

MEASURING EFFICIENCY AS INTERMEDIATION APPROACH BETWEEN CONVENTIONAL AND SHARIA BANKS IN INDONESIA

Ade Salman Al-Farisi

Faculty of International Program, Telkom Institute of Management (IMT), Indonesia
Jl. Gegerkalong Hilir No.47 Bandung, 40152, Jawa Barat- Indonesia

Riko Hendrawan

Faculty of Master of Management, Telkom Institute of Management (IMT), Indonesia
Jl. Gegerkalong Hilir No.47 Bandung, 40152, Jawa Barat- Indonesia

Abstract

As a financial intermediary, a bank accepted deposits and channels loans. However, the loans disbursed by bank were hard to be liquidated compared to deposits which were easier to be liquidated. If the asset side fluctuates, customers would take their deposit away and create a bank run. On the other side, Islamic Bank used profit and loss sharing pattern to their loans and deposits. With this pattern, Islamic bank's cost of funds was a function of their asset. With this pattern, there are possibilities that Islamic Banks' revenue would fluctuate more compared to conventional banks that were based on interest. The purpose of this research was to compare the efficiency between Islamic banks and conventional banks without trying to look whether the cause of inefficiency was able to be allocated or technical inefficiency. To measure efficiency, we used De Young's argument (1997), pooled leased square with intermediation approach and alternative profit efficiency model. The unit analysis in this research were commercial banks with 102 conventional banks and 3 Islamic Banks that operated in Indonesia using their quarterly annual report between 2002-2007. The finding from this research showed that 3 Islamic Banks were among the 20% most efficient bank in Indonesia in doing intermediation function.

Key words: financial intermediary, alternative profit efficiency, conventional bank, Islamic bank.

Banks are financial institution that run intermediation function collecting funds from people and channels it in the form of loan. Fabozzi, Miller & Modigliani (1994) mentioned that banks buy and sell money. Banks buy money by borrowing from depositors and other funds source, then banks sell money in the form of loan to companies or individuals. The main target is to sell money exceeding the expense to buy money.

Cost and return of funds is expressed in the form of interest rate per time unit. Islamic Banks do

the same function as financial intermediation organization, but the basis utilized by Islamic Banks is profit/revenue sharing principle, differing from conventional banks that based on market interest. This study aims to measure/to compare conventional banks and Islamic Banks performance in yielding profit while running financial intermediation function by using efficiency indicators.

Efficiency in economy will entangle optimal distribution from all companies that operate. The prob-

Korespondensi dengan Penulis:

Riko Hendrawan: Telp. +62 22 11 384-385, Fax. +62 22 200 11 387
E-mail: riko_hendrawan@yahoo.com

lems will be concerning on how economics allocate their resources efficiently based on available technological and individual preferences (Mayes, Harris & Lansbury, 1994).

Usage of efficiency score in measuring banks' performance have expanded largely. Relations between banks' asset and liabilities, banks' treatment on debt as raw material, and also differences on business scope has caused usage of efficiency approach for intermediary company.

Damodaran (2002) mentioned in measuring value of a company, is usually conducted by valuing its asset rather than their equities. But in financial institution's case, debt have different connotation. Most financial corporation will treat their debts as raw material rather than sources of capital.

Whereas De Young (1997) have noted that comparing cost ratios between two banks was improper to do because there are some differences on product mix, size, market conditions, and other characteristics that able to influence banks' cost. Although ratios was easy to formed, but De Young argue that ratios was hard to be interpreted. Myopic analyses on the expenditures can be misleading. For example, further reductions on labour cost, physical building or materials, do not guarantee banks will be more efficient, and larger expenditures do not signals inefficiency. While cutting abundant part of expenses can break the quality of service, quality of portfolios, and earnings.

De Young (1997) used stochastic cost frontier analysis that formed the best hypothetical bank in the population as a benchmark. By using this method will overcome the problem of grouping banks and can be done/conducted for hundreds or even thousands of bank. Stochastic cost frontier alone represents development conception on efficiency (input-output) in economics.

There are two methods in measuring efficiency, that is parametric statistical methods and non parametric statistical method. Next each method utilized based on different approach that is: (1) non para-

metric statistical efficiency methods is utilized for the production or service provision approach using deposits as an output. With this approach banks serve their monetary transaction, giving loan, taking care of deposit, liquefying cheque, etc. This represents a production flow concept. (2) Parametric statistical efficiency methods is utilized for the asset or intermediation approach. With this approach banks accept client's deposit and channels it as loan to debtors. With this approach banks mobilize and distribute their resources efficiently to make economic investment activity smooth. The asset approach have two sub groups, they are: (1) Profit Approach : Economic efficiency generally use profit approach method or cost approach. On profit approach, the role of bank's manager is to maximize profit function of the bank. So that manager has to evaluate entire cost and earnings in course of production, and measures inefficiency at the input or output side. (2) Risk Management Approach: This approach evaluate various risk coherent risk at the bank's asset. Risk management approach interpret output and input by considering management decision-making processes and its application on the input or output side.

To get a picture of intermediation role on both bank's group (Islamic and conventional), based on some opinions above, hence approach that will be used in this study the profit approach (parametric method). The profit function that is developed by Berger & Di Patti (2003) or Berger & Mester (1997), evaluate how near a company in obtaining profit as obtained by the best company within the same exogenous condition. So that company's profit represents a function from input, output, and environment variables:

$$\ln(\pi) = f_{\pi}(y, w, v) + \ln u_{\pi} + \ln \epsilon_{\pi}$$

Where π represents profit variable, y represents output variable, w represents input variable, and v represents environmental variable that can influence company performance. u represents uncontrollable factors that may influence efficiency, while

Measuring Efficiency as Intermediation Approach Between Conventional...

Ade Salman Al-Farisi dan Riko Hendrawan

° represents uncontrollable factors or random error. So that Alternative Profit Efficiency model can be depicted as follows:

$$APEFF = \frac{a\pi^i}{a\pi^{max}} = \frac{[\exp \{ f_{a\pi} (w^i, y^i, v^i) \} \times \exp (ln u_{a\pi}^i)]}{[\exp \{ f_{a\pi} (w^i, y^i, v^i) \} \times \exp (ln u_{a\pi}^{max})]}$$

Berger & Di Patti (2003) also developed Standard Profit Efficiency model. The difference among standard an alternative profit efficiency is the output variable (y) at Standard Profit Efficiency will be replaced by the price (p) of the output.

The model specification of profit function which is used in this research is a translog model (Berger and [In] Patti, 2003) as follows :

$$\begin{aligned} \ln \pi(w, y, v, t) = & \alpha + \sum_{i=1}^3 \beta_i \ln y_{it} + \frac{1}{2} \sum_{i=1}^3 \sum_{k=1}^3 \beta_{ik} \ln y_{it} \ln y_{kt} \\ & + \sum_{j=1}^3 \gamma_j \ln w_{jt} + \frac{1}{2} \sum_{j=1}^3 \sum_{m=1}^3 \gamma_{jm} \ln w_{jt} \ln w_{mt} \\ & + \sum_{i=1}^3 \sum_{j=1}^3 \delta_{ij} \ln y_{jt} \ln w_{jt} + \eta_1 \ln v_t + \frac{1}{2} \eta_2 (\ln v_t)^2 \\ & + \sum_{i=1}^3 \tau_i \ln y_{it} \ln v_t + \sum_{j=1}^3 \zeta_j \ln w_{jt} \ln v_t + \theta_1 t \\ & + \frac{1}{2} \theta_2 t^2 \sum_{i=1}^3 \Phi_i \ln y_{it} + \sum_{j=1}^3 \omega_j \ln w_{jt} + \lambda t \ln v_t + \varepsilon_t \quad (1) \end{aligned}$$

Di Patti (2000) have noted that profit efficiency can be associated with company's value maximization concept. Where value of the firm represents a sum of present value of expected profit in the future. So that failure in company's value maximization will be related to failure for the profit maximization with certain risk. Further, profit efficiency is a relative performance concept that compare companies with the best company in industry as the optimal frontier.

So if a company cannot reach the optimal value, things can be measured. If we compare with value of the firm concept, changes of value of the firm reflects fluctuation of performance to expectation and not to their potency. So it could not be an indication of exist-

ence of agency cost problem. For example, higher leverage will improve value of the firm because the improvement cannot be predicted. But higher leverage that will push the higher performance, reduction of company's facility consumption, or cheaper resources' expense, will improve profit efficiency.

Other reason is that the changes on company's stock market price will reflect differences of market price, where companies have only limited control over it. While profit efficiency was calculated to measure how a company's position compared to the best company in industry facing the same condition.

Hereinafter this research use profit efficiency approach with the following reasons: (1) profit efficiency represents approach based by bank intermediation function, where bank mobilize and distribute resources efficiently to investment activity in economy smoother, and manager play a part in maximizing profit function. Islamic Bank and conventional bank have the same intermediation role in gathering and channeling people's funds. But these two groups have a different operation in "nature" (that is being based on profit sharing and based on interest). Lacewell (2001) argued that efficiency remains an important aspect for banks although have a different operation in nature. (2) According to De Young's opinion (1997) that comparing cost ratio between two imprecise bank is not appropriate because some differences in product mix, size, market condition, and other characteristics that can influence bank's cost. That way also with Islamic bank and conventional bank which have different characteristics but have same intermediation role. (3) Profit efficiency counts not only how managers control the company's expense, but also on how they manage revenue productively by using the most efficient company as a benchmark. So this will take care the effect of market price and also other exogen factors (Berger & DiPatti, 2003).

METHOD

Unit analysis in this research is commercial banks which conducted by census to the 102 conven-

tional banks and 3 Islamic banks in Indonesia. Where according to data from Central Bank of Indonesia data (www.bi.go.id) noted there are 151 conventional banks and 3 Islamci Banks that operate in Indonesia. Some banks that do not included into research data are: (1) Conventional banks that runs an Islamic banks business units, because their financial statement were joined. (2) Conventional banks that do merger or taken over by other bank during research period.

Research conducted to both group of banks, because even each group have different method on calculation of earnings, but both have same financial intermediation characteristics in the form of gathering funds and channeling loans. Adjustment of variables which were used in this research for the Islamic banks according to Indonesian Guidance of Islamic Bank Accountancy (2003) as follows:

Interest income = Earnings from financing

Interest Expenses = Profit sharing cost to Investor's Fund + Cost from Wadia current account

Third Party Fund = Current accounts, Savings and Deposits, including Wadia current account. Wadia current account and wadia current account bonus were reckoned in efficiency because they were included in Islamic Banks' cash flow (PAPSI, 2003).

Channelled credit = channelled loan that have allowance for bad debt, that is : murabaha receivable, salam receivable, istishna receivable, ijara, qardh, mudharaba and musyarakha financing.

RESULT

Estimation on Bank's Profit Model

By using pooled least square regression from translog alternative profit efficiency (1) above, hence this research follow the approach which looking into bank's intermediation role in using raised funds from society and channels it in the form of credit to maximize profit. To prevent negative value, a constant added to the variable profit, and to eliminate heteroskedasticity influence we used white heteroskedasti-

city analysis. Output obtained by using eViews data processing is as follow (Table 1).

Table 1. Significance Level on Bank's

Variables (constant)	Parameter Estimation	t-stat
C	-6.153663	-2.718874**
LNY1	1.458401	5.463503***
LNY2	-0.295751	-4.226026***
LNY3	0.074965	0.417610
0.5*LNY12	0.022154	3.050833***
0.5*LNY13	-0.057986	-3.072741***
0.5*LNY23	-0.007848	-1.549481
LNW1	-1.630558	-4.336924***
LNW2	-0.443767	-1.387854
LNW3	-0.148965	-0.671960
0.5*LNW12	0.015218	0.230322
0.5*LNW13	-0.242846	-3.107148***
0.5*LNW23	0.181958	1.865010*
LNY1W1	0.148126	4.045404***
LNY1W2	0.069081	1.625500
LNY1W3	0.003526	0.256885
LNY2W1	-0.018110	-3.227066***
LNY2W2	-0.014703	-2.240189**
LNY2W3	-0.014630	-2.899973**
LNY3W1	-0.054474	-1.877800*
LNY3W2	-0.011104	-0.325807
LNY3W3	0.008513	0.855067
INF	-18.27145	-1.214993
0.5*INF2	-47.01485	-0.126017
LNY1INF	-2.125315	-1.694733*
LNY2INF	-0.138811	-0.941623
LNY3INF	1.438600	1.506000
LNW1INF	-1.023150	-0.605510
LNW2INF	-7.386964	-4.313685***
LNW3INF	-1.426113	-1.262630
T	0.026246	0.757958
0.5*T2	-0.000222	-0.274453
LNY1T	-0.001467	-1.070161
LNY2T	0.000713	2.049247**
LNY3T	0.002786	2.130935**
LNW1T	-0.002560	-1.080445
LNW2T	0.000385	0.082081
LNW3T	0.007483	3.826306
INFT	-0.019561	-0.076795

R-squared : 0.942823

Adjusted R-squared : 0.939406

F-stat : 275.9092

Ket. : * Significant at $\alpha = 10\%$

** Signifikant at $\alpha = 5\%$

*** Signifikan at $\alpha = 1\%$

Measuring Efficiency as Intermediation Approach Between Conventional...

Ade Salman Al-Farisi dan Riko Hendrawan

Result from regression above shows estimation model of factors that influence bank's variable profit. From the result we can conclude that some independent variables, that is given credit (Y_1), marketable securities (including bonds) (Y_2), and labour expenses (W_1), have a significant effect on bank's variable profit. While for some independent variables quarterly inflation rate (INF) and time index (T) do not have a significant effect on bank's variable profit. But according to Koetter opinion (2005), that with interaction of some variables at the same time, hence interpretation from each variable becomes not directly. Hence we only consider some variables that has significant effect and compare it to some former research:

Statistical F-test

This statistical test conducted to see the existence of and how big influence from independent variables to dependent variables in the model concurrently (multiple), or at least there is one independent variable that able to explain the dependent variable. The equation in this test is conducted with regression according to ordinary least square assumption.

Table 2. F-stat value of Panel Data Regression

F-Stat	H ₀ Hypotesis	Kesimpulan
275.9092	H ₀ rejected	Significant at $\alpha = 0,01$

Based on F-Stat value are larger value than F-Table value, hence F test above indicates that independent variables concurrently influence dependent variable significantly by 99%.

Profit Efficiency Score for All Banks

As we have obtained the regression output between some input and output variables to bank profit, next the error term obtained from every bank regression were used to count the profit efficiency score of each bank by using equation: $EFF = \exp [Y - \max (\bar{Y})]$ where \bar{Y} represents residual estimation from regression output to every bank. The profit efficiency score for all banks are as follows (Table 3).

Table 3. Bank's Profit Efficiency Scores Year 2002-2007.

BANKS	Profit Efficiency Score
Standard Chartered Bank	0.777
Bank Windu Kentjana International	0.761
Deutsche Bank A.G.	0.754
Bank China Trust Indonesia	0.753
Bank Woori Indonesia	0.752
The Bank of Tokyo Mitsubishi	0.742
Bank Maybank Indocorp	0.731
Bank Syariah Mandiri (BSM)	0.728
J.P Morgan Chase Bank N.A.	0.722
Bank UOB Indonesia	0.717
Bank Rabobank International	0.717
Bank Muamalat Indonesia (BMI)	0.715
Bank KEB Indonesia	0.712
Bank Mizuho Indonesia	0.703
Bank Ina Perdana	0.701
Bank Sumitomo Mitsui Indonesia	0.691
Bank Mayapada International	0.690
American Express Ltd	0.688
ABN Amro Bank	0.682
Bank of America N. A	0.673
Bank Syariah Mega Indonesia (BSMI)	0.671
Citibank N.A.	0.660
Bank OCBC Indonesia	0.654
Bank Victoria International Tbk	0.652
Bank Kesawan	0.652
The Bangkok Bank Company Ltd.	0.644
Bank Resona Perdana	0.642
Bank Swaguna	0.634
Bank Eksekutif International	0.615
Bank Bumiputra	0.606
Bank Himpunan Saudara 1906	0.605
Bank BNP Paribas Indonesia	0.597
Bank Persyarikatan Utama	0.595
Bank ICBC Indonsia	0.594
Bank Jasa Arta	0.586
Bank Agroniaga	0.586
Bank Harda International	0.586
Bank Index Selindo	0.585
Bank NISP	0.585
Bank Mega	0.584
Centratama Nasional Bank	0.584
Bank Bengkulu	0.583
Bank Akita	0.583
Bank Harfa	0.574
Bank Sinarmas	0.573
Bank Central Asia (BCA)	0.571
Bank Bali	0.571
Bank Ekonomi Raharja	0.571
Bank Hana	0.571
Bank Maspion Indonesia	0.571

BANKS	Profit Efficiency Score
Bank Mestika Dharma	0.571
Bank Nusantara Parahyangan	0.571
Bank Bisnis International	0.571
Bank Harmoni International	0.571
Bank Multi Arta Sentosa	0.571

Based on the tables above we can see that Standard Chartered Bank a foreign conventional bank have the highest profit efficiency score 0,777. Whereas the lowest profit efficiency score is Bank Sulawesi Tengah (BPD Sulawesi Tengah) with the score of 0,513. The three Islamic banks' score were as follows: Bank Syariah Mandiri (BSM) ranked 8 with score of 0,728, Bank Muamalat Indonesia (BMI) ranked 12 with score of 0,715 and Bank Mega Syariah ranked 21 with score of 0,671.

Table 4. Descriptive Statistics on Profit Efficiency Score Year 2002-2007

Item	Score
Mean	0.603799
Skewness	1.199675
Min	0.513134
Max	0.776964
N	105

From the descriptive statistics table above, we can conclude that with maximum score equal to 0,776964, and average profit efficiency score of 0,603799, hence other banks can maximize their profit by allocating their inputs and outputs more efficient, on average by the price of 0,776964 –

$0,603799 = 0,173165$. Standard Chartered Bank represents a bank in which during the research period are the most profit efficient, whereas Bank Sulawesi Tengah has the lowest profit efficiency score.

If we group all banks based on the owner status, descriptive statistics of the profit efficiency score above are as follows (Table 5).

Based on ownership, on average foreign banks group represent is the most efficient bank in Indonesia in allocating their entire inputs and outputs resources in running their intermediation function to yield profit. The next most efficient groups are bank campuran, foreign exchange private banks, non foreign exchange private banks, regional banks and government banks. This result is came close to the research conducted by Hadad, Santoso & Mardanugraha (2003) which were using stochastic frontier approach method (SFA). Where according to their research, for the year of 2000–2003 foreign banks groups represent the most efficient bank in Indonesia.

DISCUSSIONS

Given Credit output variable (Y1)

From the regression result we can see that coefficient of the given credit output variable is equal to 1.458401. Positive coefficient number indicate that given credit and bank's profit growth have a positive relation. This has a same result with research conducted by Illieva (2003) and Santos (2007) that found a positive relation with bank's profit function. While Koetter (2005) who have separated between com-

Table 5. Descriptive Statistic Profit Efficiency Score By Bank's Owner Year 2002-2007

Item	Government Banks	Private Forex Banks*	Private Non Forex Banks	Regional Banks	Mixing	Foreign Banks
Mean	0.5539	0.5941	0.5778	0.5636	0.6641	0.7047
Skewness		1.7696	1.8871	(2.2576)	(0.5758)	0.3351
Min	0.5539	0.5391	0.5237	0.5131	0.5154	0.6445
Max	0.5539	0.7279	0.7006	0.5832	0.7613	0.7770
N	1	29	33	17	16	9

*Including 3 Islamic Banks

mercial loan and interbank's loan found a positive relation between interbanks loan and bank's profit, but this relation become negative for commercial loan. Other result came from research by Fitzpatrick, Trevor & Mc Queen, (2005) who found the relation was not significant.

The high level of coefficient of channelled credit variable compared to other output variable coefficient, indicate that credit is a potential variable to improve bank's profit efficiency. The same opinion came from research conducted by Haddad et. al. (2003) where one of their concluded that channelled credit play important role in determining bank's profit efficiency.

Marketable Securities (Including Bonds) Output Variable (Y2)

From regression result we can see significant but negative relation between marketable securities variable with bank's profit. Where the coefficient from the variable equals to -0.295751. Negative coefficient indicate if marketable securities grow higher, then the bank's profit will fall. This result differs from Santos' (2007) research who found significant and negative relation but with bank's cost function (not bank's profit) with coefficient -0,99%. Research from Koetter (2005) found positive relation with bank's profit with coefficient 0,790.

Price of Labour Input Variable (W1)

Coefficient from labour price variable is significant and equal to -1.630558. Negative coefficient number indicates that higher labour price have negative impact on bank's profit. This output matches result from Koetter (2005) with coefficient -0.387. While two other researches give different result. Research from Fitzpatrick, Trevor & Mc Queen (2005)and Illieva (2003) found a positive and significant relation of this variable with bank's profit.

Estimating Coefficient of Determination (R^2)

Coefficient of determination (R^2) resulted from the regression equals to 0.942823, meaning that 94.282% of bank's variable profit influenced by de-

terminant variables in the model, while 5,718% is influenced by other variables outside the model.

CONCLUSION AND SUGGESTION

Conclusions

From this research we can obtain some findings related in gaining profit efficiency and also some variables that can influence them as follows: (1) By using pooled least square method to estimate translog profit efficiency model, some variables that influence significantly to bank's profit are : channelled credit (have a positive effect), marketable securities (negative effect), labour cost(have a negative effect). While other variables do not have significant effect. (2) Based on residual estimation, average profit efficiency score to the entire banks equal to 60,38%, whereas maximum profit efficiency score equal to 77,70%. Thereby on average banks in the sample still have room to improve their resources allocation to increase profit by $77,70\% - 60,38 = 17,32\%$. (3) Standard Chartered Bank has the highest profit efficiency score (77,70%) while Bank Sulawesi Tengah has the lowest score (51,30%). (3) From the entire 105 banks, the three Islamic banks ranked in the 20% most profit efficient, that Bank Syariah Mandiri (rank 8), Bank Muamalat Indensia (rank 12) and Bank Mega Syariah (rank 21). So that although there are some phenomenons related to the earnings [of] sharing holder burden and defrayment and also on their relatively low ROE at some banks, but descriptively can be said that Islamic banks can manage their input and output variables good enough in yielding profit.

Suggestions

There are some potencies and weaknesses to be developed to continue this research related to conventional and Islamic bank's profit efficiency, this research still disregard from bank's size effect which on some literatures can influence different efficiency level. Islamic Bank in Indonesia is relatively new to expand, with only small populations, compare to their conventional peers with 102 banks.

REFERENCE

- Berger, A.N. 1995. *The Profit Structure Relationship in Banking—Test of Market Power and Efficient Structure Hypothesis*. *Journal of Money, Credit and Banking*. USA
- Berger, A.N. & Di Patti, E.B. 2003. *Capital Structure and Firm Performance : A New Approach to Testing Agency Theory and an Application to The Banking Industry*. Federal Reserve System Papers, USA
- Damodaran, A. 2002. *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*. Second Edition. John Wiley & Sons, Inc. USA.
- De Young, R. 1997. *Measuring Bank Cost Efficiency: Don't Count on Accounting Ratios*. Financial Practice and Education. Washington, USA.
- Di Patti, E.B. 2000. *Capital Structure and Firm Performance: Employing Profit Efficiency to Test The Agency Approach*. George Mason University.
- Di Patti, E.B. 2000. Three Essays in The Economics of Banks. *Dissertation*. George Mason University Italy.
- Fabozzi, F.J., Modigliani, F., & Ferri, M.G. 1998. *Foundations of Financial Markets and Institutions*. Second Edition. Prentice-Hall, New Jersey, USA.
- Hassoune, A. 2002. *Islamic Bank's Profitability in an Interest Rate Cycle*. *International Journal of Islamic Financial Services*.
- Ilieva, I.S. 2003. Efficiency in The Banking Industry: Evidence from Eastern Europe. *Dissertation*. Fordham University, New York, USA.
- Koetter, M. 2005. *Measurement Matters: Input Price Proxies and Bank Efficiency in Germany*, Discussion Paper Series 2: *Banking and Financial Studies*. Utrecht School of Economics and Boston Consulting Group, Germany
- Lacewell, S.K. 2001. Are All Banks Rated Equitably? The Association Between Bank Characteristics, Efficiency and Financial Performance. *Dissertation*. Mississippi State University, Mississippi, USA.
- Mayes, H. & Lansburry, 1994, *Inefficiency in Industry*, Harvester-Wheatsheaf.
- Milima, A.P. & Hjalmarsson, L. 2002. Measurement of Inputs and Outputs in The Banking Industry. *Tanzanet Journal*. Sweden.
- Moody's Global Credit Research. 2008. *Risk Issues at Islamic Financial Institutions*. Moody's Investor Service. Paris.
- Muliaman, H.D., Santoso, W., Ilyas, D., & Mardanugraha, E. 2003. *Analisis Efisiensi Industri Perbankan Indonesia: Penggunaan Metode Nonparametrik Data Envelopment Analysis (DEA)*. Bank Indonesia.
- Muliaman, H.D., Santoso, W., Ilyas, D., & Mardanugraha, E. 2003. *Pendekatan Parametrik Nabhan, Faqih, 2008, Dasar-Dasar Akuntansi Bank Syariah*, Penerbit Lumbung Ilmu, Yogyakarta
- Negara Republik Indonesia. 2008. *Undang-Undang RI No. 21 Tahun 2008 Tentang Perbankan Syariah*. Sinar Grafika. Jakarta