**DETERMINANTS OF BANKING EFFICIENCY IN ASEAN 5 COUNTRIES TO FACE**

**ASEAN BANKING INTEGRATION FRAMEWORK**

Emi Maimunah, Nurbetty Herlina Sitorus, Dian Fajarini

University of Lampung, University of Lampung, University of Lampung

emi\_syam@yahoo.com, nurbetty.herlina@yahoo.co.id, dianfajarini25@gmail.com

***ABSTRACT***

 *The aim of this research was to analyze the determinants of banking efficiency to face ASEAN Banking Integration Framework (ABIF) by employing 15 banks in ASEAN 5 such as Singapore, Malaysia, Thailand, Indonesia, Philippine for 2011-2015 period. The determinants of banking efficiency such as CAR, BOPO/CIR, LDR, NPL, NIM employed as the independent variables and the banking efficiency score from DEA as the dependent variable.*

 *The results from From Ordinal Logit Regression could be concluded that internal factor which affect and significant to banking efficiency were BOPO/CIR and LDR. Based on analysis in this research, it could be concluded that banking in ASEAN 5 ready to face ABIF due to the strong capital and good management of risk*

*Keyword: ABIF; Banking Efficiency; Financial Ratios.*

1. Introduction

ASEAN Economic Community (AEC) is a program of integrated economy in ASEAN region. AEC was started in 2015 which focus on Single Market and Production Base, Competitive Economic Region, Equitable Economic Development, and Integration into Global Economy. For moving forward, ASEAN committees establish another framework in order to integrate the financial system called ASEAN Banking Integration Framework (ABIF).

 The economic integration through ABIF framework gives both of a good chance and challenge. By this framework, banking in ASEAN is able to operate and expand their business in other ASEAN countries. It will grow the economics of their country. But on the other hand the activities of this framework have challenge for the competitiveness and the risk of failed. In order to get success on financial integration and avoid the risk, ASEAN agree that by implementing this framework, it needs a particular regulation. So ASEAN committee states that bank which able to expand their market is banking in which the statue is Qualified ASEAN Banking (QABs). Qualified ASEAN Banks will be given to banking which have a strong capital, high-endurance, well manage and meet the prudential regulations in accordance with applicable international standards.

 Moreover ASEAN realize that not all of the countries in ASEAN are ready to face ABIF. Some countries have a better condition and performance compared to others especially for opening their market. Thus, to deal with the different condition among banking, ASEAN committee need to pay attention with the financial sector condition in each country and ask the country to help each other through some support on education, training, and expert. On The Road to Financial Integration research, countries incorporated in ASEAN were grouped into two side such as ASEAN 5 (as original members) and BCLMV (as newcomers). The grouping of those countries is because the similarity of their economic conditions.

The competition among ASEAN countries in the face of ABIF requires them to prepare and evaluate their banking performances. On this research writer focus on the ASEAN countries which involve in ASEAN 5 countries. The reason is because those five countries are the leading countries among others. Banking performances in ASEAN 5 countries can be seen in some aspects such as NPL, ROA, ROE, NIM, BOPO/CIR, CAR. On table 1 is provided the data of banking performances in ASEAN.

Table 1. Financial Indicators of ASEAN 5 Countries (Indonesia, Malaysia, Philippine,

Thailand, Singapore).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Years** | **Countries** | **NPL (%)** | **ROA (%)** | **ROE (%)** | **NIM (%)** | **CIR (%)** | **CAR (%)** |
| 2011 | IndonesiaMalaysiaPhilipinaThailandSingapore | 2,102,702,602,901,10 | 3,031,501,601,201,00 | 20,3016,8015,0010,909,21 | 5,915,603,652,171,72 | 67,9557,8359,3255,2259,19 | 16,0517,7017,1014,9016,00 |
| 2012 | IndonesiaMalaysiaPhilipinaThailandSingapore | 1,802,002,202,401,00 | 3,111,601,801,201,10 | 21,0017,3015,8011,6011,00 | 5,492,852,302,141,75 | 63,0659,1060,7759,5555,05 | 15,6017,6017,8016,3018,10 |
| 2013 | IndonesiaMalaysiaPhilipinaThailandSingapore | 1,702,003,002,300,90 | 3,081,502,201,401,00 | 19,8015,6020,0012,6011,00 | 4,892,413,262,181,58 | 63,2855,1560,2756,3557,77 | 16,3614,7018,5015,6016,90 |

 Source. Muljawan, Dadang dkk, 2014.

From table 1, it can be seen that the financial ratio of ASEAN 5 countries is relative similar one another. From the profitability aspects such as ROA, ROE and NIM, Indonesia is considered higher than others countries. Moreover from NPL ratio which show the management of risk in banking, it can be seen that Indonesia has a small ratio means that Indonesia have good management risk compared to others. Besides, to evaluate the banking performances, we can measured the efficiency of each banks then examine the factors which influence the banking efficiency in order to know what aspects which must be improved for the banking performances.

Banking efficiency is measured by using Data Envelopment Analysis or DEA which employs input and output variable. Then, the score of banking efficiency will be employed as the dependent variable while the financial ratio will be employed as the independent variable which is expected will become the determinants of banking efficiency. Most research has done this kind of analysis which is called as two stage analysis. Our research before on Nurbetty *et al* (2017) has measured the banking efficiency in ASEAN 5 countries. Therefore in this research, writers will focus to examine the internal factors which is expected will influence the banking efficiency score which has conducted before.

Some previous research have discussed about banking efficiency. Astoeti Wahjoe (2015) measured the banking efficiency using DEA and measured the internal factor influencing banking efficiency. It employed SIZE, TYPE, NPL, CAR, LDR, BOPO, DEPOSITO, NIM, GCG as independent variables and banking efficiency measured by DEA as dependent variable. The result showed that NPL, LDR, and DEPOSITO are negative significantly affected to banking efficiency while CAR and NIM are positive significantly affected to banking efficiency.

Maria Monica (2013) discussed about banking sector integration and investigates the strategy of monetary policy in country. The result showed that by implement the banking regulation standard, ABIF can make ASEAN more conservative and each country needs to prepare and harmonize the banking regulations.

Due to the competitiveness of ASEAN 5 banking and to meet the requirements of Qualified ASEAN Bank statue in order to face ABIF, we need to examine deeply about the determinants of banking efficiency. To measure the determinants of banking efficiency, we employ some financial ratios as the internal factors that influence banking efficiency. Those internal factor are CAR, BOPO/CIR, LDR, NPL and NIM as the independent variables. For the dependent variable, we use the score of banking efficiency that already measured on our previous research.

The problem formulations of this research is do the internal factors of bank such as CAR, BOPO/CIR, LDR, NPL, NIM affect banking efficiency in ASEAN 5 countries. The hypothesis appear on this research is assumed that internal factors such as CAR, BOPO, LDR, NPL, NIM affect banking efficiency in ASEAN 5 countries.

1. **Literature Review**

**2.1 Determinants of banking efficiency**

 Bactiar Usman in Prasnanugrraha (2007) stated that financial ratio analysis is done to obtain the representation of financial expansion and company financial position. Financial ratio analysis is beneficial as an internal analysis for company management.

 Green and Mayes (1991) on Badunenko et al (2006) stated that determinants of factor influence to operational in a company are first the characteristic of each company such as the number of investor, company size, market share, the company’s sales growth and Research and Development expenses (RnD). Second, the outsourcing activities such as external contract work and services, material inputs, operating leasing, and temporary employed labor. Besides the region type of firm location and industry effect also identified influence to company efficiency.

 Badunenko et al. (2006), stated that determinants of efficiency is divided into two types such as internal factor and external factor. Internal factor includes SIZE, outsourcing activity, ownership and legal form. External factors that influence efficiency are industry affiliation, location, year effects, and market shares. M. Anwar et al. (2012) stated that determinants of banking efficiency is caused by total assets, ROA, CAR, LDR, NPL, GDP, and IHSG. Subandi (2014) analyzed the factor which influence operational banking efficiency in Indonesia such as total asset, bank types, CAR, LDR, NPL, operational expense, and NIM.

 On this research, determinants of efficiency that will be examined about their influences to banking efficiency are CAR, BOPO/CIR, LDR, NPL, NIM. Moreover, banking efficiency scores measured by Data Envelopment Analysis which is conducted on our research before will be employed as the dependent variable.

2.1.1 Capital adequacy ratio

 CAR is a ratio that shows the capability of capital in a bank to absorb risk of credit failure. In order to create a well system of banking, able to grow and compete nationally and internationally, banks need to increase the ability to absorb the risk caused by the crisis or excessive credit growth but on the other side, CAR which is too higher means banking can’t use their capital effectively. Therefore, CAR is expected can give either positive or negative influence to banking efficiency.

2.1.2 BOPO (cost to income ratio)

 BOPO or cost to income ratio is a ratio that shows the comparison between operating expenses and operating income. The higher the CIR will reduce the level of bank efficiency because indicating the amount of cost in each company. Therefore, BOPO/CIR has a negative influence to banking efficiency.

2.1.3 Loan to deposit ratio

 Loan to deposit ratio is a credit ratio that is given to third parties both of on rupiah or foreign exchange which not include the credit given to other banks to the third-party banks include clearing, deposits and saving but not include interbank funds. The higher of LDR means bank is effective as the financial intermediation in which the function is to collect and distribute the fund. Therefore, LDR has a positive influence to banking efficiency.

2.1.4 Net performing loan

 Net performing loan is a ratio that shows the asset quality of banks which is measured by NPL gross and NPL net. The higher the NPL ratio will reduce the efficiency of banking, therefore NPL has a negative influence to banking efficiency but the lower the NPL ratio can give a positive influence due to the good management of risk.

2.1.5 Net interest margin

 Net interest margin is a comparison between net interest incomes to average earning assets. Net interest margin can give negative influence and positive influence to banking efficiency.

**2.2 Banking Efficiency**

Rogowski (1998) on Siudek (2008) stated that efficiency measurement on company especially banking can be focused on two approach such as operational efficiency (technical efficiency) and scale and scope efficiency. Technical efficiency usually used to measure banking efficiency on produce maximum output by using the provided input. The measurement of banking efficiency can be conducted into two methods such as parametric and non-parametric. Non-parametric approach is known as Data envelopment Analysis with linear program. (Monetary Economic and Banking Bulletin, Vol 18 no 2, Oct 2015).

**2.3 Theoretical Framework**

Banking efficiency can be measured by DEA and the score of DEA will be applied as the dependent variable. Then, the financial ratio which is expected will influence the banking efficiency of banking in ASEAN 5 countries will be applied as the independent variables. Those financial ratios are CAR, BOPO/CIR, LDR, NPL, NIM. This kind of measurement is to examine what factors that must be improved in order to face ASEAN Banking Integration Framework. The theoretical framework is shown in picture 1.

CAR (two-tailed)

BOPO/CIR (-)

NIM (two-tailed)

NPL (two-tailed)

LDR (+)

Banking Efficiency Score

(Measured by DEA on writers previous research)

Picture 1. Theoretical framework.

**3. Research Methods**

**3.1 Types and source of data**

The type of data used on this research is quantitative secondary data in a form of panel data or cross sectional time series. Involving banks in Singapore, Malaysia, Thailand, Indonesia, Philippine, the data is taken from each bank official website, Booklet of Bank Indonesia and OJK, Indonesia banking statistic in 2011 – 2015 period using quarterly data.

**3.2 Population and sample technique**

 The population on this research is conventional bank in Singapore, Malaysia, Thailand, Philippine or known as ASEAN 5 that is listed in each country stock exchange with observation period is 2011 – 2015. The sample technique is purposive sampling with the criteria as follows:

1. Conventional bank listed in Singapore, Malaysia, Thailand, Indonesia and Philippine Stock Exchange.
2. Conventional bank from Singapore, Malaysia, Thailand, Indonesia, and Philippine that is stated have the biggest assets according to ASEAN Development Bank that include three banks from each country.
3. Conventional bank from Singapore, Malaysia, Thailand, Indonesia, Philippine that publish financial report from first quarterly of 2011 until forth quarterly 2015.

Table 2

Table for Data of Banks in Singapore, Malaysia, Thailand, and Philippine based on total assets according ADB.

|  |  |  |
| --- | --- | --- |
| No | Bank | Country |
| 1 | DBS Bank | Singapore |
| 2 | OCBC Bank | Singapore |
| 3 | United Overseas Bank | Singapore |
| 4 | Maybank | Malaysia |
| 5 | CIMB | Malaysia |
| 6 | Public Bank Berhad | Malaysia |
| 7 | Bangkok Bank | Thailand |
| 8 | Siam Commercial Bank | Thailand |
| 9 | Krung Thai Bank | Thailand |
| 10 | Bank Mandiri | Indonesia |
| 11 | Bank Rakyat Indonesia | Indonesia |
| 12 | Bank Central Asia | Indonesia |
| 13 | Metropolitan Bank and Trust Company | Philippine |
| 14 | Bank of the Philippine Islands | Philippine |
| 15 | BDO Unibank Inc | Philippine |

Source. Asian Development Bank, 44th IAFEI World Congress; Global Recovery Amidst Reforms, 2014.

**3.3 Analysis method**

This research employed associated study used ordinal logit regression to see the determinants of banking efficiency in ASEAN 5 countries. Ordinal logit regression is developed to handle the dependent variable which has ordinal scale and containing of three or more categories (Gujarati, 2012). Ajith and Ranasinghe (2011) stated that ordinal logit regression is more proper to be used because naturally the efficiency scores from DEA result is an order. The data of banking efficiency measured by DEA is provided in the appendices.

Ordinal Logit Regression Model :

$$Y\_{i}^{\*}=B\_{1}CAR\_{i1}+ B\_{2}BOPO\_{i2}+B\_{3}LDR\_{i3} +B\_{4}NPL\_{i4}+B\_{5}NIM\_{i5 }+u\_{i}$$

Hypotesis :

CAR

Ho : Assumed that CAR not influence to Banking Efficiency.

Ha : Assumed that CAR influence to Banking Efficiency.

BOPO/CIR

Ho : Assumed that BOPO/CIR not influence to Banking Efficiency.

Ha : Assumed that BOPO/CIR has negative influence to Banking Efficiency.

LDR

Ho : Assumed that LDR not influence to Banking Efficiency.

Ha : Assumed that LDR has positive influence to Banking Efficiency.

NPL

Ho : Assumed that NPL not influence to Banking Efficiency.

Ha : Assumed that NPL influence to Banking Efficiency

NIM

Ho : Assumed that NIM not influence to Banking Efficiency.

Ha : Assumed that NIM influence to Banking Efficiency.

**4. Research Findings and Discussion**

4.1 Determinants of banking efficiency in ASEAN 5 countries to face ABIF

To measure the determinants of banking efficiency in ASEAN 5 countries to face ABIF, this research conducted ordinal logit regression. Ordinal logit regression was done by using CAR, BOPO/CIR, LDR, NPL and NIM as independent variables. Dependent variable is efficiency scored measured by DEA that was conducted in our research before. Those score was grouped into three categories such as (3) perfectly efficiency (PE), (2) efficient (E), (1) enough efficiency (EE). The data of banking efficiency is provided in the appendices.

Ordinal logit regression was used because grouping of efficiency rate indicates a qualitative dependent variable and ordinal so ordinal logit regression is considered proper to be applied on this research. Table 3 showed the result of ordinal logit regression used stata14 program.

Table 3

Output of Ordinal Logit Regression

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | z-statistic/z-table | Prob | Conclusion |
| CAR | -0.1987 | -1.18/-1.645 | 0.240 | Ho accepted |
| BOPO/CIR | -0.1566 | -2.17/-1.645 | 0.030 | Ho rejected |
| LDR | 0.2152 | 6.96/1.645 | 0.000 | Ho rejected |
| NPL | 0.9503 | 1.47/1.645 | 0.142 | Ho accepted |
| NIM | -0.1775 | -0.54/-1.645 | 0.586 | Ho accepted |

 Source. Data processed

4.2.1 CAR

Based on measurement obtained, z-statistic for CAR was -1.18 with 0.240 of probability on significant level of 5%. It means Ho is accepted where CAR not affect to banking efficiency. Moreover CAR showed a negative sign on this measurement.

CAR is a comparison between bank capital and ATMR that show capital capability of banking to absorb risk from their activities. CAR can affect both of negatively or positively.

On this research, CAR which not affect to banking efficiency show that every alteration of CAR was not give an impact on bank activities. It was caused bank keep CAR as appropriate as the minimum require so banks which increase their capital only for meeting the minimum require and not use the capital expand their business or give a significant influence to banking efficiency. This results was supported by Prasnanugraha (2007), Dewi et al (2014), Wahab (2015).

Moreover, the negative sign of CAR is followed by the high level of CAR. It indicates that Bank was not capable enough to use their capital. During the research period, CAR of banking in ASEAN 5 countries are high about 20 percent. So if CAR can be decreased by managing the capital better then it will increase the banking efficiency of ASEAN 5 countries. This research was supported by Rindhatmono (2005).

4.2.2 BOPO/CIR

 Based on measurement obtained, z-statistic for BOPO/CIR was -2.17 with 0.030 of probability on significant level of 5%. It means Ho is rejected where BOPO/CIR have a significant negative affect to banking efficiency.

 BOPO/CIR is a comparison between operational cost and income operational that indicate the capability of banking operational income to cover all of the operational cost so the smaller ratio of BOPO/CIR show the better efficiency rate. The significant negative affected means that the decreasing of BOPO will increase the banking efficiency score of ASEAN 5 countries. This result was supported by Mawardi (2004), Rindhatmono (2005), Purwoko et al (2013), Widiarti (2015).

4.2.3 LDR

 Based on measurement obtained, z-statistik for LDR was 6.96 with 0.000 of probability on significant level of 5%. It means Ho is rejected where LDR have a significant positive affect to banking efficiency.

 LDR is a comparison between total of credit to deposits. LDR shows how well the company collects and disburses funds to public. The higher the LDR to the maximum limit indicates that the bank is able to perform the intermediary function optimally and efficiently. The positive influence of LDR to efficiency means that the increasing of LDR will increase banking efficiency of ASEAN 5 countries. This result was supported by Mulyawan et al (2014), Widiarti (2015).

4.2.4 NPL

 Based on measurement obtained, z-statistic for NPL was 1.47 with 0.142 of probability on significant level of 5%. It means Ho is accepted where NPL not affect to banking efficiency. Moreover NPL showed a positive sign on this measurement.

 NPL is a comparison between total of nonperforming loans to total of credit that shows how much the level of problem loans in the bank. If the ratio of NPL is high then it will decrease the interest income. On this research, NPL which not affect to banking efficiency showed that the management of credit risk was well enough. This result was supported by Perwaningtyas (2014)

 The positive sign showed on NPL in this research means that the low of NPL ratio will decrease the banking efficiency, vice versa. During the research period, NPL ratio of banking in ASEAN 5 countries was considered low around 3.5 percent and still under the maximum level. It means the management of risk was well but on the other hand it indicates that the lending activities have not optimal enough. The low of NPL could be concluded that banking still able to increase the total of credit so the NPL will increase as well as the efficiency of banking. This result was supported by Noor and Achmad (2009).

4.2.5 NIM

 Based on measurement obtained, z-statistic for NIM was -0.54 with 0.586 of probability on significant level of 5%. It means Ho is accepted where NIM not affect to banking efficiency. Moreover NIM showed a negative sign on this measurement.

 On Mulyawan (2015) stated that NIM could give both of negative or positive affect to banking efficiency. The negative relationship occurred because the competition level among banking is low and causes the low efficiency of banking. Then, the inefficiency is compensated by raising the margin.

 During the research period, the ratio of NIM among banking in ASEAN 5 countries is relative similar as well as the efficiency score. This result was supported by Widiarti et al (2015).

**5. Conclusion**

Based on the analysis of each variables including internal factor that affect to banking efficiency in ASEAN 5 countries, it could be concluded that BOPO/CIR and LDR which significantly affect to banking efficiency. CAR and NPL which not significantly affected show that the efficiency of banking already good due to the strong capital and good management of risk. On the other hand the negative sign of CAR and the positive sign of NPL indicate that banking have a good capital but not optimal on using it, in line with NPL that is low so banking still able to increase the credit by using the capital more optimal. Moreover, NIM has not affect to banking efficiency with the negative sign.

Those way explained was to support the performances of banking in ASEAN Banking Integration Framework. By the result of this research, we could see that actually banking on ASEAN 5 countries is ready to face ABIF because they fulfill some of the Qualified Banks Statue requirements such as strong capital and good management of risk.

The recommendations conducted on this research are first, banking in ASEAN 5 countries should keep and manage the banking efficiency by focusing on the internal factors that affect to bank efficiency. Second, banking in ASEAN 5 countries should more optimal to use their capital. Third, financial integration give a challenge so risk mitigation is needed for all banks in ASEAN 5 countries to attend the systemic impact in case of failure in economic activity and financial integration. The last, they need to prepare on the harmonization of regulation and meet their bank to those kinds of regulations.

References

Ajith and Ranasinghe. (2011). “Use of DEA for Measure Efficiency of Human Capital Formation Evidence From a Public University in Sri Langka*”*. *First Postgraduate Symposium.*

Andries, Marius Ali. (2010). “The Determinants of Bank Efficiency and Productivity Growth in the Central and Eastern European Banking System*”*. Alexandra Ioan University of Lasi, Romania.

Anwar, Mokhamad et al. (2012). “Small Business Finance and Indonesian Banks Efficiency: DEA Approach. *The 13th International Convention of The East Asian Economic Assocoation.*

Amadou, Thierno Barry; Santos Jose; Dacanay; Laetitia Lapetit; Amine Tarazi. (2013). “Ownership Structure and Bank Efficiency in the Asia Pacific Region*”.*

A Blueprint for Growth, Asean Economic Community*.* (2015).*”* Progress and Key Achievements*”. Diakses melalui* [*www.asean.org*](http://www.asean.org)

Asian Development Bank.(2014). 44th IAFEI World Congress*.”*Global Recovery Amidst Reforms*”. Diakses melalui* [*www.adb.org*](http://www.adb.org)

ASEAN Economic Blueprint Final .(2025). *Diakses melalui* [*www.asean.org*](http://www.asean.org)

ASEAN Economic Community Blueprint.(2015). *Diakses melalui* [*www.asean.org*](http://www.asean.org)

Bank Indonesia.(2015). Laporan Perekonomian Indonesia. “Perekonomian Domestik 2015*”.*

Badunenko, O., Michael F, and Adreas (2006). “What determines the technical efficiency of a firm? The importance of industry, location and size. A research project sponsored by German institute for economic research and Geman statistic office in Wiesbaden.

Banker, R.D., A. Charnes, and W.W Cooper. (1984). “Some models for Estimating Technical and Scale Inefficient in Data Envelopment Analysis*. Management Science”.*Vol 30 No.9 1984.

Berger, A De Young and Udell, GF. (2000). Globalization of Financial Institutions. “Evidence from Cross Border Banking Performance. Working Paper Series*”.* WP 99 25*. Federal Reserve Bank of Chicago.*

Charnes, A., W.W. Cooper, E. Rhodes.(1978). “Measuring The Efficiency of Decision Making Units”. European Journal of Operational Research *2* (1978) 429 – 444.

Departemen Pengembanan UMKM Bank Indonesia.(2016). “Pemetaan dan Strategi Peningkatan Daya Saing UMKM dalam Menghadapi MEA 2015 dan Pasca MEA 2025”.

Dewi, Krisna Ayu Kadek *et al*.(2014). “Pengaruh CAR, LDR, dan BOPO terhadap ROA pada Bank Umum yang Terdaftar di BEI tahun 2008 – 2012”. Jurnal S1 Ak Universitas Pendidikan Ganesha. Vol 2 No.1 thn 2014.

Fathony, Moch.(2012)*. “*Estimasi dan Faktor-Faktor yang Memengaruhi Efisiensi Bank Domestik dan Asing di Indonesia”. Jurnal Keuangan dan Perbankan, Vol.16, No.2 Mei 2012. hlm 223 – 237.

Ghazali, Imam.(2014). “An Efficiency Determinant of Banking Industry in Indonesia*”*. ISSN Vol 5. No.3 thn 2014

Gujarati, Damodar.(2011).”Econometrics by Example”. UK. Palgrave Macmillan.

Herlina, Nurbetty; Emi Maimunah, Dian Fajarini.(2017).“Indonesian Banking Efficiency to Face ASEAN Banking Integration Framework”.

Hadad, Muliaman D., WimbohSantoso., Dwiyapoetra S Bosar., ItaRulina., Wini Purwanti., Ricky Satria (2004). “Fungsi Intermediasi Bank Asing dalam Mendorong Pemulihan Sektor Riil di Indonesia”.

Hafidz, Januar.,Rieska Indah Astuti.(2013). “Tingkat Persaingan dan Efisiensi Intermediasi Perbankan Indonesia”.

History of ASEAN and ASEAN Overview *diakses melalui* [*www.asean.org*](http://www.asean.org)

Kementrian Keuangan Indonesia.(2014). “Laporan Dampak Asean Economic Community terhadap Sektor Industri dan Jasa serta Tenaga Kerja di Indonesia”.

Kumar, Nand; Archana Singh. (2015). IOSR . *“*Measuring Technical and Scale Efficiency of Banks in India Using DEA*” Journal of Business and Management..*

Macro prudential Policy Department*.* Bank Indonesia.(2016). “*Advances and Challenges in Regional Integration”.*

Maimunah, Emi.(2012). “Determinan Efisiensi Teknis Pada Industri Keripik Pisang di Kota Bandar Lampung”. *Tesis.* Magister Ilmu Ekonomi. Universitas Padjajaran.

Murthy, Rama Sree. (2013).”Logit Research Approach to Rating Banks Using Financial Ratios: A study of Gulf Cooperation Council Banks*”*. *International Journal and Research*. Vol, 4, No. 4 thn 2013.

Muljawan, Dadang.,JanuarHafidz., Rieska Indah Astuti., Rini Oktapiani. (2014). “Faktor-Faktor Penentu Efisiensi Perbankan Indonesia serta Dampaknya Terhadap Perhitungan Suku Bunga Kredit”.

Mawardi, Wisnu.(2004). “Analisis Faktor-Faktor yang Mempengaruhi Kinerja Keuangan Bank Umum di Indonesia”. *Tesis.* Program Studi Magister Manajemen. Universitas Diponegoro.

Masita, Gracia. “Determinan Efisiensi Perbankan di Indonesia berdasarkan Data Envelopment Analysis”.

McDonald, J. (2009). “Using Least Squares and Tobit in Second Stage DEA Efficiency Analysis”. European Journal of Operational Research. 197,792-798

Noor, Mohamad Akbar; Achmad, Hayati Noor.(2012). “The Determinants of World Islamic Banks Efficiency: Does Country Income Level have an Impact?”. Journal of Islamic Economics, Banking and Finance, Vol 8 No 2, Apr – Jun 2012.

Perwaningtyas, Gloria Anindya.(2014). “Faktor – Faktor yang Mempengaruhi Efisiensi Bank di Indonesia periode 2008-2012”. *Skripsi*. Program Sarjana Fakultas Ekonomika dan Bisnis Universitas Diponegoro.

Prasnanugraha, Ponttie.(2007). “Analisis Pengaruh Rasio-Rasio Keuangan Terhadap Kinerja Bank Umum di Indonesia”. *Tesis*. Program studi Magister Sains Akuntansi. Universitas Diponegoro.

Priyatno, Dwi.(2012). Cara Kilat Analisis Data dengan SPSS 20. Yogyakarta. C.V Andi Offset.

Pujianti, Ria.(2016). “Analisis Struktur Pasar Perbankan dan Stabilitas Perbankan di Indonesia*”. Skripsi.* Jurusan Ekonomi Pembangunan. Universitas Lampung.

Purwoko, Didik; Sudiyatdo, Bambang.(2013). “Faktor-Faktor yang Mempengaruhi Kinerja Bank (Studi Empiris Pada Industri Perbankan di BEI”. Jurnal Bisnis dan Ekonomi. Vol.2 No.1. pp 25-39.

Rahmawati, Yeni; Zulian Dalimunthe.(2013). “Perbandingan Rasio Profitabilitas, Efisiensi, Likuiditas, dan Risiko pada Bank Syariah dan Bank Konvensional di Indonesia”.

Rindhatmono, Ferdi.(2005). “Analisis Faktor-Faktor yang Memengaruhi Profitabilitas Bank Pasca Merger di Indonesia”. *Tesis*. Program Studi Magister Manajemen. Universitas Diponegoro.

Rismawati. “Menghadapi *Qualified ASEAN Bank,* Indonesia: Berekspansi atau Bertahan di dalam Negeri”.

Sasongko, Danang Sigit.(2011). “Pengaruh CAR, BOPO, NIM, NPL, dan LDR terhadap Kinerja Perusahaan Perbankan”*. Skripsi*. Jurusan Akuntansi Universitas Sebelas Maret.

Sholeh. (2013). “Persiapan Indonesia dalam Menghadapi AEC (*Asean Economic Community* 2015)”.

Siaran Pers Bank Indonesia dan OJK (2014). “Indonesia Sepakat Mendukung Integrasi Perbankan ASEAN”.

Siudek. (2008). “Theoretical Foundations of Bank Efficiency and Empirical Evidence from Poland”. Social Research. Nr. 3 (13), 150-158.

Soetanto, Vanina Tessa; Ricky. (2011).”Technical Efficiency of Indonesian Commercial Banks: An Application of Two-Stage DEA*”. Jurnal Manajemen dan Kewirusahaan Vol.13 No 2, September 2011. Pp 107-116*

Subandi and Ghozali, Imam,(2014). “ A Efficiency Determinant of Banking Industry in Indonesia*. Research Journal of Finance and Accounting*.

Staub, Roberta B.(2009). “Evolution of Bank Efficiency in Brazil: A DEA Approach*”*

Suvita, Jha; Xiaofeng, Hui. (2012).”A Comparison of Financial Performance of Commercial Bank: A Case Study of Nepal”. *African Journal of Business Management Vol. 6 (25), pp. 7601 – 7611.*

Tesfay, Tadele.(2016). “Determinants of Commercial Banks Efficiency: Evidence from Selected Bank of Ethiopia*”*. *International Journal of Scientific Research Publication. Vol 6, Issue5, May 2016.*

Tlemsani, Issam; Huda Al Suwaidi.(2016). “Comparative Analysis of Islamic and Conventional Banks in the UAE during the Financial Crisis*”. Asian Economic and Financial Review, 2016. 6(6): 298-309.*

Widarjono, Agus.(2013). Ekonometrika Pengantar dan Aplikasinya. Yogyakarta. UPP STIM YKPN

Widiarti, Astoeti Wahjoe; Hermanto Siregar; TriasAndati.(2015). “The Determinants of Bank’s Efficiency in Indonesia*”. Buletin Ekonomi Moneter dan Perbankan, Volume 18, Nomor 2, Oktober 2015.*

Wahab.(2015). “Analisis Faktor-Faktor yang Mempengaruhi Efisiensi Bank Umum Syariah di Indonesia dengan Pendekatan Two Stage Frontier Approach”. *Vol VI Ed 2, Oktober 2015.*

Wahyuni, Anggun.(2016). “Analisis Perbandingan Kinerja Keuangan Perbankan ASEAN (Studi Pada Bank Umum Indonesia, Thailand dan Filipina tahun 2011-2014)”. *Skripsi.* Program Studi Akuntansi. Fakultas Ekonomi Universitas Negeri Jakarta.

Wihardja, Maria Monica.(2013).“Financial Integration Challenges in ASEAN beyond 2015”. Eria Discussion Paper Series. ERIA-DP-013-27

Xue, M.Harker P.(1999). “Overcoming the Inherent Dependency of DEA Efficiency Scores: A Bootstrap Approach*”. Working Paper. Financial Institution Center. The Wharton School, University of Pennsylvania*.

Yusri.(2013).*Statistika Sosial Aplikasi dan Interpretasi*. Yogyakarta: Graha Ilmu

.

**Appendices. Banking Efficiency Score measured by DEA**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Period** | **Bank** | **TE** | **TE** | **Bank** | **TE** | **TE** |
| Q12011 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q22011 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q32011 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q42011 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q12012 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q22012 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q32012 | DBS | 100.00 | PE | OCBC | 98.69 | E |
| Q42012 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q12013 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q22013 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q32013 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q42013 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q12014 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q22014 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q32014 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q42014 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q12015 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q22015 | DBS | 100.00 | PE | OCBC | 100.00 | PE |
| Q32015 | DBS | 100.00 | PE | OCBC | 98.81 | E |
| Q42015 | DBS | 100.00 | PE | OCBC | 98.41 | E |
| **Period** | **Bank** | **TE** | **TE** | **Bank** | **TE** | **TE** |
| Q12011 | UOB | 100.00 | PE | MAYBANK | 91.45 | E |
| Q22011 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q32011 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q42011 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q12012 | UOB | 98.61 | E | MAYBANK | 100.00 | PE |
| Q22012 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q32012 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q42012 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q12013 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q22013 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q32013 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q42013 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q12014 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q22014 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q32014 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q42014 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q12015 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q22015 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q32015 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
| Q42015 | UOB | 100.00 | PE | MAYBANK | 100.00 | PE |
|  |
|  |
| **Period** | **Bank** | **TE** | **TE** | **CAR** | **BOPO** | **LDR** |
| Q12011 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q22011 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q32011 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q42011 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q12012 | CIMB | 93.08 | E | PBB | 100.00 | PE |
| Q22012 | CIMB | 90.99 | E | PBB | 100.00 | PE |
| Q32012 | CIMB | 90.51 | E | PBB | 100.00 | PE |
| Q42012 | CIMB | 90.65 | E | PBB | 100.00 | PE |
| Q12013 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q22013 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q32013 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q42013 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q12014 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q22014 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q32014 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q42014 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q12015 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q22015 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q32015 | CIMB | 100.00 | PE | PBB | 100.00 | PE |
| Q42015 | CIMB | 92.63 | E | PBB | 100.00 | PE |
| **Period** | **Bank** | **TE** | **TE** | **CAR** | **BOPO** | **LDR** |
| Q12011 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q22011 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q32011 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q42011 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q12012 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q22012 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q32012 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q42012 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q12013 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q22013 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q32013 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q42013 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q12014 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q22014 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q32014 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q42014 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q12015 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q22015 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q32015 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
| Q42015 | BANGKOKBANK | 100.00 | PE | SIAM | 100.00 | PE |
|  |
| **Period** | **Bank** | **TE** | **TE** | **CAR** | **BOPO** | **LDR** |
| Q12011 | KRUNGTHAI | 100.00 | PE | MANDIRI | 90.23 | E |
| Q22011 | KRUNGTHAI | 100.00 | PE | MANDIRI | 87.16 | E |
| Q32011 | KRUNGTHAI | 100.00 | PE | MANDIRI | 88.18 | E |
| Q42011 | KRUNGTHAI | 100.00 | PE | MANDIRI | 93.05 | E |
| Q12012 | KRUNGTHAI | 100.00 | PE | MANDIRI | 86.90 | E |
| Q22012 | KRUNGTHAI | 100.00 | PE | MANDIRI | 92.17 | E |
| Q32012 | KRUNGTHAI | 100.00 | PE | MANDIRI | 94.28 | E |
| Q42012 | KRUNGTHAI | 97.20 | E | MANDIRI | 91.02 | E |
| Q12013 | KRUNGTHAI | 100.00 | PE | MANDIRI | 85.62 | E |
| Q22013 | KRUNGTHAI | 100.00 | PE | MANDIRI | 90.99 | E |
| Q32013 | KRUNGTHAI | 100.00 | PE | MANDIRI | 94.13 | E |
| Q42013 | KRUNGTHAI | 100.00 | PE | MANDIRI | 95.02 | E |
| Q12014 | KRUNGTHAI | 100.00 | PE | MANDIRI | 92.83 | E |
| Q22014 | KRUNGTHAI | 100.00 | PE | MANDIRI | 100.00 | PE |
| Q32014 | KRUNGTHAI | 100.00 | PE | MANDIRI | 97.66 | E |
| Q42014 | KRUNGTHAI | 100.00 | PE | MANDIRI | 90.09 | E |
| Q12015 | KRUNGTHAI | 100.00 | PE | MANDIRI | 90.46 | E |
| Q22015 | KRUNGTHAI | 100.00 | PE | MANDIRI | 92.86 | E |
| Q32015 | KRUNGTHAI | 100.00 | PE | MANDIRI | 100.00 | PE |
| Q42015 | KRUNGTHAI | 100.00 | PE | MANDIRI | 93.05 | E |
| **Period** | **Bank** | **TE** | **TE** | **CAR** | **BOPO** | **LDR** |
| Q12011 | BRI | 94.43 | E | BCA | 72.94 | E |
| Q22011 | BRI | 100.00 | PE | BCA | 73.49 | EE |
| Q32011 | BRI | 100.00 | PE | BCA | 79.19 | EE |
| Q42011 | BRI | 100.00 | PE | BCA | 84.48 | EE |
| Q12012 | BRI | 100.00 | PE | BCA | 100.00 | PE |
| Q22012 | BRI | 100.00 | PE | BCA | 89.23 | E |
| Q32012 | BRI | 100.00 | PE | BCA | 90.60 | E |
| Q42012 | BRI | 100.00 | PE | BCA | 100.00 | PE |
| Q12013 | BRI | 100.00 | PE | BCA | 70.03 | E |
| Q22013 | BRI | 100.00 | PE | BCA | 99.76 | EE |
| Q32013 | BRI | 100.00 | PE | BCA | 82.01 | E |
| Q42013 | BRI | 100.00 | PE | BCA | 89.41 | E |
| Q12014 | BRI | 100.00 | PE | BCA | 77.19 | E |
| Q22014 | BRI | 100.00 | PE | BCA | 81.42 | EE |
| Q32014 | BRI | 100.00 | PE | BCA | 100.00 | PE |
| Q42014 | BRI | 100.00 | PE | BCA | 85.75 | E |
| Q12015 | BRI | 100.00 | PE | BCA | 82.43 | E |
| Q22015 | BRI | 100.00 | PE | BCA | 86.11 | E |
| Q32015 | BRI | 100.00 | PE | BCA | 100.00 | FE |
| Q42015 | BRI | 100.00 | PE | BCA | 86.27 | E |
|  |
| **Period** | **Bank** | **TE** | **TE** | **CAR** | **BOPO** | **LDR** |
| Q12011 | METROPOLITAN | 100.00 | PE | BPI | 100.00 | PE |
| Q22011 | METROPOLITAN | 100.00 | PE | BPI | 90.12 | E |
| Q32011 | METROPOLITAN | 85.07 | E | BPI | 79.99 | E |
| Q42011 | METROPOLITAN | 79.80 | E | BPI | 74.64 | EE |
| Q12012 | METROPOLITAN | 100.00 | PE | BPI | 74.04 | EE |
| Q22012 | METROPOLITAN | 100.00 | PE | BPI | 73.30 | EE |
| Q32012 | METROPOLITAN | 92.76 | E | BPI | 73.34 | EE |
| Q42012 | METROPOLITAN | 87.61 | E | BPI | 72.56 | EE |
| Q12013 | METROPOLITAN | 96.68 | E | BPI | 85.26 | EE |
| Q22013 | METROPOLITAN | 98.49 | E | BPI | 86.16 | E |
| Q32013 | METROPOLITAN | 96.66 | E | BPI | 85.87 | E |
| Q42013 | METROPOLITAN | 91.65 | E | BPI | 81.83 | E |
| Q12014 | METROPOLITAN | 94.40 | E | BPI | 74.53 | E |
| Q22014 | METROPOLITAN | 90.21 | E | BPI | 74.63 | EE |
| Q32014 | METROPOLITAN | 82.56 | E | BPI | 75.98 | EE |
| Q42014 | METROPOLITAN | 76.50 | E | BPI | 75.95 | EE |
| Q12015 | METROPOLITAN | 98.83 | EE | BPI | 79.50 | EE |
| Q22015 | METROPOLITAN | 87.60 | E | BPI | 86.75 | EE |
| Q32015 | METROPOLITAN | 90.66 | E | BPI | 96.47 | E |
| Q42015 | METROPOLITAN | 79.41 | E | BPI | 94.93 | E |
| **Period** | **Bank** | **TE** | **TE** |  |  |  |
| Q12011 | BDO | 100.00 | PE |  |  |  |
| Q22011 | BDO | 91.05 | E |  |  |  |
| Q32011 | BDO | 86.89 | E |  |  |  |
| Q42011 | BDO | 83.74 | E |  |  |  |
| Q12012 | BDO | 98.98 | E |  |  |  |
| Q22012 | BDO | 95.38 | E |  |  |  |
| Q32012 | BDO | 91.15 | E |  |  |  |
| Q42012 | BDO | 83.65 | E |  |  |  |
| Q12013 | BDO | 84.74 | E |  |  |  |
| Q22013 | BDO | 81.02 | E |  |  |  |
| Q32013 | BDO | 78.33 | E |  |  |  |
| Q42013 | BDO | 78.69 | EE |  |  |  |
| Q12014 | BDO | 87.95 | EE |  |  |  |
| Q22014 | BDO | 89.47 | E |  |  |  |
| Q32014 | BDO | 91.36 | E |  |  |  |
| Q42014 | BDO | 90.32 | E |  |  |  |
| Q12015 | BDO | 92.04 | E |  |  |  |
| Q22015 | BDO | 91.19 | E |  |  |  |
| Q32015 | BDO | 90.20 | E |  |  |  |
| Q42015 | BDO | 84.48 | E |  |  |  |