 2 that, in 2004, the average efficiency of full-fledged banks increased by 2,972 percent since 2003. In 2005, the average banks' efficiency increased by 3,132 percent since 2004 and in 2006 the average efficiency increased by 1,387 since 2005, which is lower than the changes in previous years. In 2007, the average efficiency increase for 1,201 percent since 2006 and the changes of average efficiency in 2008 increased for 2,099 percent since 2007. Finally, in 2009 the average efficiency of Islamic banks has increased for 1,285 percent since 2008. From these phenomena, it can be concluded that since 2003 until 2009 Islamic banks had an average growth of 2,013 percent every year.

Table 3 summarizes the mean values of Islamic windows banks' efficiency in 2004 had increased for 2,825 since 2003. In 2005 the average efficiency of Islamic banks had

**Table 2**
**Full-Fledged Islamic Banks' Profit Efficiency (In Percent)**

| Period | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| Januari | - | 88,435 | 92,443 | 93,958 | 95,497 | 97,019 | 99,221 |
| Februari | - | 88,206 | 92,811 | 94,193 | 95,516 | 97,138 | 99,323 |
| Maret | 86,606 | 89,010 | 93,228 | 94,512 | 95,539 | 97,559 | 99,473 |
| April | 87,041 | 89,612 | 93,425 | 94,768 | 95,733 | 97,786 | 99,467 |
| Mei | 87,168 | 90,068 | 93,891 | 95,020 | 95,878 | 98,058 | 99,586 |
| Juni Juli | 87,411 | 90,691 | 93,918 | 95,277 | 96,249 | 98,440 | 99,730 |
| Agustus | 87,224 | 91,045 | 94,031 | 95,430 | 96,436 | 98,719 | 99,787 |
| September | - | 91,433 | 94,147 | 95,544 | 96,755 | 99,094 | 99,919 |
| Oktober | 87,941 | 91,824 | 94,226 | 95,658 | 96,892 | 99,234 | 99,942 |
| November | 88,186 | 92,218 | 94,379 | 95,710 | 96,982 | 99,275 | 100,000 |
| Desember | 88,642 | 92,306 | 94,277 | 95,754 | 97,086 | 99,368 | 99,995 |
| | 88,410 | 92,321 | 93,971 | 95,566 | 97,238 | 99,302 | 99,973 |
| Mean | 87,625 | 90,597 | 93,729 | 95,116 | 96,317 | 98,416 | 99,701 |

**Table 3**
**Islamic Windows Banks' Profit Efficiency (In Percent)**

| Period | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| January | - | 88,457 | 92,266 | 93,967 | 95,561 | 97,056 | 99,226 |
| February | - | 88,218 | 92,576 | 94,158 | 95,586 | 97,213 | 99,317 |
| March | 86,484 | 89,005 | 92,950 | 94,411 | 95,616 | 97,630 | 99,461 |
| April | 86,931 | 89,575 | 93,130 | 94,703 | 95,812 | 97,854 | 99,442 |
| May | 87,111 | 89,933 | 93,665 | 94,951 | 95,925 | 98,133 | 99,585 |
| June July | 87,335 | 90,429 | 93,666 | 95,256 | 96,235 | 98,456 | 99,702 |
| August | 87,311 | 90,797 | 93,753 | 95,346 | 96,359 | 98,682 | 99,717 |
| September | - | 91,153 | 93,825 | 95,531 | 96,605 | 98,972 | 99,876 |
| October | 87,952 | 91,562 | 93,956 | 95,598 | 96,803 | 99,142 | 99,876 |
| November | 88,284 | 91,979 | 94,050 | 95,629 | 96,907 | 99,209 | 100,000 |
| December | 88,692 | 92,089 | 94,060 | 95,750 | 97,027 | 99,372 | 99,972 |
| | 88,510 | 92,184 | 93,949 | 95,577 | 97,276 | 99,248 | 99,953 |
| Mean | 87,623 | 90,448 | 93,487 | 95,073 | 96,309 | 98,414 | 99,677 |

increased for 3,039 since 2004 while in 2006 the average efficiency had only reached 1,586 since 2005. In 2007, the average efficiency of Islamic banks had increased for 1,236 since 2006, while in 2008 the average increased had only reached 2,105 percent since2007. Finally, in the year 2009 the average increase of Islamic banks efficiency for Islamic windows was only 1,263 percent since 2008. Thus, the average yearly growth of Islamic windows banks in this case has only reached 2,009 since 2003 until 2009.
Table 4 reveals the overall profit efficiency model of the Islamic banks with or without intermediation approach.

It is indicated in Table 4 that the result of analysis uses SFA and alternative profit efficiency and Islamic bank has reached average efficiency of 94.5 percent since 2003 until 2009, for the model with intermediation. On the other hand, the average efficiency score for the model without intermediation has only reached 94.433, slightly lower than the previous model. This result supports previous study by Astiyah and Husman (2006).

Although the average efficiency of Islamic banks has reached 94.500 since 2003, the efficiency score from year to year are quite varies as indicated by the ensuing Table 5.

Table 5 presents the result of analysis, on the yearly efficiency, as compared to periodical efficiency since 2003 until 2009, has revealed different results. This is because each estimate uses different denominator. The completely period model used September 2009 as the denominator while the other model used the most efficient period each year.

**Discussion**

As indicated in Table 5 the average efficiencies of Islamic bank periodically and yearly tended to increase over the seven year-period. This finding support previous study by Mokhtar *et al* (2006) which reported similar trend on Islamic banks in Malaysia. The inefficiency of Islamic windows banks in generating profits, as compared to the full-fledge banks, could partially be attributed to the scarcity of expertise in the banks

**Table 4**
**Total Efficiency of Islamic Banks**

| Year | Model with intermediation | Model without intermediation |
|---|---|---|
| 2003 | 87,625 | 87,623 |
| 2004 | 90,597 | 90,448 |
| 2005 | 93,729 | 93,487 |
| 2006 | 95,116 | 95,073 |
| 2007 | 96,317 | 96,309 |
| 2008 | 98,416 | 98,414 |
| 2009 | 99,701 | 99,677 |
| Average | 94,500 | 94,433 |

**Table 5**
**Comparison of Efficiency**

| No | year | Total period efficiency (%) | Yearly Efficiency(%) |
|---|---|---|---|
| 1 | 2003 | 87.625 | 99.701 |
| 2 | 2004 | 90.597 | 98.854 |
| 3 | 2005 | 93.729 | 98.133 |
| 4 | 2006 | 95.116 | 99.311 |
| 5 | 2007 | 96.317 | 99.333 |
| 6 | 2008 | 98.416 | 99.053 |
| 7 | 2009 | 99.701 | 99.701 |

and small variety of the product offered by the banks (Kamaruddin *et al*, 2008).

The Indonesian Islamic banking Industries, in terms of assets, deposit and financing base, has increased significantly since 2003 until 2009. The trend results provide some valuable information regarding the favorable domino effects of introducing Islamic windows in the Indonesian banking industries. Therefore, there are a number of important changes which need to be made by the management of Islamic banks as a result of the study. For example, there is a need for establishing Islamic based human resources management because Islamic windows is only attributed as the conventional banks' by-products which aimed at entering the Islamic banks market. Thus, it is envisaged that a pool of Islamic banking professionals would significantly increase a pool of Islamic expertise (Kamaruddin *et al*, 2008). Islamic banks' Association (IBA) should be established and this functions seriously to strengthen IB's bargaining power in the market.

## CONCLUSION AND SUGGESTION

This study has been set out to provide empirical evidence of Islamic banks profit efficiency in Indonesia from 2003 until 2009. Based on the analysis, to assess the efficiency of Islamic bank in Indonesia between March 2003 and December 2009 using stochastic frontier approach, it can be concluded that there are differences in the level of efficiency between the model with intermediation and that without intermediation. Moreover, Full-fledged banks are more efficient in generating profit as compared to Islamic windows.

Since the level of efficiency for a model with intermediation function is slightly higher than the efficiency of a model without intermediary function, it indicates that financing volume has greater contribution to profit as compared to other output. Therefore, Islamic banks should be more focusing on distributing loan to the industrial sector instead of investing their fund in the monetary market. The risk associate with the loan can be minimized by imposing tighter control through frequent monitoring on loan performance. Thus, the findings of this study are expected to provide significant insight to the management and policy-maker concerning optimum resources allocation and utilization in order to improve Islamic banks competitiveness in the market. In addition, future research should be directed towards comparing the efficiency of Islamic banks with conventional banks in Indonesia, and evaluate the impact of efficiency on banks' competitiveness worldwide.

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