

AL-IQTISHAD

Journal of Islamic Economics

Volume VII (2), July 2015

The Journal is published by Faculty of Shariah and Law Syarif Hidayatullah State Islamic University Jakarta in cooperation with The Indonesian Association of Islamic Economist.

This journal focused on Islamic Economics and Finance studies.

The Journal is published twice a year on January and July.

Editor in Chief

M. Nur Rianto Al Arif

Vice Editor

Maman Rahman Hakim

Sofyan Rizal

A. Chairul Hadi

Language Editor

Ummi Kultsum

Layout and Typesetting

Farhan Mustofa

Secretariat

Ahmad Sumedi

Fitriadi

Reviewer

Muhammad Amin Suma

Fathurrahman Djamil

Asep Saepudin Jahar

Amiur Nuruddin

Didin Hafidudhin

Djoni Hartono

Ahmad Hidayat Buang

Margareth Gfrerer

Ahmad Mujahiddin

Md. Sujimon

Ashraf MD Hasyim

Abdurrahman Haqqi

M. Hudaib

(UIN Syarif Hidayatullah Jakarta)

(UIN Syarif Hidayatullah Jakarta)

(UIN Syarif Hidayatullah Jakarta)

(IAIN Sumatera Utara)

(Universitas Ibn Khaldun)

(Universitas Indonesia)

(Universiti Malaya Malaysia)

(DAAD, Germany)

(UIN Suska Riau)

(Kolej Pengajian Islam Johor Malaysia)

(ISRA, Malaysia)

(Universitas Islam Brunei)

(Adam Smith Business School, Glasgow Univ.UK)

Editorial Office

Faculty of Shariah and Law Syarif Hidayatullah State Islamic University Jakarta

Jl. Ir. H. Juanda 95, Ciputat, South Tangerang, Banten -15412-.

Phone (+6221) 74711537, Fax. (+6221) 7491821

Website: www.journal.uinjkt.ac.id; Email: editor.iqtishad@yahoo.com

CONTENT

- 141 The Impact of Financial Liberalization on Islamic Banks's Efficiency in Indonesia
Wiwiek Rabiatul Adawiyah
- 151 Effects of Service Quality, Customer Trust, and Customer Religious Commitment on Customer Satisfaction and Loyalty of Islamic Banks in East Java
Rachmad Hidayat, Sabarudin Akhmad, Machmud
- 165 Peer Group Effects on Moslem Consumer's Decision To Purchase Halal-Labeled Cosmetics
Muniaty Aisyah
- 181 The Intellectual Capital Effect on Financial Performances at Islamic Insurance
Rizqon Halal Syah Aji & Kurniasih
- 197 Capital Market Integration: Palestine and Israeli Experience
Tulus Suryanto & Abdul Razak Abdul Hadi
- 207 The Effect of Productive Zakah Mentoring on The Wealth of Mustahik
Rizky Andriati & Nurul Huda
- 217 The Image of Financial Institution as Islamic Bank in Mediation Service Quality and Customer Satisfaction on Customer Loyalty in Purwokerto
Chandra Warsito
- 229 Financial Ratio and Its Influence to Profitability in Islamic Banks
Erika Amelia
- 241 Human Resources Development of Sharia Banking: Phenomenological Approach
Burhanuddin Yusuf
- 251 Application of Pattern of Islamic State Revenue Policy to Improve The Ability of Indonesia's Fiscal
Any Setianingrum

THE IMPACT OF FINANCIAL LIBERALIZATION ON ISLAMIC BANK'S EFFICIENCY IN INDONESIA

Wiwiek Rabiatal Adawiyah¹

Abstract. *The Impact of Financial Liberalization on Islamic Bank's Efficiency in Indonesia.* The aim of this research is analyze the state of efficiency demonstrated by foreign banks, as aggressor, as compared to that of the local banks – government banks and Islamic banks during the period 2009-2012. Data Envelopment Analysis (DEA) with intermediation approach is used as the main tool of analysis. Input variable chosen are deposit, asset, and personnel expenses. Meanwhile loan and income are chosen as output variable. To find out the difference of efficiency between foreign banks and islamic banks, this study use parametric different test of Independent Sample T-test. The study indicates that foreign banks are less efficient if compared to the local banks, especially Islamic banks and Sharia Business Units. It is also evidenced that there is no significant difference between the efficiency of foreign and Islamic banks during the period 2009-2012.

Keywords : efficiency, data envelopment analysis, foreign banks, Islamic banks

Abstrak. *Dampak Liberalisasi Keuangan Terhadap Efisiensi Bank Syariah di Indonesia.* Tujuan dari penelitian ini adalah menganalisis tingkat efisiensi bank asing, sebagai agresor, dibandingkan dengan bank lokal - bank pemerintah dan bank syariah selama periode 2009-2012. Teknik analisis menggunakan Data Envelopment Analysis (DEA). Variabel input yang dipilih adalah deposito, aset, dan biaya gaji. Sementara pinjaman dan pendapatan dipilih sebagai variabel output. Untuk mengetahui perbedaan efisiensi antara bank asing dan bank syariah, studi ini menggunakan uji beda parametrik Independent Sample T-test. Hasil penelitian menunjukkan bahwa tingkat efisiensi bank asing tidak lebih tinggi jika dibandingkan dengan bank lokal, khususnya bank Islam dan Unit Usaha Syariah. Penelitian ini juga membuktikan bahwa tidak ada perbedaan yang signifikan antara efisiensi bank asing dan Islam selama periode 2009-2012.

Kata Kunci: efisiensi, analisis DEA, bank asing, bank syariah

First draft: January, 10th 2015, Revision: February, 27th 2015, Accepted: March, 20th 2015

¹Faculty of Economics and Business University of Jenderal Soedirman. Jl. Prof. Dr. H.R. Boenyamin No. 709, Grendeng Purwokerto 53122

Email: wiwiekra@gmail.com

Introduction

Increase in foreign participation in the financial sector of emerging market brings benefits the host countries in the form of better technology and financial systems as well as from increased competition stimulated by new entrants. Does foreign banks always prominent? Claessens *et al* (2001) highlights that foreign banks earn greater profits than domestic banks in developing countries, but the opposite in developed countries, because foreign banks adopt better technology compared to banks in the developing countries. The banking system plays an important role in the economic development of any countries. As intermediary institutions, banking industries are required to have good performance (Sutawijaya and Lestari, 2009). Among successful indicators of bank performance is efficiency which refers to a measure of the deviation between actual performance and desired performance (Mester, 2003). As a consequence, a bank should minimize waste and eliminate unnecessary operational costs in order to be efficient. Managements of banks are aiming at rigorously cut costs in order to improve efficiency and ultimately profitability. Efficiency brings benefits in the form of positive spread (Karimzadeh, 2012). Thus it is a kind of survival strategy for financial institution in today's no-growth worlds.

The measurement of economic efficiency lies on determining the extent of technical and possibly allocative efficiency in an organization. Efficiency can be measured using parametric approaches and non-parametric approach (Deb, 2012). The parametric technique uses a pre-specified functional form for efficiency frontier, which may result in an inaccurate efficiency measurement (Berger and Humphrey, 1997). Economists have employed frontier efficiency measurement techniques to measure the productive performance of banks. Frontier efficiency measurement techniques use a production possibility frontier to map a locus of potentially technically efficient output.

This study employs the non-parametric frontier method, Data Envelopment Analysis (DEA) to examine whether the foreign banks are relatively more efficient than the Islamic banks. The empirical results reveal that increasing foreign bank entry is associated with increasing profitability, growing overhead expenses and rising non-performing loans in Indian public sector banks (Kalluru and Bhat, 2009). Therefore, it is interest to investigate whether that condition will be happened as well as to the State-owned banks, and especially Islamic banks (*BUS*) and Sharia Business Units (*UUS*) in Indonesia.

The purpose of this study is to analyze the state of efficiency demonstrated by foreign banks compared to the local banks, which are government banks and Islamic banks. Evan, Hoffer and Payne (2006) state that foreign banks have substantially better efficiency scores than all categories of domestic banks. Other researcher also

examined that foreign banks are more efficient than the local banks in developing countries, and the foreign bank entry has a rather negative impact on the local bank efficiency (see Fathi, 2010). However, different researcher finds that foreign banks are not more efficient than Islamic banks (see Saif and Yaseen, 2005, Sufian and Habibullah, 2010). To fill the research gap, this study examines to test theory related to banks' efficiency in foreign banks and Islamic banks.

Literature Review

DEA is a popular technique to evaluate bank efficiency performance and productivity improvement which combining all input and output data of the bank in a single measures (Deb, 2012).

Therefore, the DEA efficiency score for a specific firm is defined not by an absolute standard but is relative to the other firms under considerations (Tahir et al, 2009).

The efficiency of the banking technique is measured by calculating the ratio between output and input. DEA will calculate banks using *n* inputs to produce outputs of different *m* (Miller and Noulas, 1996 in Sutawijaya and Lestari, 2009). Bank efficiency is measured as follows:

$$h_s = \sum_{t=1}^m u_t y_{ts} / \sum_{j=1}^n v_j x_{js}$$

DEA assumes that each DMU will have weight that maximize of efficiency ratio (maximize total weighted output/total weighted input) (Muharam and Pusvitasari, 2007). Assumption of this efficiency ratio made DEA research is using orientation output in calculating efficiency technique, but both of these assumptions would have obtained the same results (Sutawijaya and Lestari, 2009: 58). An DMU can be said as efficient relatively if it dual value equal to 1 (efficiency value of 100 percent). Contrarily when the dual value is less than 1, then DMU is considered not efficient relatively (experiencing inefficient) (Silkman, 1986; Nugroho, 1995 in Huri and Susilowati, 2004).

Measurement model engineering approach banks on the assumption frontier is divided into two types, namely (Sutawijaya and Lestari, 2009): *First*, DEA CCR model (Charnes - Cooper - Rhodes , 1978). The assumption that is used in this model is Constant Return to Scale (CRS). Some linear program transformed into ordinary linear program in term of primal or dual, as follows:

Maximization:

$$h_s = \sum_{i=1}^m u_i y_{is} + U_o$$

Function limitations and constraints:

$$\sum_{t=1}^m u_t y_{ir} - \sum_{j=1}^n v_j x_{jr} \leq 0, r = 1, \dots, N;$$

$$\sum_{j=1}^n v_j x_{js} = 1 \text{ and } u_1 \text{ and } v_j \geq 0$$

The efficiency of each bank is calculated using linier program to maximize the amount of output that weighted from the s bank. Constraints weighted sum of inputs must be equal to one for s banks, while constraints for all banks are weighted output minus the weighted sum of inputs must be less or equal to 0. This means that all banks will be in or under reference of frontier performance which is straight line that cuts axis origin (Insukirdo in Sutawijaya and Lestari, 2009).

Second, BCC DEA models (Bankers, Charnes and Cooper, 1984). The assumption that is used in this model is Variable Return to Scale (VRS). Some linear program transformed into ordinary linear program in term of primal or dual, as follows:

Maximization

$$h_s = \sum_{i=1}^m u_i y_{is} + U_o$$

Function limitations and constraints:

$$\sum_{t=1}^m u_t y_{ir} - \sum_{j=1}^n v_j x_{jr} \leq 0, r = 1, \dots, N;$$

$$\sum_{j=1}^n v_j x_{js} = 1 \text{ and } u_1 \text{ and } v_j \geq 0$$

Where U_o can be a positive or negative value.

Banker, Charnes and Cooper with the method of variable returns to scale (VRS) finally is known as CCR model (Charnes-Cooper-Rhodes) and BCC (Banker-Charnes-Cooper) (Amrillah, 2010). CCR assumes the existence of CRS. The mean of assumption CRS is that the proportional changes at all levels of the input will produces the same proportional change in the output level. Meanwhile, BCC assumes the existence of VRS. The mean of VRS assumption is that all the units that will produce measurable changes at various levels of output and the assumption that the scale can affect the efficiency of production. In this study will only use the input orientation approach assuming CRS, because the approach of

input orientation to find out how much reduction in inputs that to be done by the DMUs that have poor performance for improving its performance.

Determining input-output which are used to calculate efficiency is one of important phases either when using parametric method or non parametric method. Input variable is the one which if increases, the other factors being constant, the efficiency unit would decrease and if decreases, the efficiency would increase and output variable is the one which if increases, the other things being equal, the efficiency would increase and vice versa (Nia et al, 2012).

In conducting analysis of banks' efficiency, there are five main approaches for defining inputs and outputs, namely: the production approach, the intermediation approach, the operational approach, the profitability approach and the modern approach (Nia et al, 2012). Since the intermediation approach has been used extensively in determining the inputs and outputs of the bank industry, therefore this study adopts this approach. The intermediation approach accounts for the cost of resources used and price (value) of outputs produced (Cook, et al, 2000). Intermediation approach constitutes a better instrument to study efficiency, and gives a more accurate image of how efficiently a bank is using its resources to generate profit Berger and Humphrey 1997, Taylor et al, 1998 in Cook, et al, 2000).

Methods

Data employed in this research was secondary data consisted of deposit, asset, personnel expense, loan and income of Foreign banks, State-owned Banks, Islamic Banks and Sharia Business Units in Indonesia. This secondary data were obtained by using observation method on the financial statement of those banks during the observation period in 2009-2012. The source of data obtained from official website Bank of Indonesia www.bi.go.id.

The populations used in this research are the foreign banks and Islamic banks in Indonesia. The sample of this research is chosen by using purposive sampling method with the following criteria: *First*, foreign banks, State-owned Banks, Islamic Banks and Sharia Business Units listed in Bank of Indonesia during the period of 2009-2012. *Second*, banks provide financial statements during the period 2009-2012.

The analysis technique used is descriptive and comparative methods. The data analysis method of this research is data envelopment analysis (DEA) using Banxia Frontier software. Thus, three inputs under the intermediation approach: deposit, assets, personnel expenses and two outputs: loan and income are utilized to investigate efficiency of foreign banks and Islamic banks.

Discussion

A unit (bank) said to be efficient if it obtained a score of 100 percent. Banks with 100 percent efficiency rate is said to be efficient. Furthermore, the most efficient banks will become a benchmark for other units. According to the result of calculation DEA analysis with Constant Return to Scale (CRS) assumption by using Banxia Frontier software, it can be concluded that from the total of ten foreign banks as sample, only four foreign banks that can achieve efficiency score of 100 percent in 2009. Meanwhile, foreign banks are not efficient but have efficiency scores above average in 2009 was Citibank and Deutsche Bank with the efficiency of each bank is equal to 99.2 percent and 98.6 percent.

However, the efficiency score of foreign banks in 2010 declined, which only two foreign banks was perfectly efficient. While inefficient foreign banks but have efficiency scores above average in 2010 were the Bank of China Limited (98.1 percent), Citibank (94.6 percent), and The Bank of Tokyo Mitsubishi UFJ (99.2 percent). In 2010 foreign banks that concluded inefficient was Bank of America, Deutsche Bank AG., Standard Chartered Bank, Hongkong & Shanghai Banking, and the Royal Bank of Scotland.

In 2011, only two foreign banks can achieve efficiency score of 100 percent, which were Deutsche Bank AG and The Bangkok Bank Comp. Ltd. Then the bank with the lowest efficiency score in 2011 was The Royal Bank of Scotland.

In 2012, the most efficient foreign bank is Deutsche Bank, JP Morgan Chase Bank, The Bangkok Bank Comp. Ltd. and The Hongkong & Shanghai Banking. It can be concluded that foreign bank that can maintain the efficiency score of 100 percent during 2009-2012 was The Bangkok Bank Comp. Ltd.

Table 1. Efficiency Scores of Foreign Banks during 2009-2012

No	Bank	Efficiency %			
		2009	2010	2011	2012
1	Bank of America N.A	36.9	41.7	36.6	42.4
2	Bank of China Limited	49.7	98.1	78.9	62.6
3	Citibank N.A	99.2	94.6	79.1	86.0
4	Deutsche Bank AG	98.6	44.9	100.0	100.0
5	JP. Morgan Chase Bank, N.A.	100.0	100.0	26.0	100.0
6	Standard Chartered bank	69.8	72.5	63.7	87.9
7	The Bangkok Bank Comp. Ltd.	100.0	100.0	100.0	100.0
8	The Bank of Tokyo Mitsubishi UFJ	100.0	99.2	92.0	96.0
9	The Hongkong & Shanghai Banking	75.3	78.2	89.6	100.0
10	The Royal Bank of Scotland	100.0	49.2	25.8	57.6

Source: Data Processed by Banxia Frontier Software

In table 2., it explains that efficiency scores of foreign banks compared to the islamic banks (*BUS*) and Sharia Business Units (*UUS*). Islamic banks and Sharia Business Units was the banks that attained efficiency score of 100 percent during 2009-2012. As well as it occurred to the Bank of America N.A. Third level bank that had efficiency score in above average was Bank of China Limited, which the bank can achieved 95 percent (2009), 98.1 (2010), 100 percent (2012), then 96.9 percent in 2012. The rest of sample had fluctuate efficiency score.

Table 2. Efficiency Scores of Foreign Banks, Islamic Banks, and Sharia Business Unit during 2009-2012

No	Bank	Efficiency %			
		2009	2010	2011	2012
1	Islamic Banks and Sharia Business Unit	100.0	100.0	100.0	100.0
2	Bank of America N.A	100.0	100.0	100.0	100.0
3	Bank of China Limited	95.0	98.1	100.0	96.9
4	Citibank N.A	82.9	99.3	92.0	96.0
5	Deutsche Bank AG	70.5	99.2	89.6	75.6
6	JP. Morgan Chase Bank, N.A.	68.3	40.1	79.1	73.3
7	Standard Chartered bank	64.7	68.0	77.6	73.1
8	The Bangkok Bank Comp. Ltd.	58.2	36.4	63.7	61.7
9	The Bank of Tokyo Mitsubishi UFJ	38.9	72.5	36.6	61.6
10	The Hongkong & Shanghai Banking	35.2	78.2	26.0	57.6
11	The Royal Bank of Scotland	28.3	49.2	25.8	42.4

Source: Data Processed by Banxia Frontier Software

The result of efficiency score of State-owned Banks, Islamic Banks, and Sharia Business Unit during 2009-2012 was most same with table 2. Which Islamic Banks, and Sharia Business Unit can maintain the efficiency score in 100 percent during 2009-2012. While state-owned bank that can be said as perfectly efficient bank is PT Bank BNI Tbk. during 2010-2011, Pt Bank BRI Tbk., and PT Bank BTN Tbk. in 2011. The smallest efficiency score was owned by PT bank Mandiri Tbk amounting to 64.2 percent in 2009.

Table 3. Efficiency Scores of State-owned Banks, Islamic Banks, and Sharia Business Unit during 2009-2012

No	Bank	Efficiency %			
		2009	2010	2011	2012
1	Islamic Banks and Sharia Business Unit	100.0	100.0	100.0	100.0
2	PT Bank BNI Tbk.	74.8	100.0	100.0	93.5
3	PT Bank BRI Tbk.	92.1	86.1	100.0	84.0

4	PT Bank BTN Tbk.	98.2	75.5	100.0	77.4
5	PT Bank Mandiri Tbk.	64.2	69.0	84.5	70.7

Source: Data Processed by Banxia Frontier Software

Based on the results obtained that the perfect efficient banks in 2009-2012 were The Bank of Tokyo Mitsubishi, *BUS* and *UUS*. For inefficient banks but had efficiency scores above average in 2009 was the Bangkok Bank Comp. Ltd. (95 percent) and PT. Bank BTN (93.9 percent). While there was eight inefficient banks in 2009 including Deutsche Bank, PT. Bank Mandiri Tbk., Standard Chartered Bank, Citibank, The Hongkong & Shanghai Banking, PT. Bank BNI Tbk., JP Morgan Chase Bank, and PT. Bank BRI Tbk. For inefficient banks but had efficiency scores above average in 2010 is JP Morgan Chase Bank (99.3 percent), The Bank of Tokyo Mitsubishi UFJ (99.2 percent) and PT. Bank BTN Tbk. (99.2 percent). While there were seven inefficient banks in 2010, including Deutsche Bank, PT. Bank Mandiri Tbk., Citibank, Standard Chartered Bank, PT. Bank BNI Tbk, The Hongkong & Shanghai Banking, and PT. Bank BRI Tbk. Perfectly efficient bank in 2011 were Deutsche Bank, PT. Bank BRI Tbk., The Bangkok Bank Com.Ltd., *BUS* and *UUS*. Bank that less efficient but had efficiency scores above average in 2011 was The Bank of Tokyo Mitsubishi UFJ (92 percent). While inefficient banks in 2010 were JP Morgan Chase Bank, Standard Chartered Bank, PT. Bank BNI Tbk., PT Bank Mandiri Tbk., Citibank, PT. Bank BTN Tbk., The Hongkong and Shanghai Banking. For the banks that are less efficient but the level of efficiency was above average were The Bank of Tokyo Mitsubishi UFJ (96 percent) and PT. Bank BTN Tbk. (79.2 percent). While there are eight banks, namely Citibank, PT. Bank Mandiri Tbk., PT. Bank BNI Tbk., The Hongkong & Shanghai Banking, Standard Chartered Bank, Deutsche Bank, PT. Bank BRI Tbk., and PT. Bank BTN Tbk.

Table 4. Efficiency Scores of Foreign Banks, State-owned Banks, Islamic Banks, and Sharia Business Unit during 2009-2012

No	Bank	Efficiency %			
		2009	2010	2011	2012
1	Islamic Banks and Sharia Business Unit	100.0	100.0	100.0	100.0
2	The Bank of Tokyo Mitsubishi UFJ	100.0	100.0	100.0	100.0
3	The Bangkok Bank Comp. Ltd.	95.0	99.3	100.0	96.9
4	PT Bank BTN Tbk.	93.9	99.2	100.0	96.0
5	PT Bank BRI Tbk.	88.3	99.2	92.0	79.2
6	JP. Morgan Chase Bank, N.A.	82.9	85.1	86.7	78.6
7	PT Bank BNI Tbk.	71.6	78.2	79.9	75.6
8	The Hongkong & Shanghai Banking	70.5	74.7	77.0	73.3
9	Citibank N.A	68.3	72.5	76.5	73.1

10	Standard Chartered bank	64.7	68.0	68.4	69.6
11	PT Bank Mandiri Tbk.	61.8	68.0	63.7	65.0
12	Deutsche Bank AG	58.2	36.4	26.0	61.7

Source: Data Processed by Banxia Frontier Software

Conclusion

DEA analysis result is known that the average of efficiency local banks is better than foreign banks. Which the first rank is occupied by Islamic Banks (*BUS*) and Sharia Business Units (*UUS*), State-owned Banks and the smallest score is Foreign Banks. The average of efficiency Islamic banks during 2009-2012 is 100 percent. While the average of efficiency State-owned banks, Islamic banks (*BUS*) and Sharia Business Units (*UUS*) in sequence are 81.97 percent and 77.26 percent. The result is in line with the previous research that conducted by Sufian and Habibullah (2010), they states Islamic banks currently exist in all parts of the world and it is seen as an alternative system, which has a lot to offer.

For foreign banks and local banks are already efficient, in order to maintain its performance by minimizing the input variables at the same time increasing the output variable resulting in productivity, but with due regard to fairness is primarily concerned with the cost of labor input variables. For the banks that have not yet reached an efficiency score of 100 percent are expected to pay more attention to variables that are still not used optimally so as to avoid waste of resources and thus increases the efficiency of the bank.

For the Indonesian Bank Regulator and the *OJK*, to create rules that supports the development of the financial industry, especially Islamic finance especially in banking. Because Islamic Banking Finance, is a nascent industry in the State of RI that the majority Moslem has huge potential. For investors are expected to be able to see bank efficiency as consideration in investing their fund in the banks observed. Further research who wants to carry out the similar research is suggested to use DEA efficiency analysis with *VRS (Variable Return to Scale)* so that all units measured will make change at various outputs, which technology and production scale will influence efficiency level.

References

Bank Indonesia. 2014. *Laporan Keuangan Publikasi Bank*. Retrieved June 20, 2014, from <http://www.bi.go.id>

Bank Indonesia. 2014. *Statistik Perbankan Indonesia*. Retrieved June 4, 2014, from <http://www.bi.go.id>

Berger, A. & D. Humphrey. 1997. *Efficiency of Financial Institutions: International*

- Survey and Directions for Future Research*. European Journal of Operational Research. 98(5), pp. 175-212.
- Bouzidi, F. 2010. *Consequences of The Foreign Bank Implantation in Developing Countries and Its Impact on the Local Bank Efficiency: Theoretical Analysis and Empirical Tests on International Data*. International Journal of Economics and Finance. 2(5).
- Claessens, S., A. et.al. 2001. *How Dose Foreign Entry Affect Domestic Banking Markets?*. Journal of Banking and Finance, 25, pp. 891-911
- Cook, W.D. et.al. 2000. *Financial Liberalization and Efficiency in Tunisian Banking Industry: DEA Tests*. Canada: Schulich School of Business York University.
- Deb, N. 2012. *Evaluation of Online Bank Efficiency in Bangladesh: A Data Envelopment Analysis (DEA) Approach*. Journal of Internet Banking and Commerce, XVII (2).
- Dendawijaya, L. 2005. *Manajemen Perbankan*. Bogor: Ghalia Indonesia.
- Evan, K. et.al. 2006. *Privatization, foreign bank entry and bank efficiency in Croatia: a Fourier-flexible function stochastic cost frontier analysis*. Applied Economics, 38, pp. 2075–2088.
- Indonesia Stock Exchange. 2014. Laporan Keuangan and Inan. Retrieved May 10, 2014, from www.idx.co.id
- Kalluru, S.R. & Sham, B.K. 2009. *Does Foreign Bank Entry Affect Operations of Domestic Banks? A Study on Indian Public Sector Banks*. Research Scholar, Department of Economics, Pondicherry Central University.
- Karimzadeh, M. 2012. *Efficiency Analysis by using Data Envelop Analysis Model: Evidence from Indian Banks*. International Journal of Latest Trends in Finance & Economic Sciences, II (3).
- Nia, N.M. et.al. 2012. *A Comparative Profitability Efficiency Study of Private and Government Banking System in Iran Applying Data Envelopment Analysis (DEA)*. Journal of Basic and Applied Scientific Research, 2 (11): pp. 2090-4304.
- Sutawijaya, A. & E.P. Lestari. 2009. *Efisiensi Teknik Perbankan Indonesia Pascakrisis Ekonomi: Sebuah Studi Empiris Penerapan Model DEA*. Jurnal Ekonomi Pembangunan, 10(1), pp. 49 – 67.
- Tahir, I.M. et.al. 2009. *Evaluating Efficiency of Malaysian Banks Using Data Envelopment Analysis*. International Journal Business and Management, 4 (8), pp. 96-106.