EFFICIENSY IN INDONESIA BANKING INDUSTRY: AN ANALYSIS OF TRADITIONAL APPROACH AND DATA ENVELOPMENT ANALYSIS (DEA) APPROACH

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EFFICIENCY IN INDONESIA BANKING INDUSTRY:

AN ANALYSIS OF TRADITIONAL APPROACH AND DATA ENVELOPMENT ANALYSIS (DEA) APPROACH

Thesis By: Abdurrahman

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ABSTRACT

This research estimates the efficiency of the Indonesian commercial banks listed in BEI in the period 2008-2012 using the traditional approach and data envelopment analysis. ROA, ROE, NIM, OER are employed as efficiency indicators of traditional approach. Data envelopment analysis employs both input-oriented costant return to scale and input-oriented variable return to scale. Intermediation approach are applied in specification of Data envelopment analysis.

The results shows that: first, the average technical efficiency of banking companies listed in BEI is 94.97% measured by DEA input-oriented constant return to scale and 96.64% measured by DEA input-oriented variable return to scale. Second, the inefficiency of banking companies is caused by both technical efficiency and scale efficiency.

Keywords: Banking Efficiency, Data Envelopment Analysis (DEA), Technical Efficiency (TE), Scale Efficiency (SE).

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Saya yang bertanda tangan di bawah ini menyatakan bahwa skripsi dengan judul :
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CHAPTER I

INTRODUCTION

1.1 Background of The Study

By the end of December 2012, banking sector in Indonesia showed positive growth trends: assets increased by 9.8 per cent, loans increased by 16.2 per cent, and the fund from the third parties increased by 9.5 per cent. In addition, CAR increased by 17.4 per cent, ROA increased by 3.7 per cent, OER increased by 71.3 per cent and LDR increased by 83.3 per cent. Those positive growth trends were due to trust of investor to the banking sector in Indonesia (www.tempo.co, 2012).

Table 1.1, Table 1.2, Table 1.3, and Table 1.4 shows some financial indicators from the performance of several banks listed in BEI during the year 2012:

Table 1.1
Earning Per Share (EPS) Several Banks Listed In BEI

No	Code	Emiten Name	2012	2011	Growth
1	BBCA	Bank Central Asia (Persero) Tbk	480	444	8,1%
2	BBNI	Bank Negara Indonesia (Persero) Tbk	378	312	19,2%
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk	778,93	628,91	23,9%
4	BBTN	Bank Tabungan Negara (Persero) Tbk	147	123	19,5%
5	BDMN	Bank Danamon Tbk	418,57	373,99	11,9%
6	BMRI	Bank Mandiri (Persero) Tbk	664,86	529,33	25,6%
7	BNGA	Bank CIMB Niaga Tbk	168,44	126,77	32,9%
8	BNII	Bank International Indonesia Tbk	21	12	75,0%
9	BNLI	Bank Permata Tbk	150	128	17,2%
10	BTPN	Bank Tabungan Pensiuanan Nasional Tbk	341	247	38,1%
11	NISP	Bank OCBC NISP Tbk	116,37	106,88	8,9%

(source:www.sahamok.com, 2013)

Table 1.2
ROE (Return On Equity) Several Banks Listed In BEI

No	Code	Emiten Name	2012	2011
1	BBCA	Bank Central Asia Tbk	23%	26%
2	BBNI	Bank Negara Indonesia (Persero) Tbk	16%	15%
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk	29%	31%
4	BBTN	Bank Tabungan Negara (Persero) Tbk	13%	14%
5	BDMN	Bank Danamon Tbk	14%	13%
6	BMRI	Bank Mandiri (Persero) Tbk	21%	20%
7	BNGA	Bank CIMB Niaga Tbk	19%	17%
8	BNII	Bank International Indonesia Tbk	18%	8%
9	BNLI	Bank Permata Tbk	11%	13%
10	BTPN	Bank Tabungan Pensiuanan Nasional Tbk	26%	25%
11	NISP	Bank OCBC NISP Tbk	10%	11%

(source: www.sahamok.com, 2013)

Table 1.3
Income Several Banks Listed In BEI (Presented In Million Rupiah)

No	Code	Emiten Name	2012	2011	Growth
1	BBCA	Bank Central Asia Tbk	34.945.120	31.498.987	10,9%
2	BBNI	Bank Negara Indonesia (Persero) Tbk	31.150.328	28.293.271	10,1%
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk	58.000.153	53.940.323	7,5%
4	BBTN	Bank Tabungan Negara (Persero) Tbk	9.390.073	8.068.121	16,4%
5	BDMN	Bank Danamon Tbk	24.658.785	22.053.693	11,8%
6	BMRI	Bank Mandiri (Persero) Tbk	60.112.759	54.304.457	10,7%
7	BNGA	Bank CIMB Niaga Tbk	18.910.881	17.052.975	10,9%
8	BNII	Bank International Indonesia Tbk	11.576.492	10.159.476	13,9%
9	BNLI	Bank Permata Tbk	10.320.808	8.747.192	18,0%
10	BTPN	Bank Tabungan Pensiuanan Nasional Tbk	9.575.777	7.656.443	25,1%
11	NISP	Bank OCBC NISP Tbk	5.760.036	4.838.032	19,1%

(source: www.sahamok.com, 2013)

Table 1.4

Operational Income Several Banks Listed In BEI (Presented In Million Rupiah)

No	Code	Emiten Name	2012	2011	Growth
1	BBCA	Bank Central Asia Tbk	14.255.568	13.296.775	7,2%
2	BBNI	Bank Negara Indonesia (Persero) Tbk	8.641.023	7.242.543	19,3%
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk	22.682.538	17.584.230	29,0%
4	BBTN	Bank Tabungan Negara (Persero) Tbk	1.870.969	1.525.749	22,0%
5	BDMN	Bank Danamon Tbk	6.182.854	5.174.734	19,5%
6	BMRI	Bank Mandiri (Persero) Tbk	19.625.447	16.348.933	20,0%
7	BNGA	Bank CIMB Niaga Tbk	5.740.829	4.338.716	32,3%
8	BNII	Bank International Indonesia Tbk	1.667.364	962.594	73,2%
9	BNLI	Bank Permata Tbk	1.751.744	1.439.219	21,7%
10	BTPN	Bank Tabungan Pensiuanan Nasional Tbk	2.487.158	1.795.283	38,5%
11	NISP	Bank OCBC NISP Tbk	1.213.567	992.692	22,3%

(source: www.sahamok.com, 2013)

Overall the financial performance of banks that are listed in BEI showed positive growth. However, the method to measure the above positive growth trends is merely the traditional method of financial indices based on balance sheet analysis. The major shortcoming of effectiveness the traditional method as a measure of performance is that it is based solely on the levels of output and has no relation to the quantities of input used to produce the output observed (Subhash and Chen, 2009). Even if the method based on balance sheet characteristic indexes has monopolized the banking practice, there are others methods to estimate the efficiency of banking practice. The two principal methods that have been used are stochactic frontier approach (SFA) and the non-parametric frontier data envelopment analysis (DEA).

Data Envelopment Analysis (DEA) is a well-known linear programming technique for evaluating relative efficiency of a given set of similar decision making units(DMUs). According to Pan et al. (2010) Data Envelopmet Analysis Approach has a number of advantages:

1. It is unnecessary to specify functional form for the relationship between inputs and outputs.
2. It could deal with the situation of multiple inputs and outputs.
3. It could measure the economic efficiency, allocation efficiency and pure technical efficiency, which makes make it possible to conduct a comprehensive evaluation of achievement.

While Hammad(2007) proposed other advantages of Data Envelopment Analysis approach:

1. DMUs are directly compared against a peer or combination of peers
1. Inputs and Outputs can have very different units. For example, X_1 could be in units of trips taken and X_2 could be bus fare of monthly pass.

Therefore, the aim of this research is to present the result of the efficiency analysis computed by both methods: the traditional approach and the non-parametric DEA approach. The analysis was carried out in commercial banks operating in Indonesia listed in Indonesia Stock Exchange. The period of efficiency analysis covers the years 2008-2012.

1.2 Problem Definitions

Most research carried out in bank efficiency in Indonesia has used the traditional method to evaluate the performance of the banking company without considering the other method to measure the performance. Consequently, the performance was only measured by the level of output, not to the relationship of the quantities of input used to produce the output. This present work is arranged to evaluate the performance of the bank by using the traditional method and compare it with the non-parametric DEA method. Conclusively, **what is the level of efficiency**

of banking company in Indonesia measured by traditional method and non-parametric method (DEA approach) from the years 2008-2012?

1.3 The Objective of The Study

Based upon the problem statement above, the objective of this study is to measure and analyse the level of efficiency of banking company in Indonesia from the years 2008-2012.

1.4 The Benefits of The Study

This study is expected to provide to benefits to bank managements and banks owners in term of:

1. The information about the level of efficiency of banking companies in Indonesia from the years 2008-20012.
2. The consideration in taking the decisions about the performance level of banking companies in Indonesia.

This study is also expected to be the reference for the further research about level of efficiency of banking companies in Indonesia.

1.5 Writing Systematic

The writing systematic of this research will be divided into five parts, which consist of as follow:

1. Chapter I is Introduction. This chapter explains the motivation for conducting the research. It comprises of problem background and questions that will be answer in research result toward the objective of the result.

2. Chapter II is the Theoritical Framework. It consist of the concept of efficiency of productivity, efficiency measurement methods used by banks, review of previous study, and research flow.
3. Chapter III is the Research Methods. It describes the research design, research population and sample, type of data, data collection methods, data analysis tools, research variables, and research analysis design.
4. Chapter IV is the results and discussions. It comprises of sample description, descriptive statistic analysis, emperical findings, discussion and analysis.
5. Chapter V is conclusion. It describes the conclusion the study, implication of the research and suggestion for further research.

CHAPTER II

THEORITICAL FRAMEWORKS

2.1 The Concept of Efficiency and Productivity

The aim in productivity and efficiency analysis is to evaluate the performance of economic entities that convert inputs into outputs. Productivity is defined as the ratio of outputs over inputs. The ratio yields a relative measurement of performance, applying to any factor of production. The ratio can be calculated for a single input and output or multiple inputs and outputs. Productivity is the ratio of the amount of **acceptable** goods and services produced (outputs) to the amount of resources (inputs) used to produce them. Productivity is expressed in the form of a ratio such as cost or time per unit of output.

In essence, efficiency indicates how well an organization uses its resources to produce goods and services. Thus, it focuses on resources (inputs), goods and services (outputs), and the rates (productivity) at which inputs are used to produce or deliver the outputs. To understand fully the meaning of "efficiency", it is necessary to understand the following terms: inputs, outputs (including quantity and quality), and level of service.

1. **Inputs** are resources (e.g., human, financial, equipment, materiel, facilities, information, energy and land) used to produce outputs.
2. **Outputs** are goods and services produced to meet client needs. Outputs are defined in terms of quantity and quality and are delivered within parameters relating to level of service.

3. **Quantity** refers to the amount, volume, or number of outputs produced. For example, number of passports issued, number of income tax returns processed, and number of applicants selected as immigrants, and area of facilities maintained.
4. **Quality** refers to various attributes and characteristics of outputs such as reliability, accuracy, timeliness, service courtesy, safety, and comfort.
5. **Level of service refers** to the "richness" of service in terms of such characteristics as accessibility, options, frequency, and response time. Level-of-service standards are sometimes defined by statute, regulations, or policies. Such standards may influence quality as well as the cost of service

There are two concepts of efficiency: **Technological efficiency** occurs when it is not possible to increase output without increasing inputs. **Economic efficiency** occurs when the cost of producing a given output is as low as possible.

Technological efficiency is an engineering matter. Given what is technologically feasible, something can or cannot be done. Economic efficiency depends on the prices of the factors of production. Something that is technologically efficient may not be economically efficient. But something that is economically efficient is always technologically efficient.

The concept of productivity is closely related with that of efficiency. While the term productivity and efficiency are often used interchangeably, efficieny does not have the same precise meaning as does productivity. While efficiency is also defined in term of comparison of two components (inputs and outputs), the highest productivity level from input level is recognised as efficient situation. Coelli, Rao and Battase (1998) further suggest that efficiency reflect the ability of a firm to obtain maximum output from a given set of inputs. If a firm is obtaining maximum output from a set of inputs, it is said to be efficient firm.

2.2 Efficiency Methods Measurement of Bank

A financial istitution or a bank can be said to be efficient if it has the ability to produce a result with minimum effort or resources (Nguyen, 2012). Wozniewska (2008) stated that to estimate banks' efficiency, different methods can be used. These methods can be classified in various ways. One of them distinguishes:

1. The traditional method of financial indices based on balance sheet analysis
2. Parametric methods based on the knowledge of production function, and
3. Non-parametric methods that do not require the knowledge o production function,

For the purposes of the present research, the traditional and the non-parametric DEA methods are chosen to evaluate banks' efficiency. The parametric method was omitted as it requires defining the relation between inputs and performance and also data over long periods of time.

The efficiency indicators may be analyzed from different aspects. In the case of time as a criterion, the dynamics of ratios are studied, which allows to check whether the efficiency improves or deteriorates within the given period of time. If the consideration includes a group of bank, the banks' efficiency can be compared to the average values of the group.

From a microeconomic point of view, the problem of bank performance assessment is one of profit maximization, hence explaining the changes in profitability of banks is implicit or explicit subject of much of the banking literature. In this sence the use of economic profit is suitable for measuring the performance of banks. The measurement of ROA—reflecting the capacity of bank management to transforms assets into net earnings, ROE—accounting profit as a percentage of the bank's equity, NIM—net interest margin for measuring current and future profitability defined by the difference between a depository institution's interest income and interest expenses as a percentage of total assets, are the most suitable for assessing the performance of banking.

Nevertheless, this traditional measurement of performance by using financial ratio fails to provide a general efficiency score when multiple inputs or outputs are used. An alternative approach is to explain banking performance through inefficiency. One bank can operate at lower costs and produce higher profits if it makes better use of its inputs and tranforms them into outputs in the cheapeast possible way. In order to survive, every bank has to produce efficiency in the long run.

2.3 Efficiency Analysis Using The Method of Financial Indicators

Efficiency analysis is essential for the evaluation of banks' performance. Financial indicators are important analytical instrument, and the banks' owner and potential customers use them to compare and evaluate the performance of banks. That is why banks need to pay particular attention to the value of the traditional indicators if they want to create a positive image and to be perceived positively by general public. The banks' financial reports such as balance sheets, profit and loss accounts, or less frequently, cash flow accounts are used to assess the efficiency indicators. These indicators can be divided into four groups:

1. Profitability rates,
2. Margin rates,
3. Weighted result rates,
4. Employment efficiency rates,

The first group of the indicators are **profitability rates**. The most common ones in this group are:

1. Return on assets (ROA), presented as a ratio of financial result and a bank's assets;
2. Return on equity (ROE), presented as a ratio of financial result to a bank's income;

3. Return on sale (ROS), presented as a ratio of financial result to a bank's income;
4. Cost ratio (C/I), presented as a ratio of costs to incomes.

The ROA, ROE, and ROS ratios, which are universally applied in financial analysis, allow evaluate the efficiency of bank's performance within a given period of time and in comparison to other market players. So, their significance for management is of comparative nature.

Another group of efficiency indicators are **margin rates.** Two basic rates of this group are based on interest margin:

1. Net interest margin(NIM), presented as a ratio of interest results to assets;
2. Interest spread, which can be interpreted as a difference between the average interest bearing assets and the average expense of interest-bearing liabilities.

The next group of financial measures applied in efficiency analysis are **weighted result rates:**

1. The result rate charged with reserve (reserves balance) which is shown as a different between the building up and dissolution of reserves, and the achieved result;
2. The result rate charged with operating costs, i.e. the ratio of operating cost to the result.

If the result rate charged with reserves shows a positive value, i.e. if a bank builds up more reserves than dissolved, it can be said that building up reserves charges the bank's result, i.e. 'decreases' its level.

The result following from both definitions can be interpreted in various ways. The clearest interpretation is provided by applying the results of banking activity. In this case, the indicators show the percentage of the result used to cover the operation costs or the reserves balance.

The last group of measures constitutes the **employment efficiency rates.** The most frequently used ones are:

1. The rate presented as a ratio of assets to a number of employees (job positions);
2. The rate presented as a ratio of a result to a number of employees.

These indicators show the average balance sum (sum of assets) and the result produced by one full-time employee of a bank.

2.4 Efficiency Analysis Using the DEA Method

Data Envelopment Analysis is an alternative non-parametric method of measuring efficiency that uses mathematical programming rather than regression. The non-parametric DEA method was first proposed by Charnes, Cooper and Rhodes (1978). The authors, relying on Debreu and Farell's concept of productivity, in which the efficiency measure was defined as a ratio of single input to a single output, applied method in multi-dimensional situation in which there were more than one outputs and more than one inputs. The efficiency is measured in relation to other units in the group under study. The proof of economic efficiency can be the fact that the examined unit is on the efficiency frontier which means that it fully utilizes the availability resources and also that it is not possible to increase the production of particular goods (for example, a bank's service). In this method, any units on the efficiency frontier line are said to be efficient and their efficiency rates equal to 1. The units below the efficiency frontier line have efficiency rates less than 1, which show a level of their inefficiency. The efficiency rate defined in this way takes the values from 0 to 1.

DEA compares each producer with only the "best" producers. In the DEA literature, a producer is usually referred to as a decision making unit or DMU. The production process for each

producer is to take a set of inputs and produce a set of outputs. Each producer has a varying level of inputs and gives a varying level of outputs. For instance, consider a set of banks. Each bank has a certain number of tellers, a certain square footage of space, and a certain number of manager (the inputs). There are a number of measures of the output of a bank, including number of checks cashed, number of loan applications processed, and so on (the outputs). DEA attempts to determine which of the banks are most efficient, and to point out specific inefficiencies of the other banks.

A fundamental assumption behind this method is that if a given producer, A, is capable of producing Y (A) units of output with X (A) inputs, the other producers should also be able to do the same if they were to operate efficienctly. Similarly, if producer B is capable of producing Y (B) units of ouput with X(B) inputs, the other producers should also be capable of the same production schedule. Producers A, B, and others can then be combined to form a comosite necessariy exist, it is typically called a virtual producer.

The heart of the analysis lies in finding the "best" virtual producer for each real producer. If the virtual producer is better than original producer by either making more output with same input or making the same output with less input then the original producer is inefficient. The subtleties of DEA are introduced in the various ways that producers A and B can be scaled up or down and combined.

There are two oriented measures in used in the DEA method; Input oriented measures and Output oriented measures. Input oriented measures show how much a company's inputs should be decreased to be efficient leaving output unchanged. Output oriented measures present how much a company's productivity should be increased using the same values of inputs. The input

oriented analysis is particularly useful for evaluating bank's performance as it measures cost efficiency.

There are two most used models of DEA; CCR-Model and BCC-Model. CCR-model was developed by Charnes, Chooper and Rhodes in 1978. Its specific assumption is that the decision making unit (DMU) operates under constant return to scale (CRS). BCC-Model was defined by Banker, Charnes and Cooper in 1984. It estimates the efficiency under the assumption of variable return to scale (VRS). The efficiency scores calculated by BCC-model are higher than the efficiency scores estimates by CCR-model. BCC-model compares DMU's with the DMU's, operating in the same region of return to scale, while CRR-model compares DMU's in the whole sample.

2.5 Previous Research

Sarjono (2008) conducted the research to find out the efficiency level by using Data Envelopment Analysis in three syariah banks operates in Indonesia: Bank Muamalat, Bank Syariah Mega and Bank Syariah Mandiri. The research covered the years from the period 2005-2007. The research showed that Bank Muamalat and Bank Syariah Mandiri had achieved a 100 % level of efficiency during the the research covered years. While, Bank Syariah Mega had only achieved 99.2% level of efficiency.

Rahma Vicky and Niki Lukviarman (2008) conducted the research entitled "Pengukuran Kinerja Bank Komersial dengan pendekatan eficiency: Study terhadap perbankan *Go Public* di Indonesia." The research conducted by using banks listed In Jakarta Stock Exchange(JSE) for the years 2002-2004. The study found that among the banks listed in Jakarta Stock Exchange, only 11.8 % operate in efficiency manners.

Nenovsky et all (2008) conducted the research entitled "Efficiency of the Bulgarian Banking System: Traditional Approach and Data Envelopment Analysis". The study covered the period of 1999-2006. The study discussed the limits of the traditional accounting approach to bank efficiency as well as the implementation of non-parametric methods, in particular Data Envelopment Analysis (DEA). Different specification of DEA like intermediaton and operating approach were applied to separated groups and sub groups. The results showed that: firstly, the foreign banks perform better than domestic and state-owned banks because of technological and managerial improvements, and secondly, the large banks are more efficient than the small bnaks due to decreasing operating costs and scale economies.

Akay Yuksel and Huseyin Tatlidil (2012) conducted the research entitled "Efficiency in The Turkish Banking System: A Data Envelopment Approach." The research investigated the performance of the Turkish banking sector for the period 2002-2008 by utilizing data envelopment analysis (DEA). To measure productivity changes over time, Malquist Total Productivity (TFP) indices are calculated from DEA scores. Moreover, this study examined the relative efficiency of banks of different size (large, medium, small) categorized by the share of total assets. Then, super-efficiency scores of Turkish Banks are calculated to rank the performance of the efficient banks. The research found that the level of efficiency of Turkish banking system via the production approach was very high and stable while the efficiency via the intermediatation approach is moderately high and somewhat volatile.

Rami Zeitun and Hicham Benjelloun (2013) measured and evaluated the relative efficiency of the Jordanian banks over period 2005-2010. The measurement of efficiency is estimated using Data Envelopment Analysis (DEA). Sample data contains 12 banks; there of them are Islamic banks. Constant return to scale (CRS) and variable return to scale (VRS) were used in order to

measure the ralative efficieny of Jordanian banks, using annual data from 2005 through 2010. The result show that, on the technical efficiency scale only e few Jordanian banks were efficient in managing their financial resources and generating profit. Furthermore, only few banks were found to be efficient on the scale of pure technical efficiency and only a few years. The financial crisis was found to have a significant impact on banks' efficiency.

Wahyu Bhava(2013) conducted the research entitled "Analisis efisiensi perbankan menggunakan metode non parametrik data envelopment analysis (DEA)". The study was conducted to 13 sample banks listed in IDX from the year 2007-2010. Four input variables are used: demand deposits, saving deposits, time deposits and the number of employees. While three output variable are used: investment loans, working capital loans and consumer loans. The study showed that Bank Mandiri, Bank Bukopin, Bank CIMB Niaga, Bank Danamon, Bank Ekonomi Raharja, Bank Permata and Bank Pundi Indonesia were technically efficient.

CHAPTER III

RESEARCH METHODS

3.1 Research Design

This research use a quantitative analysis of traditional method and Data Envelopment Analysis to show the level efficiency of banking company in Indonesia. The measurement efficiency using traditional method will use four indicators: ROA, ROE, NIM and OER. The measurement efficiency using Data Envelopment Analysis will both apply constant return to scale (CRS) and variable return to scale (VRS). This reserch will cover the period 2008-2012.

3.2 Research Population and Sample

The population of the research is all commercial banking companies in Indonesia. The sample is the banking companies which listed in Indonesian Stock Exchange until the period ended December 31, 2012. Rural credit banks, Syariah based banks, banks like financial institutional are not included in the study.

3.3 Type of Data

This research used data from secondary sources. Secondary sources refer to information that are obtained from finished form, has been collected and processed by another party. Data are collected from annual report of banking company that have been submitted to the website of Indonesian Stock Exchange and the company own websites.

3.4 Data Collection Method

The relevant data are needed in order to acquire the solution of the problem. The data collection methods in this study are:

1. Library research

   Library research is studying the literature related to the object of the research in order to get a basic theory and as a basis for conducting a research.

2. Documentation

   Documentation is a technique in collecting of the data by collecting and analyzing the necessary data about the company, specially related to variables used in the present research.

3.5 Data Analysis Tools

For the purpose of analyzing the efficiency by using the traditional method, Microsoft Office Excel 2007 will be used. For the purpose of finding out the efficiency score using non-parametric DEA approach, MaxDea Basic 6.0 will be used.

3.6 Research Variables

3.6.1 Efficiency Measurement Using Traditional Method

From a microeconomic point of view, the problem of bank performance assessment is one of profit maximization, hence explaining the changes in profitability of banks is implicit or explicit subject of much of the banking literature. In this sence the use of economic profit is suitable for measuring the performance of banks. The measurement of ROA—reflecting the

capacity of bank management to transforms assets into net earnings, ROE—accounting profit as a percentage of the bank's equity, NIM—net interest margin for measuring current and future profitability defined by the difference between a depository institution's interest income and interest expenses as a percentage of total assets, are the most suitable for assessing the performance of banking. As a result, the traditional method will use ROA, ROE and NIM as the indicators to measure the efficiency of banking in Indonesia.

3.6.2 Efficiency Measurement Using Non Parametric Data Envelopment Analysis

An important stage in applying Data Envelopment Analysis is building up the behavioural model of a bank and defining the inputs and outputs of its activity. The main approach used in modelling a bank's behaviour are production approach, intermediation approach and modern approach, i.e, the one that involve characteristic features of bank's activity, i.e. risk management and data processing fro the classical theory of enterprise.

The intermediation approach charactizes banks as financial intermediaries whose function is to collect funds in the form of deposits and other lenable funds and to offer them as loans or other assets that earn income. Different forms in which funds can be borrowed and the various costs incurred for performing the process of intermediation are considered inputs to the model. This ways in which funds can be loaned out considered outputs of the model. This approach reflects the way of evaluating the efficiency of bank which takes banks as entities which use labor and capital to transform deposits into loans and securities. This approach meaures the economic viability of banks.

The production approach treats banks as institution providing fee based products and services to customers using various resources. This approach measures the cost efficiency of the

banks. Products and services such as loans and deposits are output in this approach and the resources consumed such as labor, capital and operating expenses are inputs. This approach is used to study the operational efficiency and assumes the output is given by the customers' demand. The objective of the bank is to minimize the input consumption in delivering these banking services. From the production viewpoint, the banks' objective is to provide service to their customers at a minimum cost to the bank, which result in input-oriented models.

Considering the availability of data in the annual report of banking companies in Indonesia and the economic treatment of banking instititution as mediators of funds between savers and investors, this present research will use the intermediation approach in evaluating the efficiency. Munteanu et al(2013) considered that the intermediation approach was more practical than the production approach. First, by using the intermediation approach, the researchers avoid the problem on how to weight each bank service in the computation of output. Second, the production approach ignores interest costs which will be importance in realistic situations like for example the increase in the number of branches that would be accompanied by falling deposits rates.

As a result, this present reserach would use four inputs and two outputs are chosen:

1. Customer deposits
2. Net fixed capital
3. Personnel costs
4. Interest expenses
5. Loans
6. Interest income.

Table 3.1
Inputs and Output Variables Data Envelopment Analysis Approach

Inputs	Variables	Sources
X_1	Customer Deposits	Statement of Financial Position
X_2	Net Fixed Capital	Statement of Financial Position
X3	Personnel Costs	Statement of Comprehensive Income
X4	Interest Expenses	Statement of Comprehensive Income
Outputs	**Variables**	**Sources**
Y_1	Loans	Statement of Financial Position
Y_2	Interest Income	Statement of Comprehensive Income

3.7 Research Analysis Design

3.7.1 Efficiency Measurement Using Traditional Method

The ROA, ROE NIM and OER are used to assess the efficiency of banking under the traditional method. The efficiency score is the average score of each bank from years covered in this study. Based upon the efficiency scores, each bank would be classified efficient or inefficient. For the purpose of the study, a bank is classified inefficient if its efficiency score falls below the average of efficiency score of all bank under the study. Otherwise, a bank is classified efficient. Furthermore, bank is classfied into one of the following categories:

1. *Relatively efficient.* A bank is classified as relatively efficient if its efficiency score is above the average of efficiency scores of all efficient bank.
2. *Weakly efficient.* A bank is classified as weakly efficient if its efficiency score is less than the average of efficiency scores of all efficient bank.
3. *Medium inefficient.* A bank is classified as medium inefficient if its efficiency score is above than the average of efficiency scores of all inefficient bank.

4. *Distinctively inefficient.* A bank is classified as distinctively inefficient if its efficiency score is less than the average of efficiency scores of all inefficient bank.

3.7.1.1 Return On Asset

Return on assets (ROA) is a financial ratio that shows the percentage of profit that a company earns in relation to its overall resources (total assets). Return on assets is a key profitability ratio which measures the amount of profit made by a company per dollar of its assets. It shows the company's ability to generate profits before leverage, rather than by using leverage. Unlike other profitability ratios, such as return on equity (ROE), ROA measurements include all of a company's assets – including those which arise from liabilities to creditors as well as those which arise from contributions by investors. So, ROA gives an idea as to how efficiently management use company assets to generate profit, but is usually of less interest to shareholders than some other financial ratios such as ROE.

Return on assets gives an indication of the capital intensity of the company, which will depend on the industry. Capital-intensive industries (such as railroads and thermal power plant) will yield a low return on assets, since they must possess such valuable assets to do business. Shoestring operations (such as software companies and personal services firms) will have a high ROA: their required assets are minimal. The number will vary widely across different industries. This is why, when using ROA as a comparative measure, it is best to compare it against a company's previous ROA figures or the ROA of a similar company.

Return on assets is calculated by dividing a company's **net income** (usually annual **income)** by its total assets, and is displayed as a percentage. There are two acceptable ways to calculate return on assets: using total assets on the *exact date* or *average* total assets:

ROA = Net Income after tax / Total assets (or Average Total assets)

3.7.1.2 Return On Equity

Return on equity (ROE) is the amount of net income returned as a percentage of shareholders equity. It reveals how much profit a company earned in comparison to the total amount of shareholder equity found on the balance sheet.

ROE is one of the most important financial ratios and profitability metrics. It is often said to be the ultimate ratio or the 'mother of all ratios' that can be obtained from a company's financial statement. It measures how profitable a company is for the owner of the investment, and how profitably a company employs its equity.

Return on equity is calculated by taking a year's worth of earnings and dividing them by the average shareholder equity for that year, and is expressed as a percentage:

ROE = Net income after tax / Shareholder's equity

Instead of net income, *comprehensive income* can be used in the formula's numerator.

Return on equity may also be calculated by dividing net income by the *average* shareholders' equity; it is more accurate to calculate the ratio this way:

ROE = Net income after tax / Average shareholder's equity

Average shareholders' equity is calculated by adding the shareholders' equity at the beginning of a period to the shareholders' equity at the period's end and dividing the result by two.

3.7.1.3 Net Interest Margin

The **net Interest margin** can be expressed as a performance metric that examines the success of a firm's investment decisions as contrasted to its debt situations. A negative Net Interest Margin indicates that the firm was unable to make an optimal decision, as interest expenses were higher than the amount of returns produced by investments. Thus, in calculating the Net Interest Margin, financial stability is a constant concern.

The Net Interest Margin is calculated as:

Net Interest Margin = (Investment Returns – Interest Expenses) / Average Earning Assets

3.7.1.4 Operating Expense Ratio(OER)

The **Operating Expense Ratio** is defined as a company's operating expenses as a percentage of operating revenue. The operating expense ratio is used to determine the efficiency of a company's management by comparing operating expenses to operating revenue. The smaller the ratio, the greater the company's ability to generate profit. Operating expense ratio is calculated by dividing total operating expenses by its total operating income, and is displayed as percentage.

3.7.2 Efficiency Measurement Using Non Parametric Data Envelopment Analysis

This present research will use the Data Envelopment Analysis to measure the efficiency of banking companies in Indonesia from the year of 2008 to the year of 2012. The two most popular models of DEA will be used: The CCR model and BCR model.

Introduced by Charnes, Cooper, and Rhodes (1978), DEA-CCR model assigns an efficiency score of each unit by comparing the efficiency score of each unit with that of its peers. It identifies a frontier comprising best performers. Those units that lie on the frontier are recognized as efficient, and those that do not, as inefficient. DEA involves the solution of linear programming to fit a non-stochastic, non–parametric production frontier based on the actual input-output observation in the sample. In the basis DEA model (CCR), the objective is to maximize the efficiency value of a test firm k from among a reference set of s firms, by selecting the optimal weights associated with the input and output measures. The maximum efficiencies are contrained to 1. The formulation is represented by model:

$$Maximize\ E_{kk} = \frac{\sum_y O_{ky} V_{ky}}{\sum_x I_{kx} U_{kx}}$$

$$subject\ to\ E_{ks} \leq 1\ \forall\ firms\ s$$

$$U_{ks}, V_{ky} \geq 0 \qquad (1)$$

Where E_{ks} is the efficiency score of firm s, using the weights of test firm k; O_{ky} is the value of output y for firm k; I_{kx} is the value for input x of firm k; V_{ky} is the weight assigned to firm k for output y; and U_{kx} is the weight assigned to firm k for input x.

This $_{non}$-linear programming is the equivalent to the linear programming problem represented by model:

$$Maximize\ E_{kk} = \sum_y O_{ky} V_{ky}$$

$$subject\ to\ E_{ks} \leq 1\ \forall\ firms\ s$$

$$\sum_x I_{kx} U_{kx} = firms\ s$$

$$U_{ks} V_{ky} \geq 0 \qquad (2)$$

The transformation is completed by constraining the efficiency ratio denominator from (1) to a value of 1, represented by constraint $\sum_x I_{kx} U_{kx} = 1$.

The result of formulation (2) is an optional simple or technical efficiency value (E^*_{kk}) that is at most equal to 1. If $E^*_{kk} = 1$, then no other firm is more efficient than firm k for its selected weights. That is, $E^*_{kk} = 1$ has firm k on the optimal frontier and is not donimated by any other firm. If $E^*_{kk} < 1$, then firm k does not lie on the optimal frontier and there is at least one other firm that is more efficient for the optimal set of weights determined by (2). Formulation (2) is executed s times for each firm.

The dual of the CCR model is represented by model:

$$Minimize\ \theta$$

$$subject\ to:$$

$$\sum_s \lambda_s I_{sx} - \theta \leq 0\ \forall\ inputs\ I$$

$$\sum_s \lambda_s I_{sx} - O_{ky} \geq 0\ \forall\ outputs\ O$$

$$\lambda_s \geq 0\ \forall\ firms\ s \qquad (3)$$

Where θ is the efficiency score.

The CCR model has an assumption of constant returns to scale (CRS) for the inputs and outputs. To take into consideration variable returns scale (VRS), a model introduced Banker, Charnes, and Cooper (1984) (BCC) is utilized. The BCC model aids in determining the scale efficiency of a set of units (which is a technically efficient unit for the VRS model). This model has additional convexity constraint defined by limiting the summation of the multiplier weights (λ) equal to 1, or:

$$\sum_s \lambda_s = 1 \qquad (4)$$

The BCC model evaluates whether increasing, constant, or decreasing returns to scale would boost the efficiency observed. In the case of constant returns to scale, the output changes proportionally to input, as it also does in the CCR model. But with variable returns to scale, a

change in the input leads to a disproportional change in the output. The use of the CCR and BCC models together helps determine the overall technical and scale efficienciencies of the firm and whether the data exhibits varying returns to scale.

Pure technical efficiency is entirely under the control and results from management decisions, thus this kind of efficiency is also called managerial efficiency. From this point of view ineffiency occurs when inputs are used more than should be required for producing a certain amount of output thus resulting in poor abilities of cost control and failure to maximize revenue. The pure technical efficiency (PTE) value are obtained by running the DEA-BCC model.

Scale efficiency refers to optimal choice of production scale in terms of cost control (e.g minimization of average costs). Typically, a scale efficient firm will produce a constant return to scale. In the case of production technology that is characterized by increasing return to scale (irs), efficiency gains could be obtained by expanding production levels. On the other side, if the bank's technology reflects decreasing return to scale (drs), efficiency gains could be achieved by reducing production levels. The scale efficiency value (SE) are obtained by dividing the pure technical efficiency (PTE) value by the overall efficiency (OE) value; that is, OE = SE * PTE.

When dealing with DEA, the overall relative efficiency value estimated by the CCR model is generally between 0 and 1. For a decision-making unit, an efficiency value equal to 1 implies high efficiency. In the BCC model, an additional variable, u_0, is ades as a constaint into the (dual) multiplier problems. This extra variable makes it possible to effect returns-to-scale (RTS) evaluations (increasing, constant, and decreasing). Thus, the BCC model is also referred to as the variable RTS model and is distinct from the CCR model, which is referred

to as the constant RTS model. That is, the item u_0 marks the major difference between the BCC and CCR model. When $u_0 = 0$, there is a *constant* RTS; when $u_0 > 0$, there is a *decreasing* RTS; and when $u_0 < 0$, there is *increasing* RTS. The meanings of different RTS values are shown in the following table:

RTS	**Meaning**
Constant	The bank (DMU) is able to linearly scale the inputs and outputs without increasing or decreasing efficiency, and thus the bank is operating at a productive scale, which is known as the most productive scale size (MPSS), and can maintain a state of efficiency unless a major change occurs. No inputs or outputs are increased or decreased, and maintenance of the scale is adequate.
Increasing	The bank (DMU) can increase or expand in scale first, and the input could then be increased to enhance performance, as a higher overall efficiency value will be obtained.
Decreasing	The bank (DMU) can decrease in scale, as this is likely to enhance its overall efficiency value.
Figure 3.1 **RTS Meaning**	

Source: (Pin Fu and Jia Ruey Ou, 2013)

3.8 Research Flow

The first part of research focus on measuring the efficiency of banking in Indonesia by using the traditional approach. Four measurement financial indicators of efficiency will be used; Return

On Asset (ROA), Return On Equity (ROE), Net Interest Margin (NIM) and Operating Expense Ratio(OER).

This second part of this research focus on non parametric approach-Data Envelopment Analysis methodology to measure the efficiency of banking companies in Indonesia. In order to formulate the suitable measurement methodology for efficiency, this research first identifies variables of input and output, and collects relevant data regarding banking efficiency. The collected data were input to run DEA solver software to obtain the overall efficiency (OE) value by CCR model and a pure technology efficiency (PTE) value by using the BBC model. After this, the scale efficiency (SE) was obtainded by dividing the OE value by the pure technology efficiency (PTE). Finally, this research analyzes the results of DEA and proposes managerial implications. The reserach flowchart is shown in following figure:

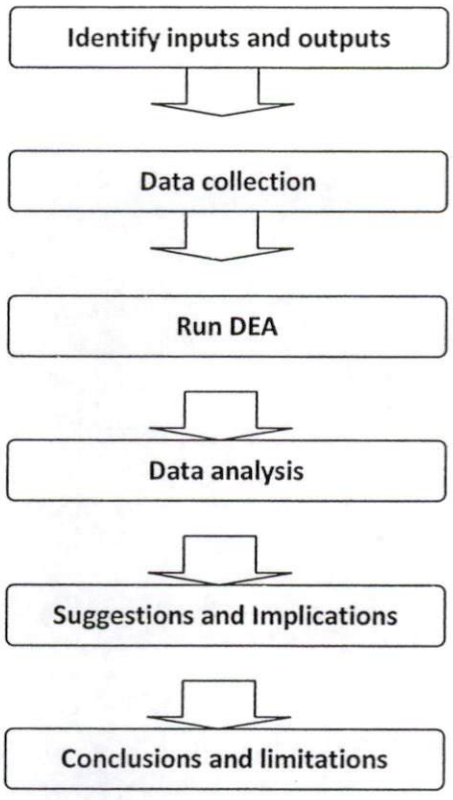

Figure 3.2

Data Envelopment Analysis Flowchart

CHAPTER IV

RESULTS AND DISCUSSIONS

4.1 Sample Description

The object of the research used in this study is banking sector listed in Indonesian Stock Exchange for the years 2008-2012. There are 32 banks listed in the period 2008-2012 but there are only 30 banks that are used in this research. The bank companies included in this research for further processed are as follows:

Table 4.1
List of Banks

No	Code	Companies Name
1	AGRO	PT Bank Agroniaga Tbk
2	BABP	PT Bank ICB Bumi Putera Tbk
3	BACA	PT Bank Capital Indonesia Tbk
4	BAEK	PT Bank Ekonomi Raharja Tbk
5	BBCA	PT Bank Central Asia Tbk
6	BBKP	PT Bank Bukopin Tbk
7	BBNI	PT Bank Negara Indonesia (Persero) Tbk
8	BBNP	PT Bank Nusantara Parahyangan Tbk
9	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
10	BBTN	PT Bank Tabungan Negara (Persero) Tbk
11	BDMN	PT Bank Danamon Tbk
12	BJBR	PT Bank Pembangunan Daerah Jawa Barat dan Banten Tbk
13	BJTM	PT Bank Pembangunan Daerah Jawa Timur Tbk
14	BKSW	PT Bank Kesawan Tbk
15	BMRI	PT Bank Mandiri (Persero) Tbk
16	BNBA	PT Bank Bumi Arta Tbk
17	BNGA	PT Bank CIMB Niaga Tbk
18	BNII	PT Bank International Indonesia Tbk
19	BNLI	PT Bank Permata Tbk
20	BSIM	PT Bank Sinarmas Tbk
21	BSWD	PT Bank Swadesi Tbk
22	BTPN	PT Bank Tabungan Pensiunan Nasional Tbk
23	BVIC	PT Bank Victoria International Tbk
24	INPC	PT Bank Arta Graha International Tbk
25	MAYA	PT Bank Mayapada International Tbk
26	MCOR	PT Bank Windu Kentjana International Tbk
27	MEGA	PT Bank Mega Tbk
28	NISP	PT Bank OCBC NISP Tbk
29	PNBN	PT Bank Pan Indonesia Tbk
30	SDRA	PT Bank Himpunan Saudara 1906 Tbk

Source: www.idx.co.id

4.2 Descriptive Statistic Analysis

According to data gained from the research sample, researcher conducts the research which result on the descriptive statistic. Descriptive statistic summarizes the description about the data used in the research.

4.2.1 Traditional Method

Table 4.2 shows that average ROA the banks covered in the study steadily increase from year to year. It was showed by the increasing of average ROA from 1.75% in 2008 to 2.25% in 2012.

Table 4.2
Descriptive Statistics Of Return on Assets

Year	2008	2009	2010	2011	2012
Mean	1.75%	1.78%	2.25%	2.19%	2.25%
Std. Dev.	0.01236	0.0112	0.0128	0.0139	0.0121
Min	-0.11%	0.07%	0.51%	-1.64%	-0.69%
Max	4.48%	3.75%	5.57%	4.97%	5.15%

Source: Author's calculation(2013)

Table 4.3 shows the average ROE of banks covered in the study. The ROE increased from 13.01% in 2008 to 13.61% in 2009 and 17.33% in 2010. In 2011, The ROE decreased by 0.70% to 16.53% and in 2012 icreased by 0.64% to 17.17%.

Table 4.3
Descriptive Statistics Of Return on Equity

Year	2008	2009	2010	2011	2012
Mean	13.01%	13.61%	17.33%	16.53%	17.17%
Std. Dev.	0.099268	0.094725	0.108883	0.113213	0.098452
Min	-1.67%	-0.76%	4.16%	-18.96%	-15.02%
Max	34.50%	35.22%	43.83%	42.49%	38.66%

Source: Author's calculation(2013)

Table 4.4 shows the average NIM of banks covered in the study. Aside from the year 2010, the NIM are at 5.52% to 5.82%.

Table 4.4
Descriptive Statistics Of Net Interest Margin

Year	2008	2009	2010	2011	2012
Mean	5.82%	5.72%	7.50%	5.72%	5.52%
Std. Dev.	0.024266	0.022106	0.082515	0.022683	0.041576
Min	1.49%	1.84%	1.77%	1.72%	-13.27%
Max	34.50%	35.22%	43.83%	42.49%	38.66%

Source: Author's calculation(2013)

Table 4.5 shows the average OER of banks covered in the study. The average OER increased from 81.23% in 2008 to 81.50% in 2009. The average OER decreased by 3.63% for the year 2010 to 77.87%. The average OER increase from 77.87% in 2010 to 77.93% in 2011. And in the 2012, the average OER decrease by 1.42% to 76.51%.

Table 4.5
Descriptive Statistics Of Operational Expenses Ratio(OER)

Year	2008	2009	2010	2011	2012
Mean	81.23%	81.50%	77.87%	77.93%	76.51%
Min	45.50%	41.60%	42.40%	44.60%	42.30%
Max	102.64%	100.77%	95.97%	114.63%	120.81%
SD	0.149409	0.154515	0.151009	0.162046	0.163632

Source: Author's calculation(2014)

4.2.2 Non Parametric Data Envelopment Analysis

Table 4.6 reports the summary statistics for variables used to estimated the efficiency by using DEA approach. The statistics are calculated from yearly data in which all variables are expressed in Rp Million. From the data in table 4.6, it is concluded that the commercial banks covered in the study are much diversified in size. Four input variables tend to increase over time, particulally deposits rises strongly from year to year. This due to the growth of commercial bank system. Table 4.6 also shows the trend of two outputs. We can see the bank's income is primarily from interest income has increased over the years. It is in line with the increase of loans. Thus, it is remain clear that the income from credit operations remains as a high proportion of the income statement of banks.

Table 4.6
Table Descriptive Statistics Input and Output Variables

Year		Deposits (X1)	Fixed Capital(X3)	Personnel Costs (X2)	Interest Expense (X4)	Loans (Y1)	Interest Income (Y2)
2008	Mean	45,801,012	815,370	988,268	2,369,817	31,375,595	5,413,249
	Std. Dev.	73033297.14	1136757.23	1556969.441	3058042.926	45194268.56	7945364.032
	Min	1,000,260	12,868	11,974	69,459	669,775	126,819
	Max	289,112,052	4,603,560	6,329,075	12,371,417	162,637,788	28,096,633
2009	Mean	52,703,502	860,480	1,102,220	2,846,718	35,549,454	6,340,913
	Std. Dev.	84243844.8	1182083.395	1669594.313	3824561.63	52360331.77	9399751.114
	Min	1,210,110	9,417	18,429	84,719	960,847	159,217
	Max	319,550,381	4,963,306	6,675,793	15,675,213	194,242,503	35,334,131
2010	Mean	73,043,079	964,666	1,618,539	3,021,704	52,068,351	8,364,426
	Std. Dev.	107288671.7	1261453.304	2437298.575	3823892.399	72226153.58	12433389.45
	Min	1,226,475	16,156	21,129	81,993	1,050,806	167,356
	Max	337,387,909	5,253,057	8,675,721	14,394,598	232,972,784	44,615,162
2011	Mean	85,580,804	1,115,378	1,795,077	3,581,543	64,115,441	9,001,130
	Std. Dev.	123290101.3	1453957.765	2570325.202	4369611.6	87394479.26	12781996.34
	Min	1,675,844	18,328	23,844	81,127	1,413,686	177,633
	Max	384,728,603	6,049,246	8,700,847	15,954,037	298,988,258	48,164,348
2012	Mean	99,423,896	1,324,716	2,082,978	3,595,776	78,998,954	9,959,798
	Std. Dev.	142665794	1789612.387	2899272.798	4164289.688	108949083.3	13510704.17
	Min	1,972,256	17,687	28,739	106,250	1,825,422	203,913
	Max	450,166,383	7,002,690	9,605,547	15,019,850	370,570,356	49,610,421

Source: Author's calculation(2013)

4.3 Empirical Findings

4.3.1 Traditional Method

Table 4.7
Efficiency of Commmercial Banks, 2008-2012 (ROA)

No.	DMUs	ROA					Mean
		2008	2009	2010	2011	2012	
1	AGRO	-0.11%	0.18%	0.67%	1.39%	1.63%	0.75%
2	BABP	0.09%	0.18%	0.51%	-1.64%	0.09%	-0.15%
3	BACA	1.14%	1.42%	0.74%	0.84%	1.32%	1.09%
4	BAEK	2.26%	2.21%	1.78%	1.49%	1.02%	1.75%
5	BBCA	3.40%	3.40%	3.50%	3.80%	3.60%	3.54%
6	BBKP	1.66%	1.46%	1.62%	1.87%	1.83%	1.69%
7	BBNI	1.10%	1.70%	2.50%	2.90%	2.90%	2.22%
8	BBNP	1.17%	1.02%	1.50%	1.53%	1.57%	1.36%
9	BBRI	4.18%	3.73%	4.64%	4.93%	5.15%	4.53%
10	BBTN	1.80%	1.47%	2.05%	2.03%	1.94%	1.86%
11	BDMN	1.50%	1.50%	2.70%	2.60%	2.70%	2.20%
12	BJBR	3.31%	3.24%	3.15%	2.65%	2.46%	2.96%
13	BJTM	3.94%	3.75%	5.57%	4.97%	3.34%	4.31%
14	BKSW	0.22%	0.27%	4.45%	0.40%	-0.69%	0.93%
15	BMRI	2.50%	3.00%	3.40%	3.40%	3.50%	3.16%
16	BNBA	2.00%	2.05%	1.32%	2.11%	2.47%	1.99%
17	BNGA	1.10%	2.10%	2.75%	2.85%	3.18%	2.40%
18	BNII	1.11%	0.07%	1.14%	1.13%	1.62%	1.01%
19	BNLI	1.70%	1.40%	1.98%	1.66%	1.70%	1.69%
20	BSIM	0.34%	0.93%	1.44%	1.07%	1.74%	1.10%
21	BSWD	2.53%	3.53%	2.93%	3.66%	3.14%	3.16%
22	BTPN	4.48%	3.42%	4.00%	4.40%	4.70%	4.20%
23	BVIC	0.88%	1.10%	1.71%	2.65%	2.17%	1.70%
24	INPC	0.34%	0.44%	0.76%	0.72%	0.66%	0.58%
25	MAYA	1.27%	0.90%	1.22%	2.07%	2.41%	1.57%
26	MCOR	0.25%	1.00%	1.11%	0.96%	2.04%	1.07%
27	MEGA	1.98%	1.77%	2.45%	2.29%	2.74%	2.25%
28	NISP	1.51%	1.91%	1.29%	1.91%	1.79%	1.68%
29	PNBN	1.75%	1.78%	1.76%	2.02%	1.96%	1.85%
30	SDRA	3.00%	2.41%	2.78%	3.00%	2.78%	2.79%

Source: Author's calculation(2013)

Table 4.7 shows the Return of Assets banking for the years covered in the study. The average ROA of all bank under the study is 2.04%. The average ROA of efficient banks is 3.14% while inefficient banks have average ROA 1.31%. Based upon those average ROA, the banks are classified into one of the following categories:

Relatively Efficient	Bank Rakyat Indonesia (BBRI) BPD Jawa Timur(BJTM) Bank Tabungan Pensiunan Nasional(BTPN) Bank Central Asia(BBCA) Bank Mandiri(BMRI) Bank Swadesi(BSWD)
Weakly Efficient	BPD Jawa Barat dan Banten(BJBR) Bank Himpunan Saudara 1906(SDRA) Bank CIMB Niaga(BNGA) Bank Mega(MEGA) Bank Negara Indonesia(BBNI) Bank Danamon(BDMN)
Medium Inefficient	Bank Bumi Arta(BNBA) Bank Tabungan Negara(BBTN) Bank Pan Indonesia(PNBN) Bank Ekonomi Raharja(BAEK) Bank Victoria International(BVIC) Bank Bukopin(BBKP) Bank Permata(BNLI) Bank OCBC NISP(NISP) Bank Mayapada International(MAYA) Bank Nusantara Parahyangan(BBNP)
Distinctively Inefficient	Bank Sinar Mas(BSIM) Bank Capital Indonesia(BACA) Bank Windu Kentjana International(MCOR) Bank International Indonesia(BNII) Bank Kesawan(BKSW) Bank Agro Niaga(AGRO) Bank Artha Graha International(INPC) Bank ICB Bumi Putera(BABP)
Figure 4.1 **Bank Categories Based on ROA**	

Table 4.8
Efficiency of Commmercial Banks, 2008-2012 (ROE)

No.	DMUs	ROE					Mean
		2008	2009	2010	2011	2012	
1	AGRO	-1.67%	0.79%	4.16%	11.37%	10.26%	4.98%
2	BABP	0.37%	0.99%	5.33%	-18.96%	0.26%	-2.40%
3	BACA	6.54%	6.50%	5.11%	5.19%	8.46%	6.36%
4	BAEK	18.06%	19.42%	14.34%	10.43%	7.63%	13.98%
5	BBCA	30.20%	31.80%	33.30%	33.50%	30.40%	31.84%
6	BBKP	18.80%	16.52%	19.02%	20.10%	19.47%	18.78%
7	BBNI	9.00%	16.30%	24.70%	20.10%	20.00%	18.02%
8	BBNP	8.98%	8.51%	12.38%	12.82%	14.37%	11.41%
9	BBRI	34.50%	35.22%	43.83%	42.49%	38.66%	38.94%
10	BBTN	19.64%	14.53%	16.56%	17.65%	18.23%	17.32%
11	BDMN	14.60%	11.20%	18.10%	17.20%	16.20%	15.46%
12	BJBR	24.98%	28.09%	24.95%	21.00%	25.02%	24.81%
13	BJTM	31.48%	28.59%	40.43%	33.65%	18.96%	30.62%
14	BKSW	3.53%	3.58%	4.83%	4.49%	-15.02%	0.28%
15	BMRI	18.10%	22.10%	24.40%	22.00%	22.60%	21.84%
16	BNBA	3.44%	7.19%	8.39%	11.94%	14.84%	9.16%
17	BNGA	7.39%	15.34%	20.88%	19.09%	20.88%	16.72%
18	BNII	8.17%	-0.76%	6.81%	9.16%	15.79%	7.83%
19	BNLI	12.40%	13.30%	22.80%	15.87%	17.54%	16.38%
20	BSIM	3.85%	8.46%	15.34%	10.03%	15.42%	10.62%
21	BSWD	10.48%	13.36%	11.69%	15.26%	16.82%	13.52%
22	BTPN	28.44%	25.89%	36.40%	31.80%	32.60%	31.03%
23	BVIC	7.81%	8.00%	18.41%	24.91%	16.48%	15.12%
24	INPC	4.13%	4.60%	8.79%	8.79%	13.14%	7.89%
25	MAYA	4.41%	4.27%	7.28%	11.53%	17.67%	9.03%
26	MCOR	1.39%	6.03%	7.24%	6.94%	15.91%	7.50%
27	MEGA	20.47%	18.72%	27.20%	26.74%	27.44%	24.11%
28	NISP	8.90%	11.82%	8.12%	12.90%	12.22%	10.79%
29	PNBN	10.16%	10.40%	11.62%	14.63%	15.37%	12.44%
30	SDRA	21.63%	17.62%	17.45%	23.36%	27.44%	21.50%

Source: Author's calculation(2013)

Table 4.8 shows the Return of Equity banking for the years covered in the study. The average ROE of all bank under the study is 15.53%. The average ROE of efficient banks is 23.38% while inefficient banks have average ROE 8.66%. Based upon those average ROE, the banks are classified into one of the following categories:

Relatively Efficient	Bank Rakyat Indonesia (BBRI) Bank Central Asia(BBCA) Bank Tabungan Pensiunan Nasional(BTPN) BPD Jawa Timur(BJTM) BPD Jawa Barat dan Banten(BJBR) Bank Mega(MEGA)
Weakly Efficient	Bank Mandiri(BMRI) Bank Himpunan Saudara 1906(SDRA) Bank Bukopin(BBKP) Bank Negara Indonesia(BBNI) Bank Tabungan Negara(BBTN) Bank CIMB Niaga(BNGA) Bank Permata(BNLI) Bank Danamon(BDMN)
Medium Inefficient	Bank Victoria International(BVIC) Bank Ekonomi Raharja(BAEK) Bank Swadesi(BSWD) Bank Pan Indonesia(PNBN) Bank Nusantara Parahyangan(BBNP) Bank OCBC NISP(NISP) Bank Sinar Mas(BSIM) Bank Bumi Arta(BNBA) Bank Mayapada International(MAYA)
Distinctively Inefficient	Bank Artha Graha International(INPC) Bank International Indonesia(BNII) Bank Windu Kentjana International(MCOR) Bank Capital Indonesia(BACA) Bank Agro Niaga(AGRO) Bank Kesawan(BKSW) Bank ICB Bumi Putera(BABP)
Figure 4.2 **Bank Categories Based on ROE**	

Table 4.9
Efficiency of Commmercial Banks, 2008-2012 (NIM)

No.	DMUs	NIM					Mean
		2008	2009	2010	2011	2012	
1	AGRO	4.06%	4.98%	5.72%	4.54%	6.00%	5.06%
2	BABP	5.17%	5.78%	5.15%	5.43%	5.44%	5.39%
3	BACA	4.36%	4.64%	3.95%	3.62%	4.66%	4.25%
4	BAEK	4.61%	4.63%	4.09%	4.38%	3.77%	4.30%
5	BBCA	6.60%	6.40%	5.30%	5.70%	5.60%	5.92%
6	BBKP	4.80%	4.07%	4.75%	4.55%	4.56%	4.55%
7	BBNI	6.30%	6.00%	5.80%	6.00%	5.90%	6.00%
8	BBNP	3.60%	3.69%	4.91%	4.99%	5.56%	4.55%
9	BBRI	10.18%	9.14%	10.77%	9.58%	8.42%	9.62%
10	BBTN	5.08%	4.60%	5.99%	5.76%	5.83%	5.45%
11	BDMN	11.10%	11.20%	11.30%	9.90%	10.10%	10.72%
12	BJBR	8.45%	7.63%	7.32%	6.89%	6.76%	7.41%
13	BJTM	3.67%	4.04%	4.26%	6.28%	11.29%	5.91%
14	BKSW	1.49%	1.84%	49.16%	1.72%	-13.27%	8.19%
15	BMRI	5.50%	5.00%	5.30%	5.10%	5.50%	5.28%
16	BNBA	6.90%	7.00%	6.10%	6.36%	7.13%	6.70%
17	BNGA	5.69%	6.78%	6.46%	5.63%	5.87%	6.09%
18	BNII	5.59%	6.10%	5.86%	5.22%	5.73%	5.70%
19	BNLI	6.20%	5.70%	5.34%	5.13%	5.39%	5.55%
20	BSIM	3.66%	5.04%	6.19%	5.65%	5.72%	5.25%
21	BSWD	5.44%	5.41%	5.82%	6.39%	5.12%	5.64%
22	BTPN	11.40%	12.18%	14.00%	13.00%	13.00%	12.72%
23	BVIC	2.61%	2.38%	1.77%	1.86%	3.12%	2.35%
24	INPC	3.74%	3.81%	3.97%	3.55%	4.22%	3.86%
25	MAYA	7.57%	6.74%	6.25%	5.84%	6.00%	6.48%
26	MCOR	4.95%	4.48%	4.61%	4.62%	5.18%	4.77%
27	MEGA	5.44%	4.94%	4.88%	5.40%	6.45%	5.42%
28	NISP	5.23%	5.35%	5.04%	4.80%	4.17%	4.92%
29	PNBN	4.72%	4.76%	4.59%	4.64%	4.19%	4.58%
30	SDRA	10.46%	7.19%	10.24%	9.14%	8.28%	9.06%

Source: Author's calculation(2013)

Table 4.9 shows the Net Interest Margin banking for the years covered in the study. The average NIM of all bank under the study is 6.06%. The average NIM of efficient banks is 8.55% while inefficient banks have average NIM 4.99%. Based upon those average NIM, the banks are classified into one of the following categories:

Relatively Efficient	Bank Tabungan Pensiunan Nasional(BTPN) Bank Danamon(BDMN) Bank Rakyat Indonesia (BBRI) Bank Himpunan Saudara 1906(SDRA)
Weakly Efficient	Bank Kesawan(BKSW) BPD Jawa Barat dan Banten(BJBR) Bank Bumi Arta(BNBA) Bank Mayapada International(MAYA) Bank CIMB Niaga(BNGA)
Medium Inefficient	Bank Negara Indonesia(BBNI) Bank Central Asia(BBCA) BPD Jawa Timur(BJTM) Bank International Indonesia(BNII) Bank Swadesi(BSWD) Bank Permata(BNLI) Bank Tabungan Negara(BBTN) Bank Mega(MEGA) Bank ICB Bumi Putera(BABP) Bank Mandiri(BMRI) Bank Sinar Mas(BSIM) Bank Agro Niaga(AGRO)
Distinctively Inefficient	Bank OCBC NISP(NISP) Bank Windu Kentjana International(MCOR) Bank Pan Indonesia(PNBN) Bank Nusantara Parahyangan(BBNP) Bank Bukopin(BBKP) Bank Ekonomi Raharja(BAEK) Bank Capital Indonesia(BACA) Bank Artha Graha International(INPC) Bank Victoria International(BVIC)

Figure 4.3
Bank Categories Based on NIM

Table 4.10
Efficiency of Commmercial Banks, 2008-2012 (OER)

No.	DMUs	OER					Mean
		2008	2009	2010	2011	2012	
1	AGRO	101.47%	97.98%	95.97%	91.65%	86.54%	94.72%
2	BABP	96.81%	98.84%	94.60%	114.63%	99.68%	100.91%
3	BACA	88.36%	86.03%	91.75%	92.82%	86.85%	89.16%
4	BAEK	75.83%	77.79%	76.32%	81.00%	90.02%	80.19%
5	BBCA	66.80%	68.70%	64.30%	60.90%	62.40%	64.62%
6	BBKP	84.45%	86.93%	84.98%	82.05%	81.42%	83.97%
7	BBNI	90.20%	84.90%	76.00%	72.60%	71.00%	78.94%
8	BBNP	89.72%	89.50%	85.17%	85.77%	85.18%	87.07%
9	BBRI	72.65%	77.76%	70.86%	66.69%	59.93%	69.58%
10	BBTN	86.18%	88.29%	82.39%	81.75%	80.74%	83.87%
11	BDMN	55.00%	49.70%	50.10%	51.80%	50.80%	51.48%
12	BJBR	75.41%	77.30%	76.60%	80.02%	80.02%	77.87%
13	BJTM	67.42%	66.04%	59.38%	60.02%	68.89%	64.35%
14	BKSW	102.64%	96.46%	95.57%	96.67%	120.81%	102.43%
15	BMRI	45.50%	41.60%	42.40%	44.60%	42.30%	43.28%
16	BNBA	82.44%	82.92%	86.15%	86.68%	78.71%	83.38%
17	BNGA	88.26%	82.98%	76.80%	76.10%	71.10%	79.05%
18	BNII	94.68%	100.77%	92.26%	92.75%	87.87%	93.67%
19	BNLI	88.90%	89.20%	84.01%	85.42%	84.51%	86.41%
20	BSIM	98.52%	91.18%	91.41%	93.55%	83.75%	91.68%
21	BSWD	80.52%	74.57%	73.35%	67.51%	72.31%	73.65%
22	BTPN	77.53%	84.06%	59.00%	54.00%	54.00%	65.72%
23	BVIC	92.23%	92.05%	88.21%	78.33%	78.82%	85.93%
24	INPC	97.54%	96.24%	91.75%	92.43%	93.03%	94.20%
25	MAYA	90.63%	93.82%	90.17%	83.38%	79.93%	87.59%
26	MCOR	68.80%	91.81%	91.21%	92.97%	81.74%	85.31%
27	MEGA	83.15%	85.91%	77.79%	81.84%	76.73%	81.08%
28	NISP	65.25%	59.94%	62.36%	58.59%	57.07%	60.64%
29	PNBN	47.61%	46.35%	45.97%	51.47%	47.73%	47.83%
30	SDRA	82.42%	85.36%	79.30%	80.03%	81.49%	81.72%

Source: Author's calculation(2014)

Table 4.10 shows the ratio Operational Expenses to Operational Income banking for the years covered in the study. The average OER of all bank under the study is 79.01%. The average OER of efficient banks is 80.41% while inefficient banks have average OER 78.20%. Based upon those average OER, the banks are classified into one of the following categories:

Relatively Efficient	Bank Mandiri(BMRI) Bank Pan Indonesia(PNBN) Bank Danamon(BDMN) Bank OCBC NISP(NISP)
Weakly Efficient	BPD Jawa Timur(BJTM) Bank Central Asia(BBCA) Bank Tabungan Pensiunan Nasional(BTPN) Bank Rakyat Indonesia (BBRI) Bank Swadesi(BSWD) BPD Jawa Barat dan Banten(BJBR) Bank Negara Indonesia(BBNI)
Medium Inefficient	Bank CIMB Niaga(BNGA) Bank Ekonomi Raharja(BAEK) Bank Mega(MEGA) Bank Himpunan Saudara 1906(SDRA) Bank Bumi Arta(BNBA) Bank Tabungan Negara(BBTN) Bank Bukopin(BBKP) Bank Windu Kentjana International(MCOR) Bank Victoria International(BVIC) Bank Permata(BNLI) Bank Nusantara Parahyangan(BBNP) Bank Mayapada International(MAYA)
Distinctively Inefficient	Bank Capital Indonesia(BACA) Bank Sinar Mas(BSIM) Bank International Indonesia(BNII) Bank Artha Graha International(INPC) Bank Agro Niaga(AGRO) Bank ICB Bumi Putera(BABP) Bank Kesawan(BKSW)
Figure 4.3 **Bank Categories Based on OER**	

In comparison with the average industri, the traditional financial measures of banks are classified into efficient and inefficient. The following shows the average industri for selected financial indicators:

Table 4.11
Average Industry Finacial Ratio

No.	Indicators	Period					Mean
		2008	2009	2010	2011	2012	
1	ROA	2.33	2.60	2.86	3.02	3.18	2.80
2	ROE	16.88	21.11	21.37	22.54	23.00	20.98
3	NIM	5.66	5.56	5.73	5.91	5.45	5.66
4	OEI	88.59	86.63	86.14	88.81	77.38	85.51

Source: www.bi.go.id(2014)

Based upon the data from the table 4.11, banks are classified into one of the following categories:

Categories	Financial Indicators			
	ROA	ROE	NIM	OER
Efficient Banks	-BBRI -BJTM -BTPN -BBCA -BMRI -BSWD -BJBR	-BBRI -BBCA -BTPN -BJTM -BJBR -MEGA -BMRI -SDRA	-BTPN -BDMN -BBRI -SDRA -BKSW -BJBR -BNBA -MAYA -BNGA -BBNI -BBCA -BJTM -BNII	-BMRI -PNBN -BDMN -NISP -BJTM -BBCA -BTPN -BBRI -BSWD -BJBR -BBNI -BNGA -BAEK -MEGA -SDRA -BNBA -BBTN -BBKP -MCOR
Inefficient Banks	-SDRA -BNGA -MEGA -BBNI -BDMN -BNBA -BBTN -PNBN -BAEK -BVIC -BBKP -BNLI -NISP -MAYA -BBNP -BSIM	-BBKP -BBNI -BBTN -BNGA -BNLI -BDMN -BVIC -BAEK -BSWD -PNBN -BBNP -NISP -BSIM -BNBA -MAYA -INPC	-BSWD -BNLI -BBTN -MEGA -BABP -BMRI -BSIM -AGRO -NISP -MCOR -PNBN -BBNP -BBKP -BAEK -BACA -INPC	-BVIC -BNLI -BBNP -MAYA -BACA -BSIM -BNII -INPC -AGRO -BABP -BKSW

	-BACA -MCOR -BNII -BKSW -AGRO -INPC -BABP	-BNII -MCOR -BACA -AGRO -BKSW -BABP	-BVIC	
	Figure 4.4 **Bank Categories In Comparison With Average Industry**			

4.3.2 Non Parametric Data Envelopment Analysis

Table 4.12
Efficiency of Commmercial Banks, 2008-2012 (CRS)

No.	DMUs	CCR					Mean
		2008	2009	2010	2011	2012	
1	AGRO	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	BABP	1.00000	0.94291	1.00000	0.96961	0.92854	0.96821
3	BACA	1.00000	0.81942	0.87032	0.79812	0.79299	0.85617
4	BAEK	1.00000	0.98268	0.99012	1.00000	0.96028	0.98662
5	BBCA	1.00000	0.97569	0.95705	1.00000	1.00000	0.98655
6	BBKP	0.98704	0.91708	0.88635	1.00000	0.96799	0.95169
7	BBNI	0.99227	0.92785	0.89606	0.93644	0.98522	0.94757
8	BBNP	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
9	BBRI	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
10	BBTN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
11	BDMN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
12	BJBR	0.93453	0.93348	1.00000	1.00000	1.00000	0.97360
13	BJTM	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14	BKSW	0.83764	0.78961	0.77080	0.83593	0.91803	0.83040
15	BMRI	0.92613	0.93422	0.89092	0.93951	1.00000	0.93815
16	BNBA	0.85680	0.83480	0.74218	0.80802	0.88162	0.82468
17	BNGA	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
18	BNII	0.85090	0.86169	0.90026	0.92691	0.93026	0.89400
19	BNLI	0.95607	0.91385	0.94756	0.95917	1.00000	0.95533
20	BSIM	1.00000	1.00000	0.93394	0.90393	0.91063	0.94970
21	BSWD	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
22	BTPN	0.97934	0.97343	1.00000	1.00000	1.00000	0.99055
23	BVIC	1.00000	1.00000	1.00000	1.00000	0.99124	0.99825
24	INPC	1.00000	1.00000	0.96632	0.96334	0.92594	0.97112
25	MAYA	0.70686	0.65335	0.86463	0.87658	0.86401	0.79309
26	MCOR	0.96773	0.95563	1.00000	0.92316	0.85833	0.94097
27	MEGA	0.88075	0.79474	0.82064	0.78869	0.82128	0.82122
28	NISP	0.95564	0.84251	0.93032	1.00000	0.96095	0.93788
29	PNBN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
30	SDRA	1.00000	1.00000	1.00000	0.94477	0.93257	0.97547
Mean							**0.94971**

Source: Author's calculation(2013)

Table 4.12 shows the technical efficiency scores for all the banks covered in the study. Here we see that under constant return to scale input oriented, there are nine banks—Bank Agro Niaga(AGRO), Bank Nusantara Parahyangan(BBNP), Bank Rakyat Indonesia(BBRI), Bank

Tabungan Negara(BBTN), Bank Danamon Indonesia(BDMN), BPD Jawa Timur(BJTM), Bank CIMB Niaga(BNGA), Bank Swadesi(BSWD), Bank Pan Indonesia(PNBN) are technically efficient because they have the technical efficiency scores equal to one. We note that the technical efficiency (TE) of Bank ICB Bumi Putera(BABP) is 0.968. That is BABP should be able to decrease the costs and expenses by 3.2% without decreasing outputs. Similar interpretation holds for the other banks. It is shown also that the banking sector achieved average technical efficiency of 94.97%.

Table 4.13
Efficiency of Commmercial Banks, 2008-2012 (VRS)

No.	DMUs	BCC					Mean
		2008	2009	2010	2011	2012	
1	AGRO	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	BABP	1.00000	0.94516	1.00000	0.98411	0.93061	0.97198
3	BACA	1.00000	1.00000	0.96551	0.90807	0.86884	0.94848
4	BAEK	1.00000	1.00000	0.99193	1.00000	0.97365	0.99312
5	BBCA	1.00000	0.97584	0.96029	1.00000	1.00000	0.98723
6	BBKP	1.00000	0.94488	0.88779	1.00000	1.00000	0.96653
7	BBNI	1.00000	0.93760	0.89654	0.95945	0.98525	0.95577
8	BBNP	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
9	BBRI	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
10	BBTN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
11	BDMN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
12	BJBR	0.98675	0.93467	1.00000	1.00000	1.00000	0.98428
13	BJTM	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
14	BKSW	0.85774	0.85518	0.94388	0.88580	0.98381	0.90528
15	BMRI	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16	BNBA	1.00000	1.00000	0.93537	0.93757	1.00000	0.97459
17	BNGA	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
18	BNII	0.91022	0.86435	0.90045	0.92791	0.93351	0.90729
19	BNLI	0.95777	0.91390	0.94799	0.96311	1.00000	0.95655
20	BSIM	1.00000	1.00000	0.96919	0.92025	0.91487	0.96086
21	BSWD	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
22	BTPN	0.99764	0.97772	1.00000	1.00000	1.00000	0.99507
23	BVIC	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
24	INPC	1.00000	1.00000	1.00000	0.96510	0.92921	0.97886
25	MAYA	0.71674	0.65478	0.87414	0.88521	0.86790	0.79975
26	MCOR	0.99434	0.96923	1.00000	0.92429	0.86977	0.95153
27	MEGA	0.89074	0.79616	0.84510	0.78952	0.83546	0.83139
28	NISP	0.95929	0.84335	0.94367	1.00000	0.96450	0.94216
29	PNBN	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
30	SDRA	1.00000	1.00000	1.00000	0.96296	0.94610	0.98181
Mean							**0.96642**

Source: Author's calculation(2013)

Table 4.13 shows the efficiency score of DEA Approach under VRS input oriented. It shows that there are eleven banks—Bank Agro Niaga(AGRO), Bank Nusantara Parahyangan(BBNP), Bank Rakyat Indonesia(BBRI), Bank Tabungan Negara(BBTN), Bank Danamon Indonesia(BDMN), BPD Jawa Timur(BJTM), Bank Mandiri (BMRI), Bank CIMB Niaga(BNGA), Bank Swadesi(BSWD), Bank Victoria International(BVIC), Bank Pan

Indonesia(PNBN) are technical efficient. Other 18 banks are technically inefficient as their efficiency scores are less than one. It is shown also that the banking sector achieved average technical efficiency of 96.64%.

4.4 Discussion and Analysis

4.4.1 Discussion

This reserach shows that the efficiency of banks in Indonesia would be different according to the approach employed to measure the efficiency. By using traditional indicator in term of ROA, six banks are relatively efficient: Bank Rakyat Indonesia (BBRI), BPD Jawa Timur(BJTM), Bank Tabungan Pensiunan Nasional(BTPN), Bank Central Asia(BBCA), Bank Mandiri(BMRI) and Bank Swadesi(BSWD). In term of ROE, six banks are relatively efficient: Bank Rakyat Indonesia (BBRI), Bank Central Asia(BBCA), Bank Tabungan Pensiunan Nasional(BTPN), BPD Jawa Timur(BJTM), BPD Jawa Barat dan Banten(BJBR) and Bank Mega(MEGA). In term of NIM, four banks are relatively efficient: Bank Tabungan Pensiunan Nasional(BTPN), Bank Danamon(BDMN), Bank Rakyat Indonesia (BBRI) and Bank Himpunan Saudara 1906(SDRA). While in term of OER, four banks are relatively efficient: Bank Mandiri(BMRI), Bank Pan Indonesia(PNBN), Bank Danamon(BDMN) and Bank OCBC NISP(NISP).

Under Data Envelopment Analysis CRS-input oriented approach, nine banks are technically efficient: Bank Agro Niaga(AGRO), Bank Nusantara Parahyangan(BBNP), Bank Rakyat Indonesia(BBRI), Bank Tabungan Negara(BBTN), Bank Danamon Indonesia(BDMN), BPD Jawa Timur(BJTM), Bank CIMB Niaga(BNGA), Bank Swadesi(BSWD), and Bank Pan Indonesia(PNBN). While under Data Envelopment Analysis VRS-input oriented approach, eleven banks are technically efficient: Bank Agro Niaga(AGRO), Bank Nusantara Parahyangan(BBNP), Bank Rakyat Indonesia(BBRI), Bank Tabungan Negara(BBTN), Bank

Danamon Indonesia(BDMN), BPD Jawa Timur(BJTM), Bank Mandiri (BMRI), Bank CIMB Niaga(BNGA), Bank Swadesi(BSWD), Bank Victoria International(BVIC), and Bank Pan Indonesia(PNBN). This differs with the previous study conducted by Wahyu Bhava(2013) which showed that Bank Mandiri(BMRI), Bank Bukopin(BBKP), Bank CIMB Niaga(BNGA), Bank Danamon Indonesia(BDMN), Bank Ekonomi Raharja(BAEK), Bank Permata(BNLI) and Bank Pundi Indonesia were tecnically efficient.

This study find that on average the level of efficiency of banking companies listed in BEI are 94.97% under assumption constant return to scale and 96.64% under the assumption variable return to scale. This finding differs with the research of Rahma Vicky and Niki Lukviarman(2008) which showed that the level of efficiency banking companies listed in BEI for the years 2002-2004 was 11.8%.

The research finds that there are technically efficient banks measured by DEA approach but they are not relatively efficient measured by traditional financial indicators. Bank Agro Niaga(AGRO) is technically efficient while in term of ROA, ROE, OER is distinctively inefficient, and its NIM is medium inefficient. Bank Nusantara Parahyangan(BBNP) is medium inefficient in term of ROA, ROE, OER, while its NIM is distinctively inefficient. Bank Rakyat Indonesia(BBRI) has relatively efficient ROA, ROE and NIM, while its OER is weakly efficient. Bank Tabungan Negara(BBTN) has medium inefficient in term of ROA, NIM and OER, while its ROE is weakly efficient. Bank Danamon Indonesia(BDMN) is weakly efficient in term of ROA and ROE, while its NIM and OER is relatively efficient. BPD Jawa Timur(BJTM) is relatively efficient in term of ROA, ROE, and OER while its NIM is medium inefficient. Bank Mandiri (BMRI) is relatively efficient in term of ROA and OER, weakly efficient in term of ROE and medium inefficient in term of NIM. Bank CIMB Niaga(BNGA) is weakly efficient in term of ROA, ROE, NIM, while it has distinctively inefficient in term of OER. Bank Swadesi(BSWD) has relatively efficient in term of ROA,

medium inefficient in term of ROE and NIM and weakly efficient in term of OER. Bank Victoria International(BVIC) is medium inefficient in term of ROA, ROE and OER, while its NIM is distinctively inefficient. Bank Pan Indonesia(PNBN) is medium inefficient in term of ROA and ROE, while its NIM is distinctively inefficient and its OER is relatively efficient. The reason may be the fact that numericators of the financial indicators present the value of the financial result that has been growing dynamically in the recent years. On the other hand, efficiency measue in the DEA method is calculated in a different way and considers far more factors affecting banks' performance(Wozniewka, 2008).

4.4.2 Analysis

The next focus of this study is analyzing potential improvement for each DMUs. The efficiency scores results of CCR Model and BCR Model for the year 2012 will be used in this analysis.

4.4.2.1 CCR Model

DEA model results (input oriented DEA under the assumption of constant return to scale):

Table 4.14
Technical Efficiency Scores of Banks Based on CCR Model

No.	Bank Name	Abbr.	Technical Efficiency
1	Bank Agro Niaga	AGRO	1.00000
2	Bank ICB Bumi Putera	BABP	0.92854
3	Bank Capital Indonesia	BACA	0.79299
4	Bank Ekonomi Raharja	BAEK	0.96028
5	Bank Central Asia	BBCA	1.00000
6	Bank Bukopin	BBKP	0.96799
7	Bank Negara Indonesia	BBNI	0.98522
8	Bank Nusantara Parahyangan	BBNP	1.00000
9	Bank Rakyat Indonesia	BBRI	1.00000
10	Bank Tabungan Negara	BBTN	1.00000
11	Bank Danamon	BDMN	1.00000
12	BPD Jawa Barat dan Banten	BJBR	1.00000
13	BPD Jawa Timur	BJTM	1.00000
14	Bank Kesawan	BKSW	0.91803
15	Bank Mandiri	BMRI	1.00000
16	Bank Bumi Arta	BNBA	0.88162
17	Bank CIMB Niaga	BNGA	1.00000
18	Bank International Indonesia	BNII	0.93026
19	Bank Permata	BNLI	1.00000
20	Bank Sinar Mas	BSIM	0.91063
21	Bank Swadesi	BSWD	1.00000
22	Bank Tabungan Pensiunan Nasional	BTPN	1.00000
23	Bank Victoria International	BVIC	0.99124
24	Bank Arta Graha International	INPC	0.92594
25	Bank Mayapada International	MAYA	0.86401
26	Bank Windu Kentjana International	MCOR	0.85833
27	Bank Mega	MEGA	0.82128
28	Bank OCBC NISP	NISP	0.96095
29	Bank Pan Indonesia	PNBN	1.00000
30	Bank Himpunan Saudara 1906	SDRA	0.93257
Mean			**0.95433**

Source: Author's calculation(2013)

As shown from the table 4.14 based on assumption of constant return to scale there are fourteen efficient banks (Bank Agro Niaga, Bank Central Asia, Bank Nusantara Parahyangan, Bank Rakyat Indonesia, Bank Tabungan Negara, Bank Danamon, BPD Jawa Barat dan Banten, BPD Jawa Timur, Bank Mandiri, Bank CIMB Niaga, Bank Permata, Bank Swadesi, Bank Tabungan Pensiunan Nasional, and Bank Pan Indonesia) and other sixteen banks are

considered ineffficient relative to efficient peers, the relative score for the inefficient banks are shown in the table 4.14. It is shown also that for the year 2012, the banking sector achieved an average technical efficiency 95.43%.

Hereinafter the potential improvements for each bank to reach virtual output/input ratio, that will be displayed as needed movement for each output and input variable in order to reach the targeted amount of each variable(outputs and inputs).

Results of Bank Agro Niaga

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.15
CCR Potential Improvements of Bank Agro Niaga

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	450,166,383	0	0	450,166,383
Net Fixed Capital	2,024,911	0	0	2,024,911
Personnel Costs	9,605,547	0	0	9,605,547
Interest Expenses	13,126,655	0	0	13,126,655
Outputs:				
Loans	336,081,042	0	0	336,081,042
Interest Income	49,610,421	0	0	49,610,421

Source: Author's calculation(2013)

Results of Bank ICB Bumi Putera

Technical efficiency is 92.85%, and the necessary movement in amounts for each variable is presented in table 4.16 below, for Customer Deposits should be reduced by 459,766. Net Fixed Capital should be reduced by 2,932. Personnel costs should be reduced by 40,051. Interest Expenses should be reduced by 23,662.

Table 4.16
CCR Potential Improvements of Bank ICB Bumi Putera

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,433,765	-459,766	0	5,973,999
Net Fixed Capital	41,023	-2,932	0	38,091
Personnel Costs	180,892	-12,927	-27,124	140,841
Interest Expenses	331,117	-23,662	0	307,455
Outputs:				
Loans	5,149,078	0	0	5,149,078
Interest Income	688,882	0	0	688,882

Source: Author's calculation(2013)

Results of Bank Capital Indonesia

Technical efficiency is 79.30%, and the necessary movement in amounts for each variable is presented in table 4.17 below, for Customer Deposits should be reduced by 997,587. Net Fixed Capital should be reduced by 76,366. Personnel costs should be reduced by 11,958. Interest Expenses should be reduced by 55,751. In regards to outputs, the bank need to target additional Loans by 529,191.

Table 4.17
CCR Potential Improvements of Bank Capital Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	4,778,019	-989,109	-8,478	3,780,433
Net Fixed Capital	148,955	-30,836	-45,530	72,590
Personnel Costs	57,766	-11,958	0	45,808
Interest Expenses	269,311	-55,751	0	213,560
Outputs:				
Loans	2,813,287	0	529,191	3,342,478
Interest Income	431,486	0	0	431,486

Source: Author's calculation(2013)

Results of Bank Ekonomi Raharja

Technical efficiency is 96.02%, and the necessary movement in amounts for each variable is presented in table 4.18 below, for Customer Deposits should be reduced by 832,543. Net

Fixed Capital should be reduced by 9,517. Personnel costs should be reduced by 158,181. Interest Expenses should be reduced by 29,881. In regards to outputs, the bank need to target additional Interest Income by 325,402.

Table 4.18
CCR Potential Improvements of Bank Ekonomi Raharja

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	20,960,549	-832,543	0	20,128,006
Net Fixed Capital	239,613	-9,517	0	230,096
Personnel Costs	537,940	-21,367	-136,814	379,759
Interest Expenses	752,305	-29,881	0	722,424
Outputs:				
Loans	17,077,297	0	0	17,077,297
Interest Income	1,710,211	0	325,402	2,035,613

Source: Author's calculation(2013)

Results of Bank Central Asia

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.19
CCR Potential Improvements of Bank Central Asia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	370,507,012	0	0	370,507,012
Net Fixed Capital	6,406,625	0	0	6,406,625
Personnel Costs	6,154,966	0	0	6,154,966
Interest Expenses	7,647,167	0	0	7,647,167
Outputs:				
Loans	252,760,457	0	0	252,760,457
Interest Income	28,885,290	0	0	28,885,290

Source: Author's calculation(2013)

Results of Bank Bukopin

Technical efficiency is 96.80%, and the necessary movement in amounts for each variable is presented in table 4.20 below, for Customer Deposits should be reduced by 4,848,406. Net Fixed Capital should be reduced by 19,465. Personnel costs should be reduced by 23,063. Interest Expenses should be reduced by 85,299.

Table 4.20
CCR Potential Improvements of Bank Bukopin

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	53,957,758	-1,727,243	-3,121,163	49,109,352
Net Fixed Capital	608,075	-19,465	0	588,610
Personnel Costs	720,481	-23,063	0	697,418
Interest Expenses	2,664,675	-85,299	0	2,579,376
Outputs:				
Loans	44,594,681	0	0	44,594,681
Interest Income	5,126,381	0	0	5,126,381

Source: Author's calculation(2013)

Results of Bank Negara Indonesia

Technical efficiency is 98.52%, and the necessary movement in amounts for each variable is presented in table 4.21 below, for Customer Deposits should be reduced by 3,807,369. Net Fixed Capital should be reduced by 945,795. Personnel costs should be reduced by 1,074,886. Interest Expenses should be reduced by 107,065.

Table 4.21
CCR Potential Improvements of Bank Negara Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	257,660,841	-3,807,369	0	253,853,472
Net Fixed Capital	4,591,588	-67,848	-877,947	3,645,793
Personnel Costs	5,577,867	-82,422	-992,464	4,502,981
Interest Expenses	7,245,524	-107,065	0	7,138,459
Outputs:				
Loans	193,834,670	0	0	193,834,670
Interest Income	22,704,515	0	0	22,704,515

Source: Author's calculation(2013)

Results of Bank Nusantara Parahyangan

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.22
CCR Potential Improvements of Bank Nusantara Parahyangan

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,925,186	0	0	6,925,186
Net Fixed Capital	36,009	0	0	36,009
Personnel Costs	153,001	0	0	153,001
Interest Expenses	347,507	0	0	347,507
Outputs:				
Loans	5,884,622	0	0	5,884,622
Interest Income	735,796	0	0	735,796

Source: Author's calculation(2013)

Results of Bank Rakyat Indonesia

Technical efficiency is 1, but there is slack movement for Net Fixed Capital which indicate the bank investment in term of Net Fixed Capital higher than the peers' by 779,455.

Table 4.23
CCR Potential Improvements of Bank Rakyat Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	450,166,383	0	0	450,166,383
Net Fixed Capital	2,804,366	0	-779,455	2,024,911
Personnel Costs	9,605,547	0	0	9,605,547
Interest Expenses	13,126,655	0	0	13,126,655
Outputs:				
Loans	336,081,042	0	0	336,081,042
Interest Income	49,610,421	0	0	49,610,421

Source: Author's calculation(2013)

Results of Bank Tabungan Negara

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.24
CCR Potential Improvements of Bank Tabungan Negara

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	80,667,983	0	0	80,667,983
Net Fixed Capital	1,582,812	0	0	1,582,812
Personnel Costs	1,486,938	0	0	1,486,938
Interest Expenses	4,091,760	0	0	4,091,760
Outputs:				
Loans	80,430,049	0	0	80,430,049
Interest Income	8,818,579	0	0	8,818,579

Source: Author's calculation(2013)

Results of Bank Danamon

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.25
CCR Potential Improvements of Bank Danamon

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	89,897,866	0	0	89,897,866
Net Fixed Capital	2,095,756	0	0	2,095,756
Personnel Costs	5,163,381	0	0	5,163,381
Interest Expenses	5,936,173	0	0	5,936,173
Outputs:				
Loans	90,828,149	0	0	90,828,149
Interest Income	18,858,281	0	0	18,858,281

Source: Author's calculation(2013)

Results of BPD Jawa Barat dan Banten

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.26
CCR Potential Improvements of BPD Jawa Barat dan Banten

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	47,632,863	0	0	47,632,863
Net Fixed Capital	734,873	0	0	734,873
Personnel Costs	967,340	0	0	967,340
Interest Expenses	3,140,311	0	0	3,140,311
Outputs:				
Loans	34,768,723	0	0	34,768,723
Interest Income	6,795,686	0	0	6,795,686

Source: Author's calculation(2013)

Results of BPD Jawa Timur

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.27
CCR Potential Improvements of BPD Jawa Timur

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	22,209,673	0	0	22,209,673
Net Fixed Capital	203,609	0	0	203,609
Personnel Costs	495,412	0	0	495,412
Interest Expenses	904,646	0	0	904,646
Outputs:				
Loans	18,300,663	0	0	18,300,663
Interest Income	2,883,065	0	0	2,883,065

Source: Author's calculation(2013)

Results of Bank Kesawan

Technical efficiency is 91.80%, and the necessary movement in amounts for each variable is presented in table 4.28 below, for Customer Deposits should be reduced by 297,816. Net Fixed Capital should be reduced by 73,679. Personnel costs should be reduced by 98,395. Interest Expenses should be reduced by 13,431. In regards to outputs, Interest Income should be targeted by 23,243.

Table 4.28
CCR Potential Improvements of Bank Kesawan

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	3,633,084	-297,816	0	3,335,268
Net Fixed Capital	118,302	-9,698	-63,981	44,624
Personnel Costs	161,441	-13,234	-85,161	63,046
Interest Expenses	163,850	-13,431	0	150,419
Outputs:				
Loans	3,168,908	0	0	3,168,908
Interest Income	336,359	0	23,243	359,602

Source: Author's calculation(2013)

Results of Bank Mandiri

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.29
CCR Potential Improvements of Bank Mandiri

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	442,837,863	0	0	442,837,863
Net Fixed Capital	7,002,690	0	0	7,002,690
Personnel Costs	8,045,716	0	0	8,045,716
Interest Expenses	15,019,850	0	0	15,019,850
Outputs:				
Loans	370,570,356	0	0	370,570,356
Interest Income	27,530,592	0	0	27,530,592

Source: Author's calculation(2013)

Results of Bank Bumi Arta

Technical efficiency is 88.16%, and the necessary movement in amounts for each variable is presented in table 4.30 below, for Customer Deposits should be reduced by 340,320. Net Fixed Capital should be reduced by 107,015. Personnel costs should be reduced by 9,271. Interest Expenses should be reduced by 14,090.

Table 4.30
CCR Potential Improvements of Bank Bumi Arta

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	2,874,841	-340,320	0	2,534,521
Net Fixed Capital	133,556	-15,810	-91,205	26,541
Personnel Costs	73,524	-8,704	-567	64,253
Interest Expenses	119,025	-14,090	0	104,935
Outputs:				
Loans	2,225,685	0	0	2,225,685
Interest Income	311,555	0	0	311,555

Source: Author's calculation(2013)

Results of Bank CIMB Niaga

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.31
CCR Potential Improvements of Bank CIMB Niaga

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	151,015,119	0	0	151,015,119
Net Fixed Capital	1,660,505	0	0	1,660,505
Personnel Costs	2,881,704	0	0	2,881,704
Interest Expenses	6,486,352	0	0	6,486,352
Outputs:				
Loans	140,776,159	0	0	140,776,159
Interest Income	16,195,571	0	0	16,195,571

Source: Author's calculation(2013)

Results of Bank International Indonesia

Technical efficiency is 93.02%, and the necessary movement in amounts for each variable is presented in table 4.32 below, for Customer Deposits should be reduced by 5,993,923. Net Fixed Capital should be reduced by 71,026. Personnel costs should be reduced by 451,836. Interest Expenses should be reduced by 290,736.

Table 4.32
CCR Potential Improvements of Bank International Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	85,946,647	-5,993,923	0	79,952,724
Net Fixed Capital	1,018,434	-71,026	0	947,408
Personnel Costs	2,244,098	-156,504	-295,332	1,792,263
Interest Expenses	4,168,848	-290,736	0	3,878,112
Outputs:				
Loans	75,035,586	0	0	75,035,586
Interest Income	9,482,583	0	0	9,482,583

Source: Author's calculation(2013)

Results of Bank Permata

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.33
CCR Potential Improvements of Bank Permata

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	104,914,477	0	0	104,914,477
Net Fixed Capital	749,314	0	0	749,314
Personnel Costs	1,939,294	0	0	1,939,294
Interest Expenses	4,377,456	0	0	4,377,456
Outputs:				
Loans	93,705,893	0	0	93,705,893
Interest Income	9,185,865	0	0	9,185,865

Source: Author's calculation(2013)

Results of Bank Sinar Mas

Technical efficiency is 91.06%, and the necessary movement in amounts for each variable is presented in table 4.34 below, for Customer Deposits should be reduced by 1,149,310. Net Fixed Capital should be reduced by 308,829. Personnel costs should be reduced by 20,292. Interest Expenses should be reduced by 60,000.

Table 4.34
CCR Potential Improvements of Bank Sinar Mas

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	12,860,714	-1,149,310	0	11,711,404
Net Fixed Capital	494,110	-44,157	-264,672	185,281
Personnel Costs	227,061	-20,292	0	206,769
Interest Expenses	671,392	-60,000	0	611,392
Outputs:				
Loans	10,293,836	0	0	10,293,836
Interest Income	1,451,584	0	0	1,451,584

Source: Author's calculation(2013)

Results of Bank Swadesi

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.35
CCR Potential Improvements of Bank Swadesi

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	1,972,256	0	0	1,972,256
Net Fixed Capital	17,687	0	0	17,687
Personnel Costs	28,739	0	0	28,739
Interest Expenses	106,250	0	0	106,250
Outputs:				
Loans	1,825,422	0	0	1,825,422
Interest Income	203,913	0	0	203,913

Source: Author's calculation(2013)

Results of Bank Tabungan Pensiunan Nasional

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.34
CCR Potential Improvements of Bank Tabungan Pensiunan Nasional

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	45,072,603	0	0	45,072,603
Net Fixed Capital	489,118	0	0	489,118
Personnel Costs	1,853,571	0	0	1,853,571
Interest Expenses	3,221,858	0	0	3,221,858
Outputs:				
Loans	38,995,514	0	0	38,995,514
Interest Income	9,292,972	0	0	9,292,972

Source: Author's calculation(2013)

Results of Bank Victoria International

Technical efficiency is 99.12%, and the necessary movement in amounts for each variable is presented in table 4.37 below, for Customer Deposits should be reduced by 1,462,816. Net Fixed Capital should be reduced by 1,729. Personnel costs should be reduced by 985. Interest Expenses should be reduced by 193,401. In regards to outputs, the bank should target additional Loans by 1,423,161.

Table 4.37
CCR Potential Improvements of Bank Victoria International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	11,515,732	-100,879	-1,361,937	10,052,916
Net Fixed Capital	197,375	-1,729	0	195,646
Personnel Costs	112,406	-985	0	111,421
Interest Expenses	778,518	-6,820	-186,581	585,117
Outputs:				
Loans	7,580,957	0	1,423,161	9,004,118
Interest Income	1,117,271	0	0	1,117,271

Source: Author's calculation(2013)

Results of Bank Arta Graha International

Technical efficiency is 92.60%, and the necessary movement in amounts for each variable is presented in table 4.38 below, for Customer Deposits should be reduced by 1,288,575. Net Fixed Capital should be reduced by 410,784. Personnel costs should be reduced by 20,779. Interest Expenses should be reduced by 141,845.

Table 4.38
CCR Potential Improvements of Bank Arta Graha International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	17,399,114	-1,288,575	0	16,110,539
Net Fixed Capital	726,714	-53,820	-356,964	315,930
Personnel Costs	280,575	-20,779	0	259,796
Interest Expenses	1,033,193	-76,518	-65,327	891,348
Outputs:				
Loans	15,201,934	0	0	15,201,934
Interest Income	1,859,222	0	0	1,859,222

Source: Author's calculation(2013)

Results of Bank Mayapada International

Technical efficiency is 86.40%, and the necessary movement in amounts for each variable is presented in table 4.39 below, for Customer Deposits should be reduced by 2,061,733. Net Fixed Capital should be reduced by 328,154. Personnel costs should be reduced by 35,321. Interest Expenses should be reduced by 111,671.

Table 4.39
CCR Potential Improvements of Bank Mayapada International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	15,160,619	-2,061,733	0	13,098,886
Net Fixed Capital	565,614	-76,919	-251,235	237,460
Personnel Costs	259,726	-35,321	0	224,405
Interest Expenses	821,154	-111,671	0	709,483
Outputs:				
Loans	12,079,060	0	0	12,079,060
Interest Income	1,563,359	0	0	1,563,359

Source: Author's calculation(2013)

Results of Bank Windu Kentjana International

Technical efficiency is 85.83%, and the necessary movement in amounts for each variable is presented in table 4.40 below, for Customer Deposits should be reduced by 793,149. Net Fixed Capital should be reduced by 25,229. Personnel costs should be reduced by 15,157. Interest Expenses should be reduced by 58,612.

Table 4.40
CCR Potential Improvements of Bank Windu Kentjana International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	5,598,481	-793,149	0	4,805,332
Net Fixed Capital	114,923	-16,281	-8,948	89,694
Personnel Costs	106,988	-15,157	0	91,831
Interest Expenses	330,137	-46,771	-11,841	271,525
Outputs:				
Loans	4,525,245	0	0	4,525,245
Interest Income	598,070	0	0	598,070

Source: Author's calculation(2013)

Results of Bank Mega

Technical efficiency is 82.13%, and the necessary movement in amounts for each variable is presented in table 4.41 below, for Customer Deposits should be reduced by 8,983,758. Net Fixed Capital should be reduced by 1,472,011. Personnel costs should be reduced by

208,055. Interest Expenses should be reduced by 400,133. In regards to outputs, the bank should target additional Loans by 7,698,639.

Table 4.41
CCR Potential Improvements of Bank Mega

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	50,268,395	-8,983,758	0	41,284,637
Net Fixed Capital	1,887,302	-337,291	-1,134,720	415,292
Personnel Costs	1,164,165	-208,055	0	956,110
Interest Expenses	2,238,937	-400,133	0	1,838,804
Outputs:				
Loans	26,650,298	0	7,698,639	34,348,937
Interest Income	5,581,049	0	0	5,581,049

Source: Author's calculation(2013)

Results of Bank OCBC NISP

Technical efficiency is 96.09%, and the necessary movement in amounts for each variable is presented in table 4.42 below, for Customer Deposits should be reduced by 2,373,014. Net Fixed Capital should be reduced by 31,304. Personnel costs should be reduced by 83,108. Interest Expenses should be reduced by 92,098. In regards to outputs, the bank should target additional Interest Income by 141,802.

Table 4.42
CCR Potential Improvements of Bank OCBC NISP

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	60,760,680	-2,373,014	0	58,387,666
Net Fixed Capital	801,523	-31,304	0	770,219
Personnel Costs	1,172,793	-45,804	-37,304	1,089,686
Interest Expenses	2,358,155	-92,098	0	2,266,057
Outputs:				
Loans	51,874,088	0	0	51,874,088
Interest Income	4,924,182	0	141,802	5,065,984

Source: Author's calculation(2013)

Results of Bank Pan Indonesia

Technical efficiency is 1, so there are no necessary movements in amounts for the variables; in this case the projected value is the same as the original actual value of the variables.

Table 4.43
CCR Potential Improvements of Bank Pan Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	102,695,260	0	0	102,695,260
Net Fixed Capital	2,114,288	0	0	2,114,288
Personnel Costs	1,099,771	0	0	1,099,771
Interest Expenses	6,024,990	0	0	6,024,990
Outputs:				
Loans	91,651,941	0	0	91,651,941
Interest Income	11,498,857	0	0	11,498,857

Source: Author's calculation(2013)

Results of Bank Himpunan Saudara 1906

Technical efficiency is 93.26%, and the necessary movement in amounts for each variable is presented in table 4.44 below, for Customer Deposits should be reduced by 419,880. Net Fixed Capital should be reduced by 33,671. Personnel costs should be reduced by 8,813. Interest Expenses should be reduced by 24,916.

Table 4.44
CCR Potential Improvements of Bank Himpunan Saudara 1906

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,226,709	-419,880	0	5,806,829
Net Fixed Capital	131,819	-8,889	-24,782	98,148
Personnel Costs	130,690	-8,813	0	121,877
Interest Expenses	369,500	-24,916	0	344,584
Outputs:				
Loans	5,203,977	0	0	5,203,977
Interest Income	801,920	0	0	801,920

Source: Author's calculation(2013)

4.4.2.2 BCC Model

DEA model results for the year 2012 (input oriented DEA under the assumption of Variable Return to Scale):

Table 4.45
Efficiency Scores of The Banks Based On BCC Model

No.	Bank Name	Abbr.	OE	PTE	SE	RTS
1	Bank Agro Niaga	AGRO	1.00000	1.00000	1.00000	Constant
2	Bank ICB Bumi Putera	BABP	0.92854	0.93061	0.99777	Decreasing
3	Bank Capital Indonesia	BACA	0.79299	0.86884	0.91270	Decreasing
4	Bank Ekonomi Raharja	BAEK	0.96028	0.97365	0.98627	Decreasing
5	Bank Central Asia	BBCA	1.00000	1.00000	1.00000	Constant
6	Bank Bukopin	BBKP	0.96799	1.00000	0.96799	Increasing
7	Bank Negara Indonesia	BBNI	0.98522	0.98525	0.99997	Decreasing
8	Bank Nusantara Parahyangan	BBNP	1.00000	1.00000	1.00000	Constant
9	Bank Rakyat Indonesia	BBRI	1.00000	1.00000	1.00000	Constant
10	Bank Tabungan Negara	BBTN	1.00000	1.00000	1.00000	Constant
11	Bank Danamon	BDMN	1.00000	1.00000	1.00000	Constant
12	BPD Jawa Barat dan Banten	BJBR	1.00000	1.00000	1.00000	Constant
13	BPD Jawa Timur	BJTM	1.00000	1.00000	1.00000	Constant
14	Bank Kesawan	BKSW	0.91803	0.98381	0.93313	Decreasing
15	Bank Mandiri	BMRI	1.00000	1.00000	1.00000	Constant
16	Bank Bumi Arta	BNBA	0.88162	1.00000	0.88162	Decreasing
17	Bank CIMB Niaga	BNGA	1.00000	1.00000	1.00000	Constant
18	Bank International Indonesia	BNII	0.93026	0.93351	0.99652	Increasing
19	Bank Permata	BNLI	1.00000	1.00000	1.00000	Constant
20	Bank Sinar Mas	BSIM	0.91063	0.91487	0.99537	Decreasing
21	Bank Swadesi	BSWD	1.00000	1.00000	1.00000	Constant
22	Bank Tabungan Pensiunan Nasional	BTPN	1.00000	1.00000	1.00000	Constant
23	Bank Victoria International	BVIC	0.99124	1.00000	0.99124	Decreasing
24	Bank Arta Graha International	INPC	0.92594	0.92921	0.99648	Decreasing
25	Bank Mayapada International	MAYA	0.86401	0.86790	0.99552	Decreasing
26	Bank Windu Kentjana International	MCOR	0.85833	0.86977	0.98684	Decreasing
27	Bank Mega	MEGA	0.82128	0.83546	0.98303	Increasing
28	Bank OCBC NISP	NISP	0.96095	0.96450	0.99631	Decreasing
29	Bank Pan Indonesia	PNBN	1.00000	1.00000	1.00000	Constant
30	Bank Himpunan Saudara 1906	SDRA	0.93257	0.94610	0.98570	Decreasing
Mean			**0.95433**	**0.96678**	**0.98688**	

Source: Author's calculation(2013)

As shown in table 4.45, based on the assumption of variable return to scale, there are seventeen banks (Bank Agro Niaga, Bank Central Asia, Bank Bukopin , Bank Nusantara

Parahyangan, Bank Rakyat Indonesia, Bank Tabungan Negara, Bank Danamon, BPD Jawa Barat dan Banten, BPD Jawa Timur, Bank Mandiri, Bank Bumi Arta, Bank CIMB Niaga, Bank Permata, Bank Swadesi, Bank Tabungan Pensiunan Nasional, Bank Victoria International, and Bank Pan Indonesia) are considered efficient banks. The other thirteen banks are considered inefficient relative to efficient peers. The relative score of efficiency for the inefficient banks are shown in table 4.45 above. It is also shown that most of banks have either constant or decreasing return to scale. Only three banks (Bank Bukopin, Bank International Indonesia, and Bank Mega) have increasing returns to scale. It's also clear fro the table 4.43 that the inefficiency refers to scale inefficiency; according to DEA results Overall Efficiency (OE) is 95.43%, Pure Technical Efficiency (PTE) is 96.68% and Scale Efficiency is 98.69%.

The improvements for each bank which are necessary to reach the virtual output/input ratio are displayed as the needed movement for each variable (output and input) in order to reach the targeted amount of each output and input variable.

Results of Bank Agro Niaga

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.46.

Table 4.46
BCC Potential Improvement of Bank Agro Niaga

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	450,166,383	0	0	450,166,383
Net Fixed Capital	2,024,911	0	0	2,024,911
Personnel Costs	9,605,547	0	0	9,605,547
Interest Expenses	13,126,655	0	0	13,126,655
Outputs:				
Loans	336,081,042	0	0	336,081,042
Interest Income	49,610,421	0	0	49,610,421

Source: Author's calculation(2013)

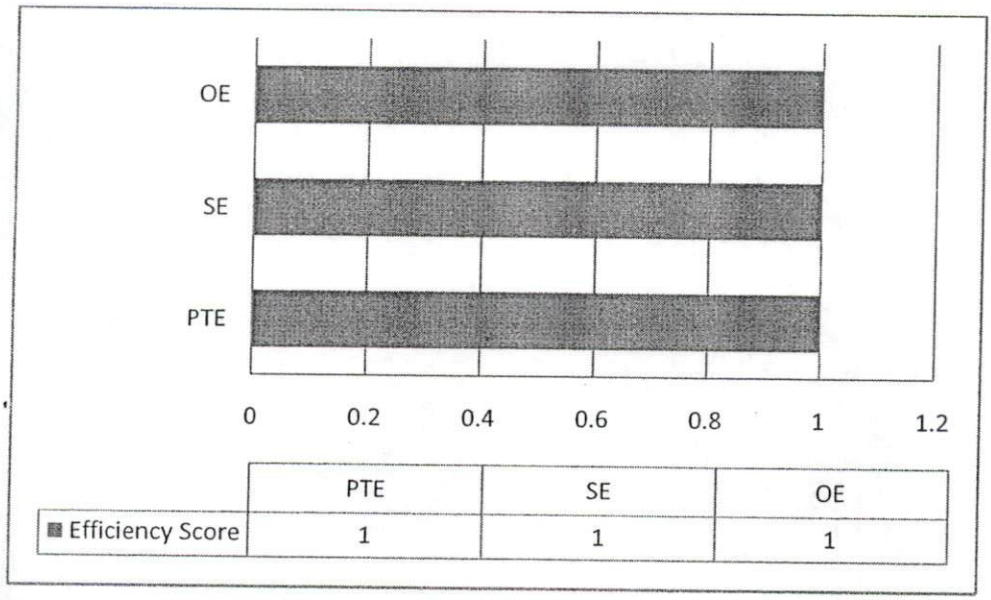

Figure 4.5
PTE, SE, OE scores of Bank Agro Niaga

And from figure 4.5, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank ICB Bumi Putera

Under the assumption of VRS, PTE is 93.06%, Scale efficiency equals to 99.78% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.47
BCC Potential Improvement of Bank ICB Bumi Putera

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,433,765	-446,432	0	5,987,333
Net Fixed Capital	41,023	-2,847	0	38,176
Personnel Costs	180,892	-12,552	-32,073	136,267
Interest Expenses	331,117	-22,976	0	308,141
Outputs:				
Loans	5,149,078	0	0	5,149,078
Interest Income	688,882	0	0	688,882

Source: Author's calculation(2013)

Since PTE is 93.06%, there is necessary movement to reach the efficiency frontier, in the case of Bank ICB Bumi Putera Customer Deposit should be reduced by 446,432. Net Fixed Capital should be reduced by 2,847. Personnel costs should be reduced by 44,625. Interest Expenses should be reduced by 22,976.

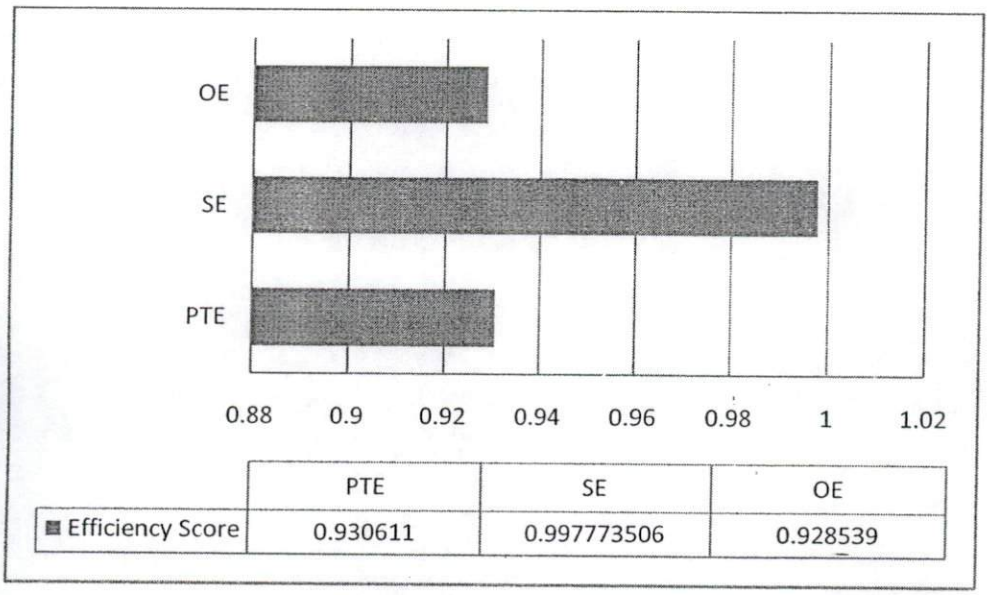

Figure 4.6
PTE, SE, OE scores of Bank ICB Bumi Putera

With regards to the question whether the bank works at its optimal level or not, from figure 4.6 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Capital Indonesia

Under the assumption of VRS, PTE is 86.88%, Scale efficiency equals to 91.27% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.48
BCC Potential Improvement of Bank Capital Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	4,778,019	-626,678	-88,406	4,062,935
Net Fixed Capital	148,955	-19,537	-69,044	60,374
Personnel Costs	57,766	-7,577	0	50,189
Interest Expenses	269,311	-35,322	0	233,989
Outputs:				
Loans	2,813,287	0	755,884	3,569,171
Interest Income	431,486	0	0	431,486

Source: Author's calculation(2013)

Since PTE is 86.88%, there is necessary movement to reach the efficiency frontier, in the case of Bank Capital Indonesia Customer Deposit should be reduced by 715,084. Net Fixed Capital should be reduced by 88,581. Personnel costs should be reduced by 7,577. Interest Expenses should be reduced by 35,322.

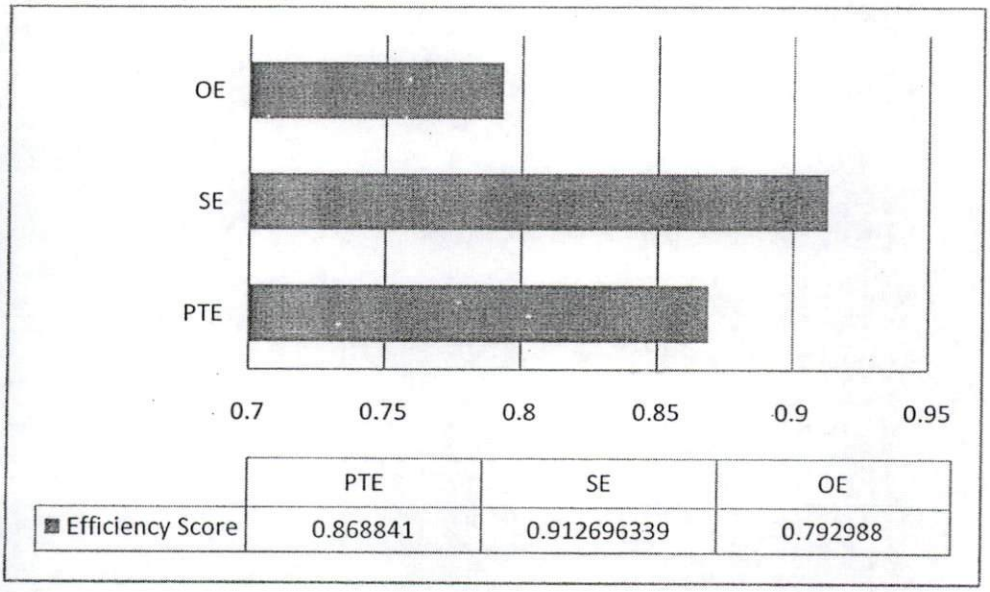

Figure 4.7
PTE, SE, OE scores of Bank Capital Indonesia

With regards to the question whether the bank works at its optimal level or not, from figure 4.7 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main

source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Ekonomi Raharja

Under the assumption of VRS, PTE is 97.36%, Scale efficiency equals to 98.63% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.49
BCC Potential Improvement of Bank Ekonomi Raharja

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	20,960,549	-552,365	0	20,408,184
Net Fixed Capital	239,613	-6,314	0	233,299
Personnel Costs	537,940	-14,176	-148,315	375,448
Interest Expenses	752,305	-19,825	0	732,480
Outputs:				
Loans	17,077,297	0	0	17,077,297
Interest Income	1,710,211	0	324,869	2,035,080

Source: Author's calculation(2013)

Since PTE is 97.36%, there is necessary movement to reach the efficiency frontier, in the case of Bank Ekonomi Raharja Customer Deposit should be reduced by 552,365. Net Fixed Capital should be reduced by 6,314. Personnel costs should be reduced by 162,491. Interest Expenses should be reduced by 19,825. In regards to output, Bank Ekonomi Raharja should target additional Interest Income by 324,869.

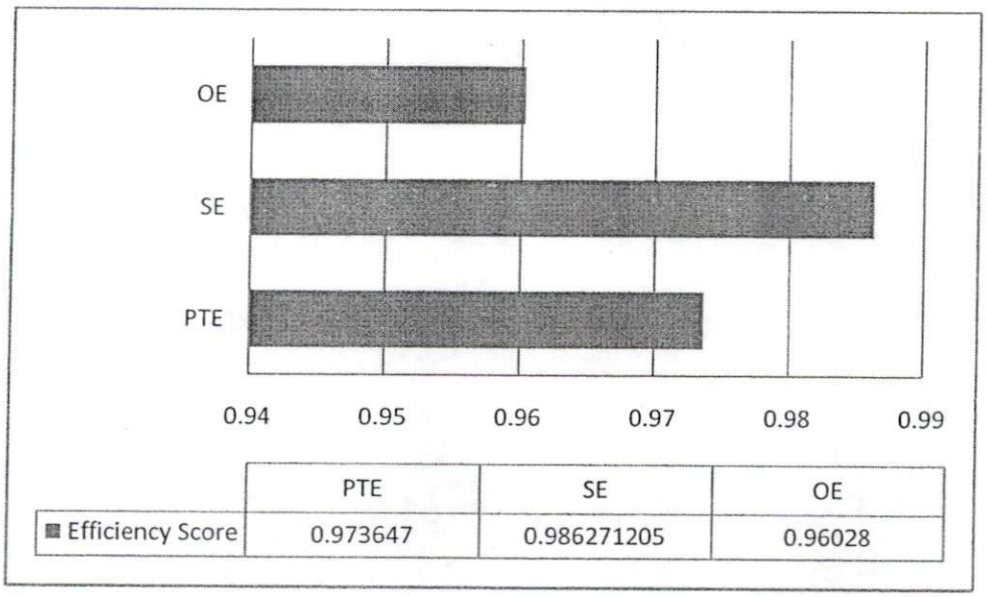

Figure 4.8
PTE, SE, OE scores of Bank Ekonomi Raharja

With regards to the question whether the bank works at its optimal level or not, from figure 4.8 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Central Asia

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.50.

Table 4.50
BCC Potential Improvement of Bank Central Asia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	370,507,012	0	0	370,507,012
Net Fixed Capital	6,406,625	0	0	6,406,625
Personnel Costs	6,154,966	0	0	6,154,966
Interest Expenses	7,647,167	0	0	7,647,167
Outputs:				
Loans	252,760,457	0	0	252,760,457
Interest Income	28,885,290	0	0	28,885,290

Source: Author's calculation(2013)

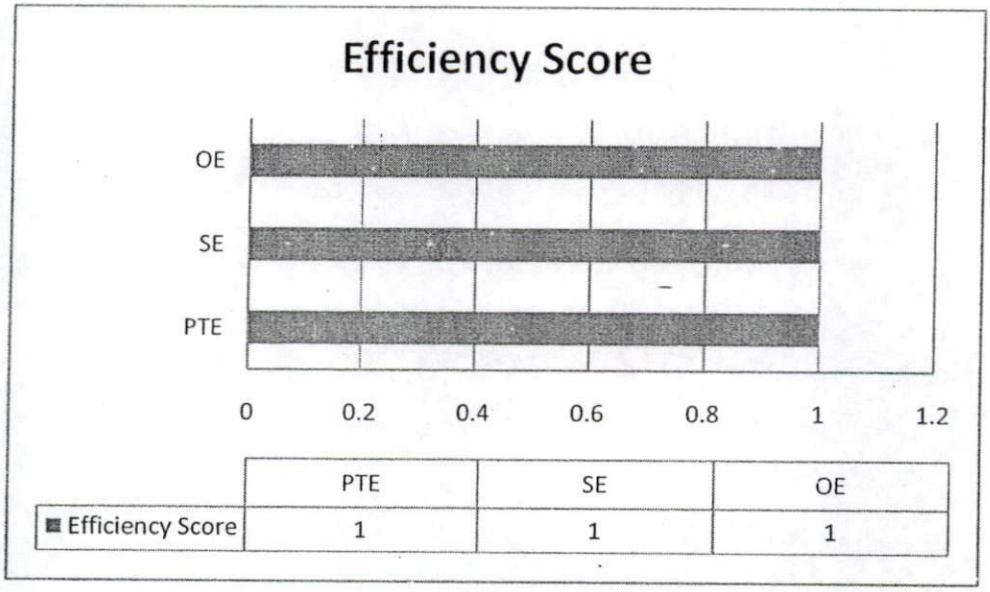

Figure 4.9
PTE, SE, OE scores of Bank Central Asia

And from figure 4.9, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Bukopin

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.51.

Table 4.51
BCC Potential Improvement of Bank Bukopin

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	53,957,758	0	0	53,957,758
Net Fixed Capital	608,075	0	0	608,075
Personnel Costs	720,481	0	0	720,481
Interest Expenses	2,664,675	0	0	2,664,675
Outputs:				
Loans	44,594,681	0	0	44,594,681
Interest Income	5,126,381	0	0	5,126,381

Source: Author's calculation(2013)

With regards to the question whether the bank works at its optimal level or not, from figure 4.10 we can see that the inefficiency in the bank's performance refers to scale inefficiency(the scale efficiency 96.80%). So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was increasing, the scale of this bank could be expanded, and the input then increased to enhance performance, as higher overall efficiency value would be obtained.

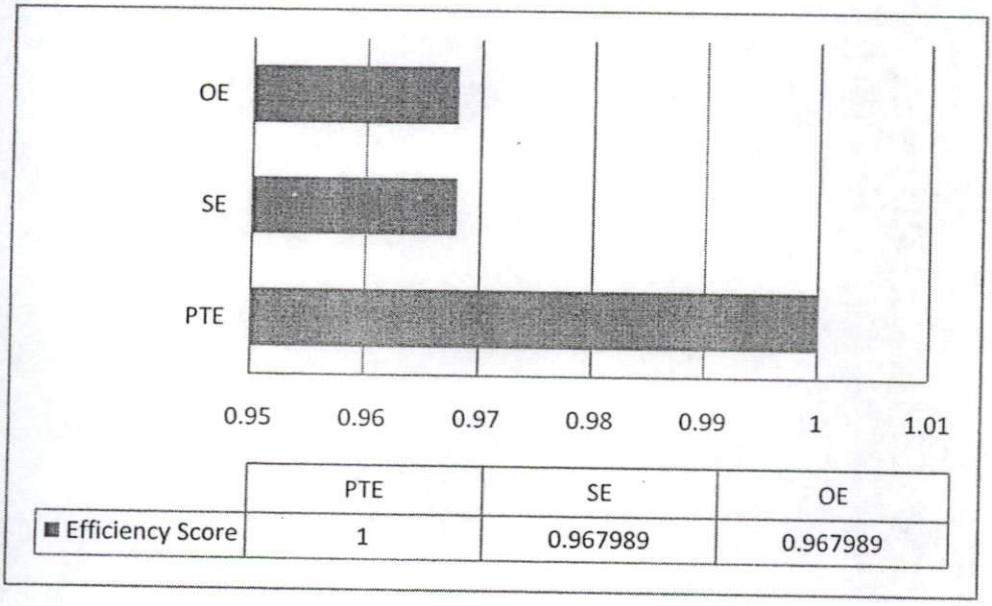

Figure 4.10
PTE, SE, OE scores of Bank Bukopin

The results show increasing returns to scale, which indicate if the bank increase inputs, the outputs will increase also, but with increasing proportion of outputs to inputs.

Results of Bank Negara Indonesia

Under the assumption of VRS, PTE is 98.52%, Scale efficiency equals to 99.99% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.52
BCC Potential Improvement of Bank Negara Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	257,660,841	-3,800,219	0	253,860,622
Net Fixed Capital	4,591,588	-67,721	-877,982	3,645,885
Personnel Costs	5,577,867	-82,268	-992,708	4,502,892
Interest Expenses	7,245,524	-106,864	0	7,138,660
Outputs:				
Loans	193,834,670	0	0	193,834,670
Interest Income	22,704,515	0	0	22,704,515

Source: Author's calculation(2013)

Since PTE is 98.52%, there is necessary movement to reach the efficiency frontier, in the case of Bank Negara Indonesia Customer Deposit should be reduced by 3,800,219. Net Fixed Capital should be reduced by 945,703. Personnel costs should be reduced by 1,004,976. Interest Expenses should be reduced by 19,825.

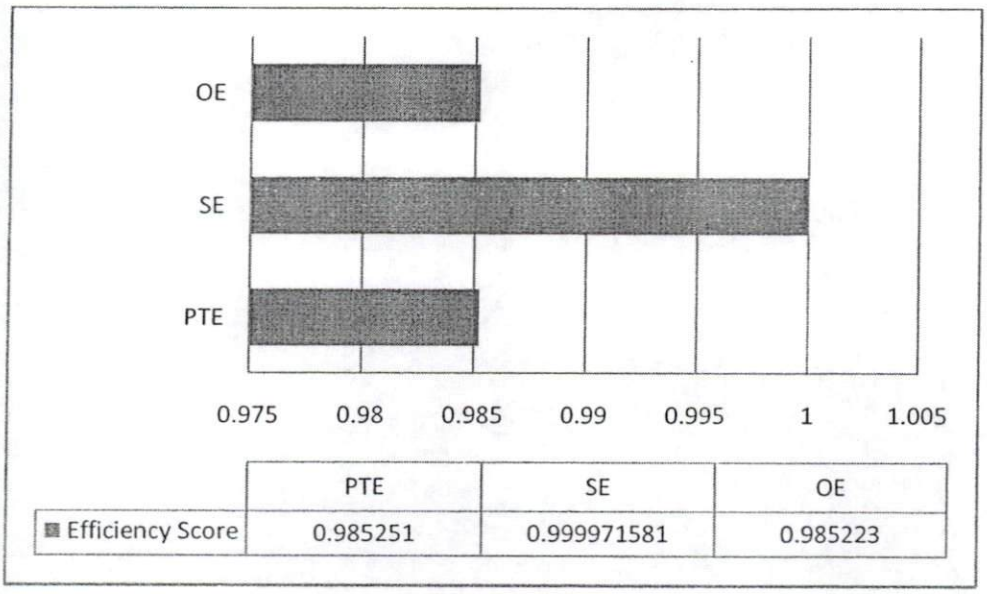

Figure 4.11
PTE, SE, OE scores of Bank Negara Indonesia

With regards to the question whether the bank works at its optimal level or not, from figure 4.11 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Nusantara Parahyangan

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.53.

Table 4.53
BCC Potential Improvement of Bank Nusantara Parahyangan

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,925,186	0	0	6,925,186
Net Fixed Capital	36,009	0	0	36,009
Personnel Costs	153,001	0	0	153,001
Interest Expenses	347,507	0	0	347,507
Outputs:				
Loans	5,884,622	0	0	5,884,622
Interest Income	735,796	0	0	735,796

Source: Author's calculation(2013)

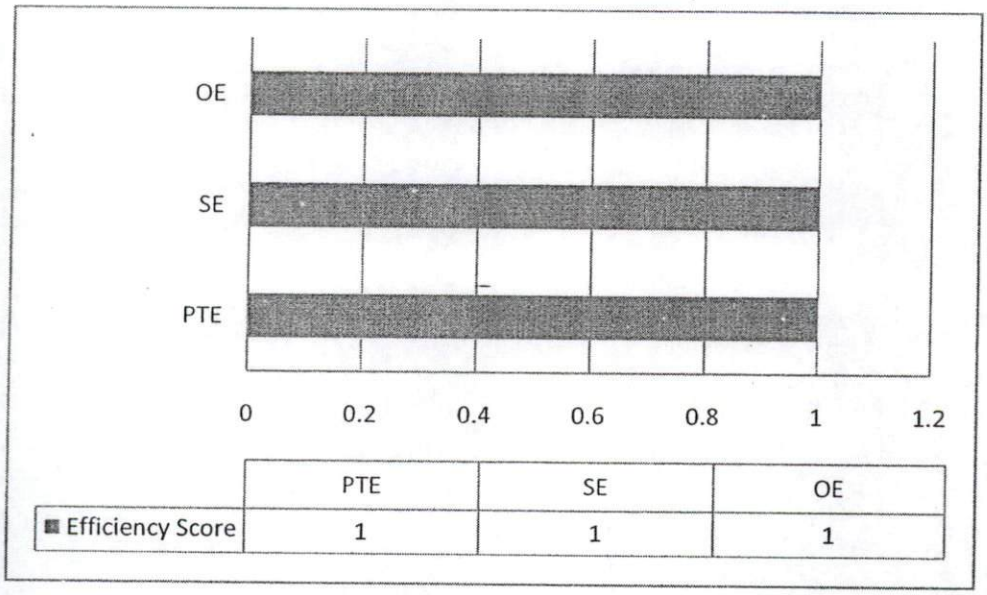

Figure 4.12
PTE, SE, OE scores of Bank Nusantara Parahyangan

And from figure 4.12, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Rakyat Indonesia

Under the assumption of VRS, PTE is 100% and there is slack movement for Net Fixed Capital. It means Bank Rakyat Indonesia would still achieve 100% Pure Technical Efficiency when reducing its Net Fixed Assets by 779,455.

Table 4.54
BCC Potential Improvement of Bank Rakyat Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	450,166,383	0	0	450,166,383
Net Fixed Capital	2,804,366	0	-779,455	2,024,911
Personnel Costs	9,605,547	0	0	9,605,547
Interest Expenses	13,126,655	0	0	13,126,655
Outputs:				
Loans	336,081,042	0	0	336,081,042
Interest Income	49,610,421	0	0	49,610,421

Source: Author's calculation(2013)

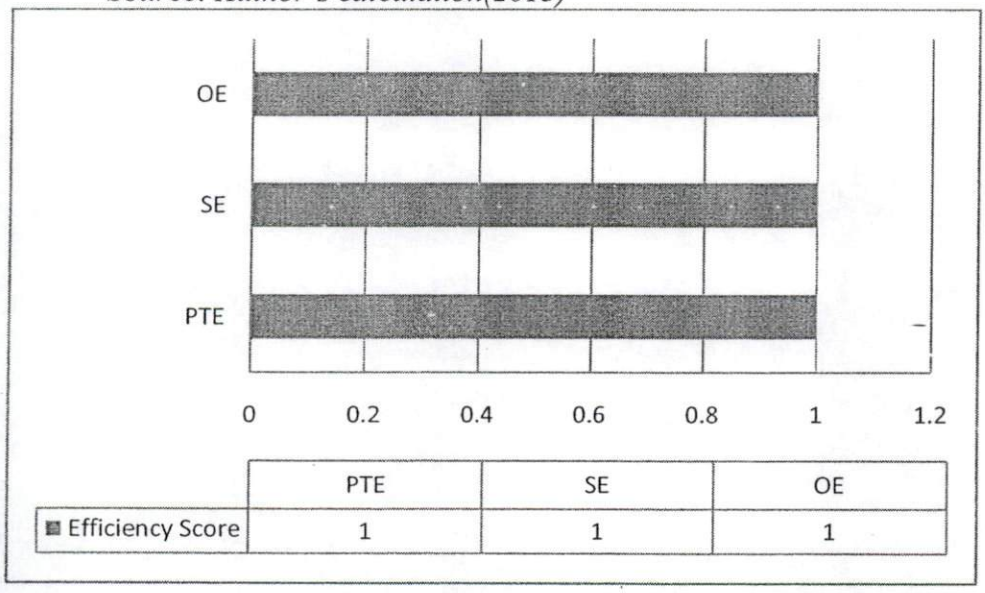

Figure 4.13
PTE, SE, OE scores of Bank Rakyat Indonesia

And from figure 4.13, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Tabungan Negara

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.55.

Table 4.55
BCC Potential Improvement of Bank Tabungan Negara

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	80,667,983	0	0	80,667,983
Net Fixed Capital	1,582,812	0	0	1,582,812
Personnel Costs	1,486,938	0	0	1,486,938
Interest Expenses	4,091,760	0	0	4,091,760
Outputs:				
Loans	80,430,049	0	0	80,430,049
Interest Income	8,818,579	0	0	8,818,579

Source: Author's calculation(2013)

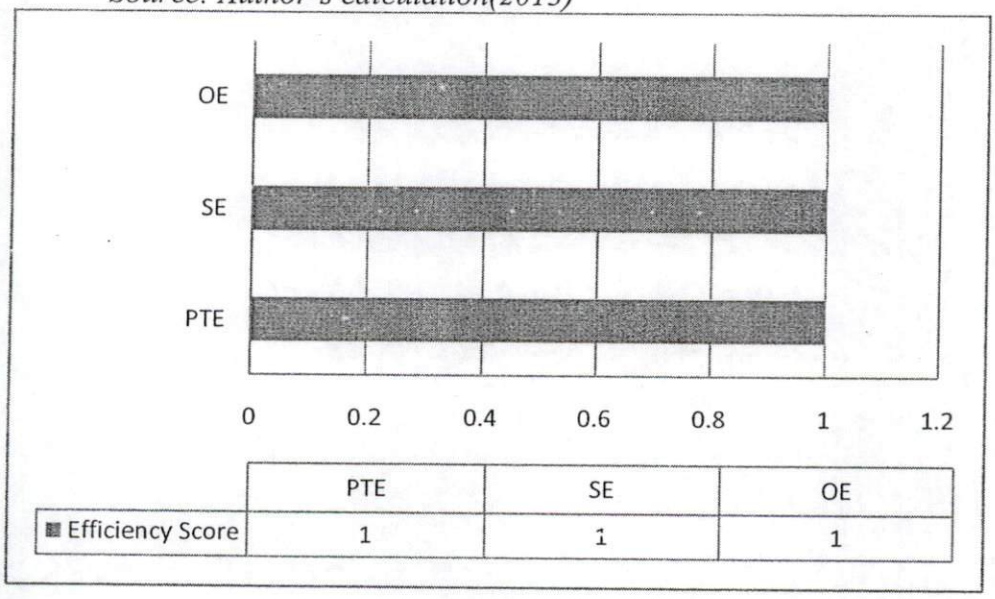

Figure 4.14
PTE, SE, OE scores of Bank Tabungan Negara

And from figure 4.14, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Danamon

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.56.

Table 4.56
BCC Potential Improvement of Bank Danamon

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	89,897,866	0	0	89,897,866
Net Fixed Capital	2,095,756	0	0	2,095,756
Personnel Costs	5,163,381	0	0	5,163,381
Interest Expenses	5,936,173	0	0	5,936,173
Outputs:				
Loans	90,828,149	0	0	90,828,149
Interest Income	18,858,281	0	0	18,858,281

Source: Author's calculation(2013)

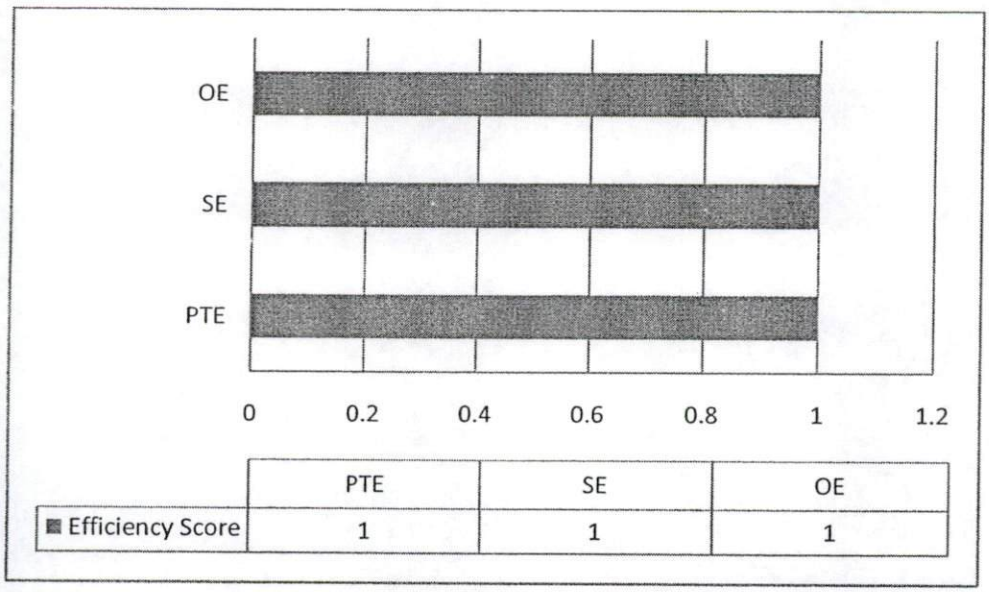

Figure 4.15
PTE, SE, OE scores of Bank Danamon

And from figure 4.15, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of BPD Jawa Barat dan Banten

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.57.

Table 4.57
BCC Potential Improvement of BPD Jawa Barat dan Banten

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	47,632,863	0	0	47,632,863
Net Fixed Capital	734,873	0	0	734,873
Personnel Costs	967,340	0	0	967,340
Interest Expenses	3,140,311	0	0	3,140,311
Outputs:				
Loans	34,768,723	0	0	34,768,723
Interest Income	6,795,686	0	0	6,795,686

Source: Author's calculation(2013)

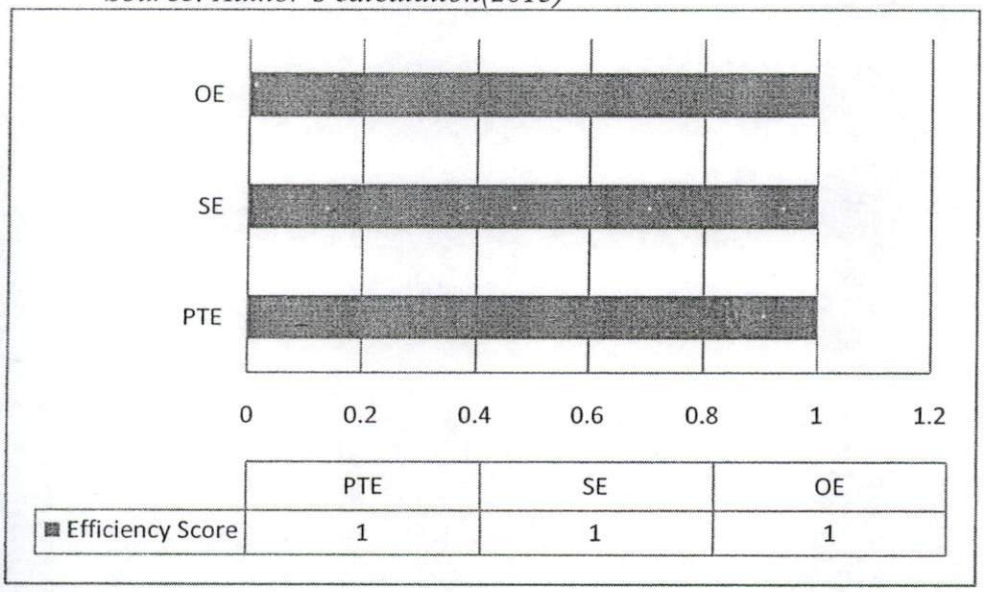

Figure 4.16
PTE, SE, OE scores of BPD Jawa Barat dan Banten

And from figure 4.16, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of BPD Jawa Timur

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.58.

Table 4.58
BCC Potential Improvement of BPD Jawa Timur

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	22,209,673	0	0	22,209,673
Net Fixed Capital	203,609	0	0	203,609
Personnel Costs	495,412	0	0	495,412
Interest Expenses	904,646	0	0	904,646
Outputs:				
Loans	18,300,663	0	0	18,300,663
Interest Income	2,883,065	0	0	2,883,065

Source: Author's calculation(2013)

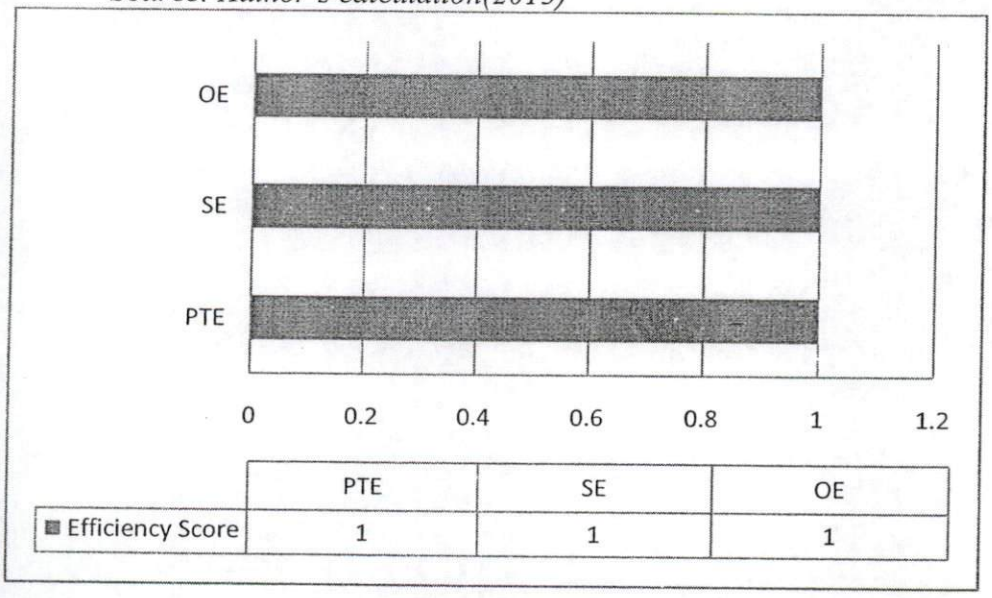

Figure 4.17
PTE, SE, OE scores of BPD Jawa Timur

And from figure 4.17, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Kesawan

Under the assumption of VRS, PTE is 98.38%, Scale efficiency equals to 93.31% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.59
BCC Potential Improvement of Bank Kesawan

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	3,633,084	-58,821	0	3,574,263
Net Fixed Capital	118,302	-1,915	-75,725	40,661
Personnel Costs	161,441	-2,614	-100,924	57,903
Interest Expenses	163,850	-2,653	0	161,197
Outputs:				
Loans	3,168,908	0	0	3,168,908
Interest Income	336,359	0	0	336,359

Source: Author's calculation(2013)

Since PTE is 98.38%, there is necessary movement to reach the efficiency frontier, in the case of Bank Kesawan Customer Deposit should be reduced by 58,821. Net Fixed Capital should be reduced by 77,640. Personnel costs should be reduced by 103,538. Interest Expenses should be reduced by 2,653.

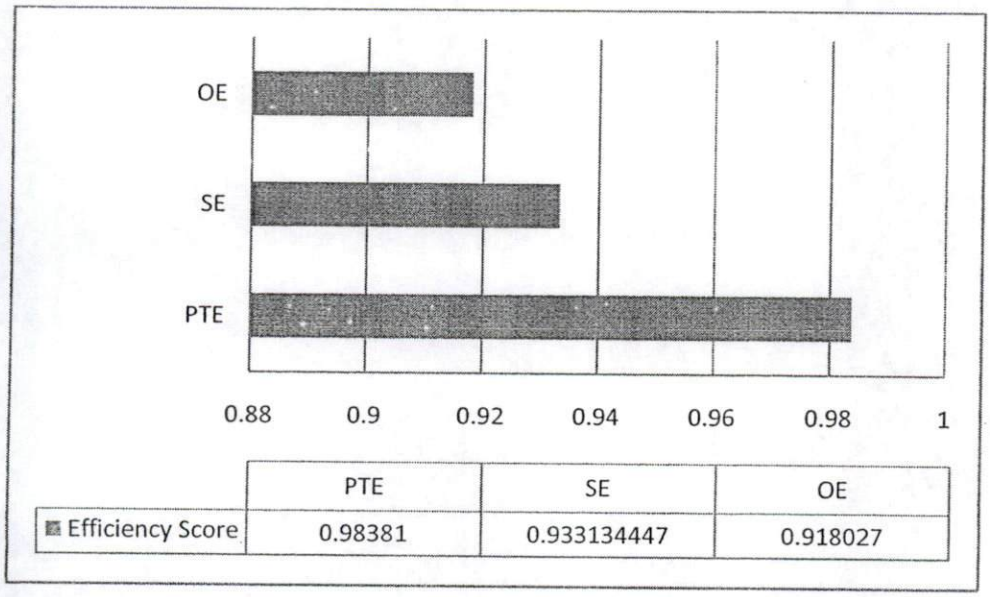

Figure 4.18
PTE, SE, OE scores of Bank Kesawan

With regards to the question whether the bank works at its optimal level or not, from figure 4.18 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main

source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Mandiri

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.60.

Table 4.60
BCC Potential Improvement of Bank Mandiri

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	442,837,863	0	0	442,837,863
Net Fixed Capital	7,002,690	0	0	7,002,690
Personnel Costs	8,045,716	0	0	8,045,716
Interest Expenses	15,019,850	0	0	15,019,850
Outputs:				
Loans	370,570,356	0	0	370,570,356
Interest Income	27,530,592	0	0	27,530,592

Source: Author's calculation(2013)

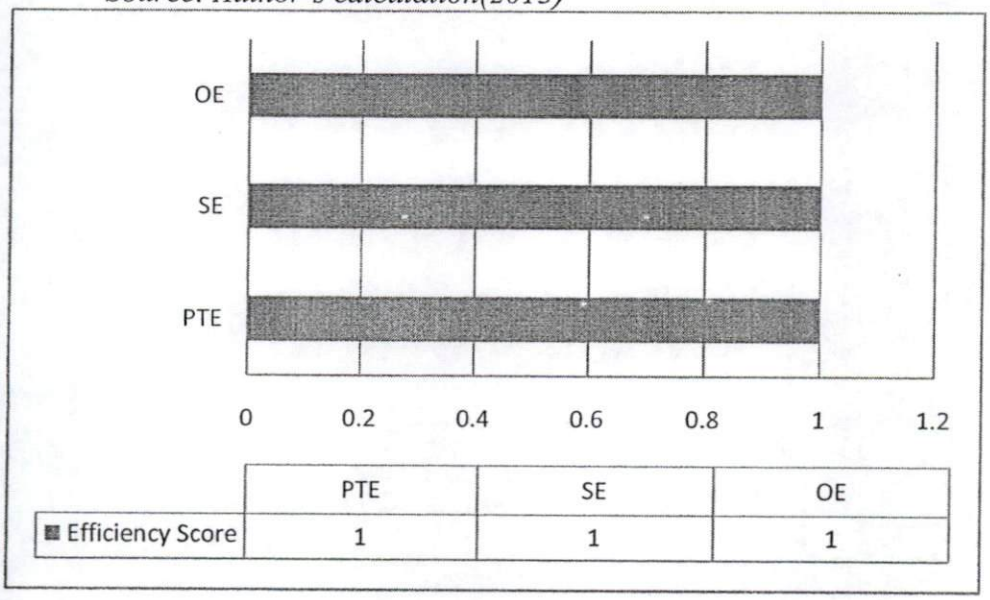

Figure 4.19
PTE, SE, OE scores of Bank Mandiri

And from figure 4.19, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Bumi Arta

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.61.

Table 4.61
BCC Potential Improvement of Bank Bumi Arta

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	2,874,841	0	0	2,874,841
Net Fixed Capital	133,556	0	0	133,556
Personnel Costs	73,524	0	0	73,524
Interest Expenses	119,025	0	0	119,025
Outputs:				
Loans	2,225,685	0	0	2,225,685
Interest Income	311,555	0	0	311,555

Source: Author's calculation(2013)

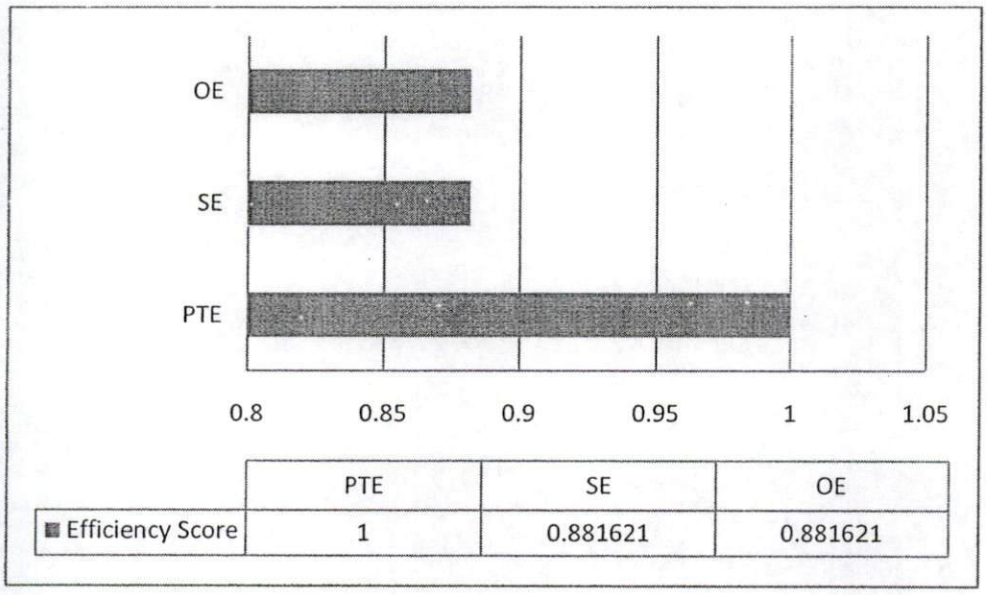

Figure 4.20
PTE, SE, OE scores of Bank Bumi Arta

With regards to the question whether the bank works at its optimal level or not, from figure 4.11 we can see that Scale Efficiency were smaller than one. It means the inefficiency in the

bank's performance was caused scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank CIMB Niaga

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.62.

Table 4.62
BCC Potential Improvement of Bank CIMB Niaga

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	151,015,119	0	0	151,015,119
Net Fixed Capital	1,660,505	0	0	1,660,505
Personnel Costs	2,881,704	0	0	2,881,704
Interest Expenses	6,486,352	0	0	6,486,352
Outputs:				
Loans	140,776,159	0	0	140,776,159
Interest Income	16,195,571	0	0	16,195,571

Source: Author's calculation(2013)

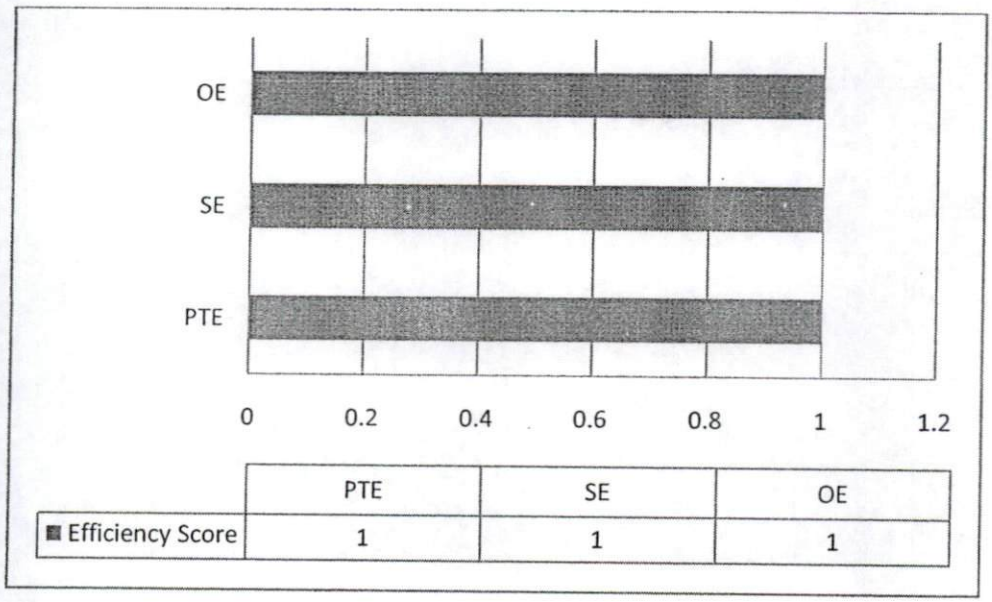

Figure 4.21
PTE, SE, OE scores of Bank CIMB Niaga

And from figure 4.21, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank International Indonesia

Under the assumption of VRS, PTE is 93.35%, Scale efficiency equals to 99.65% and the results show increasing return to scale. It means if the bank increase inputs, the output will increase also, but with the increasing proportion of outputs to inputs.

Table 4.63
BCC Potential Improvement of Bank International Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	85,946,647	-5,714,514	0	80,232,133
Net Fixed Capital	1,018,434	-67,715	0	950,719
Personnel Costs	2,244,098	-149,208	-282,293	1,812,597
Interest Expenses	4,168,848	-277,183	-219,950	3,671,715
Outputs:				
Loans	75,035,586	0	0	75,035,586
Interest Income	9,482,583	0	0	9,482,583

Source: Author's calculation(2013)

Since PTE is 93.35%, there is necessary movement to reach the efficiency frontier, in the case of Bank International Indonesia Customer Deposit should be reduced by 5,714,514. Net Fixed Capital should be reduced by 67,715. Personnel costs should be reduced by 431,501. Interest Expenses should be reduced by 497,133.

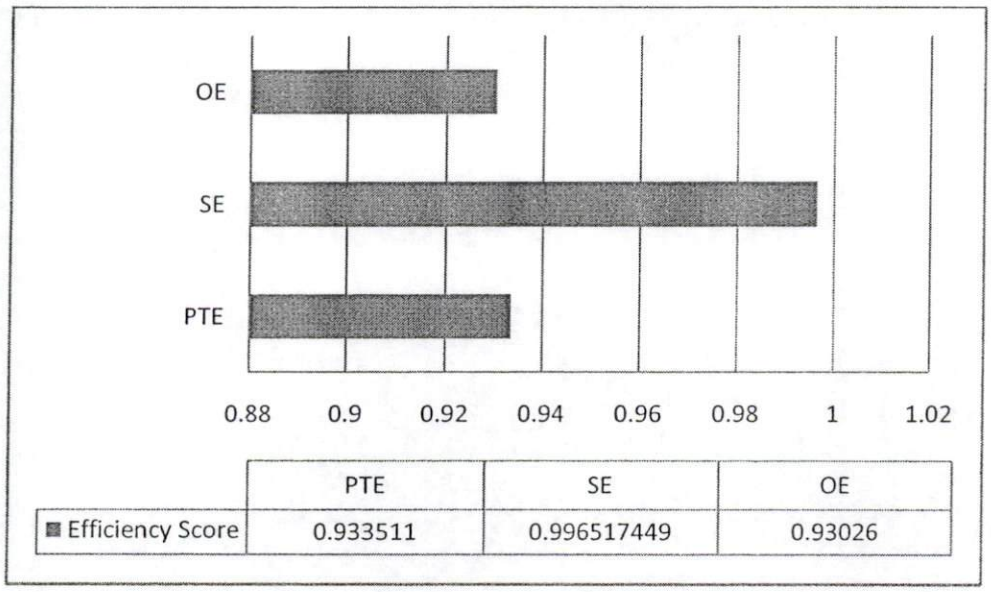

Figure 4.22
PTE, SE, OE scores of Bank International Indonesia

With regards to the question whether the bank works at its optimal level or not, from figure 4.22 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was increasing, the bank could increase in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Permata

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.64.

Table 4.64
BCC Potential Improvement of Bank Permata

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	104,914,477	0	0	104,914,477
Net Fixed Capital	749,314	0	0	749,314
Personnel Costs	1,939,294	0	0	1,939,294
Interest Expenses	4,377,456	0	0	4,377,456
Outputs:				
Loans	93,705,893	0	0	93,705,893
Interest Income	9,185,865	0	0	9,185,865

Source: Author's calculation(2013)

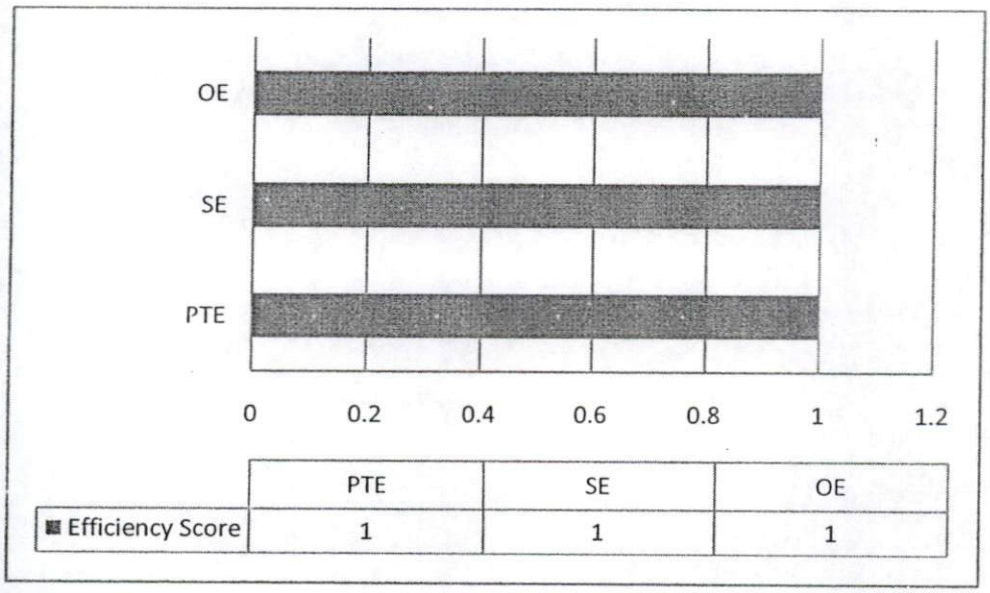

Figure 4.23
PTE, SE, OE scores of Bank Permata

And from figure 4.23, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Sinar Mas

Under the assumption of VRS, PTE is 91.49%, Scale efficiency equals to 99.54% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.65
BCC Potential Improvement of Bank Sinar Mas

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	12,860,714	-1,094,807	0	11,765,907
Net Fixed Capital	494,110	-42,063	-282,638	169,409
Personnel Costs	227,061	-19,329	0	207,732
Interest Expenses	671,392	-57,154	0	614,238
Outputs:				
Loans	10,293,836	0	0	10,293,836
Interest Income	1,451,584	0	0	1,451,584

Source: Author's calculation(2013)

Since PTE is 91.49%, there is necessary movement to reach the efficiency frontier, in the case of Bank Sinar Mas Customer Deposit should be reduced by 1,094,807. Net Fixed Capital should be reduced by 324,701. Personnel costs should be reduced by 19,329. Interest Expenses should be reduced by 57,154.

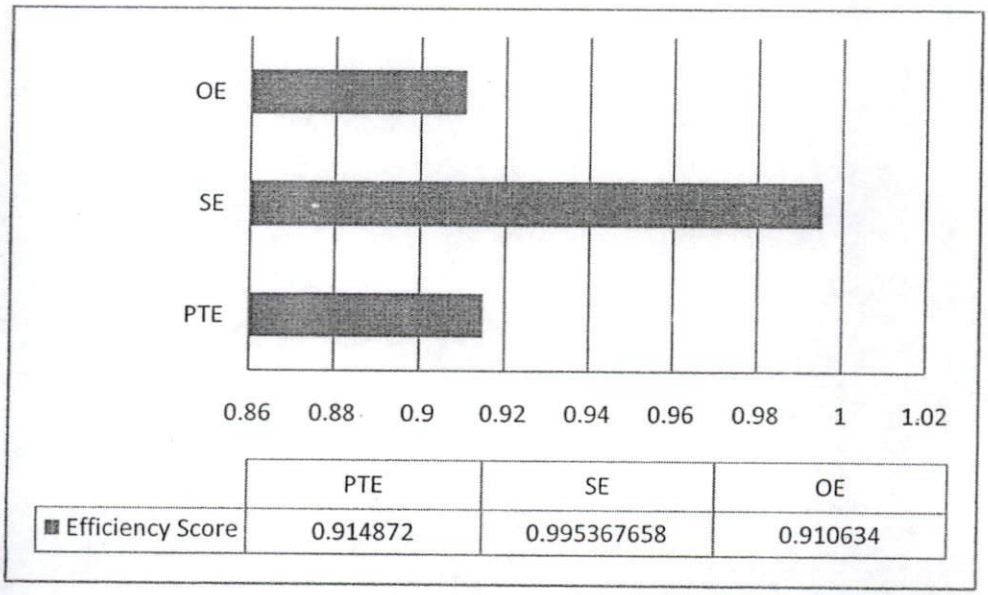

Figure 4.24
PTE, SE, OE scores of Bank Sinar Mas

With regards to the question whether the bank works at its optimal level or not, from figure 4.24 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that

the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Swadesi

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.66.

Table 4.66
BCC Potential Improvement of Bank Swadesi

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	1,972,256	0	0	1,972,256
Net Fixed Capital	17,687	0	0	17,687
Personnel Costs	28,739	0	0	28,739
Interest Expenses	106,250	0	0	106,250
Outputs:				
Loans	1,825,422	0	0	1,825,422
Interest Income	203,913	0	0	203,913

Source: Author's calculation(2013)

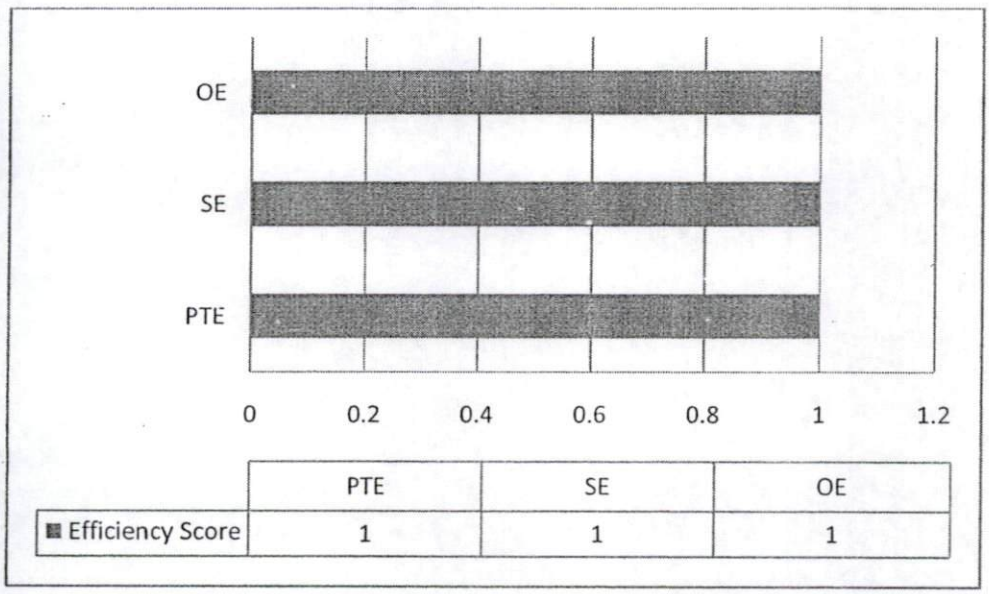

Figure 4.25
PTE, SE, OE scores of Bank Swadesi

And from figure 4.25, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Tabungan Pensiunan Nasional

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.67.

Table 4.67
BCC Potential Improvement of Bank Tabungan Pensiunan Nasional

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	45,072,603	0	0	45,072,603
Net Fixed Capital	489,118	0	0	489,118
Personnel Costs	1,853,571	0	0	1,853,571
Interest Expenses	3,221,858	0	0	3,221,858
Outputs:				
Loans	38,995,514	0	0	38,995,514
Interest Income	9,292,972	0	0	9,292,972

Source: Author's calculation(2013)

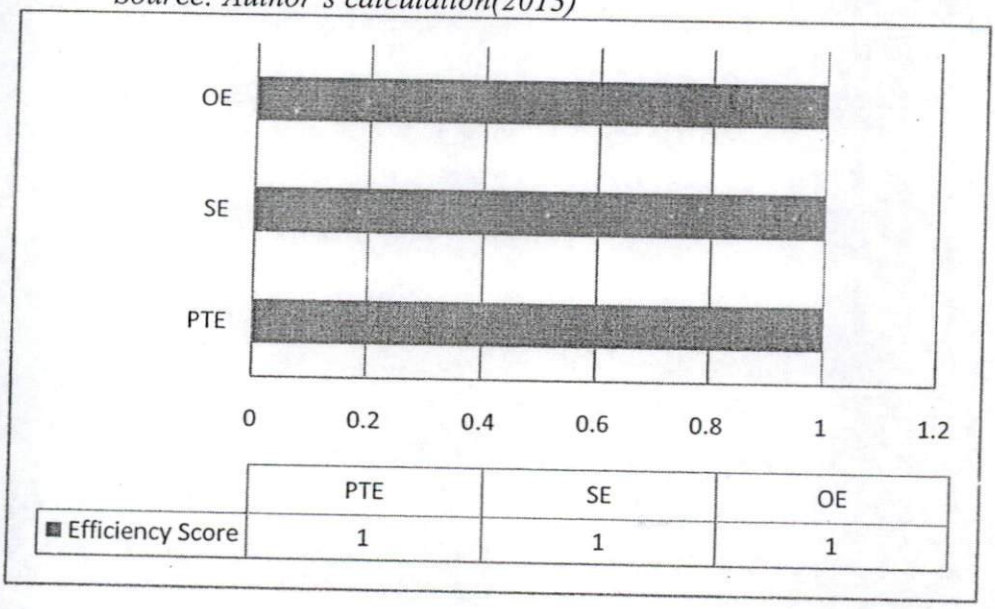

Figure 4.26
PTE, SE, OE scores of Bank Tabungan Pensiunan Nasional

And from figure 4.26, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Victoria International

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.68.

Table 4.68
BCC Potential Improvement of Bank Victoria International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	11,515,732	0	0	11,515,732
Net Fixed Capital	197,375	0	0	197,375
Personnel Costs	112,406	0	0	112,406
Interest Expenses	778,518	0	0	778,518
Outputs:				
Loans	7,580,957	0	0	7,580,957
Interest Income	1,117,271	0	0	1,117,271

Source: Author's calculation(2013)

With regards to the question whether the bank works at its optimal level or not, from figure 4.27 we can see that the inefficiency in the bank's performance refers to scale inefficiency(the scale efficiency 99.12%). So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations.

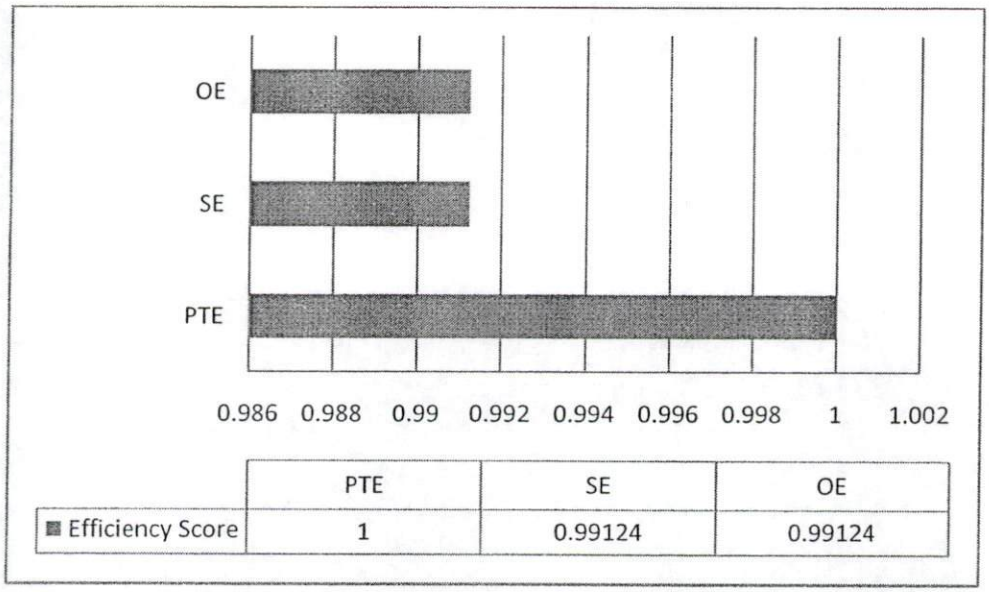

Figure 4.27
PTE, SE, OE scores of Bank Victoria International

The results show decreasing returns to scale, which indicate if the bank increase inputs, the outputs will increase also, but with decreasing proportion of outputs to inputs.

Results of Bank Artha Graha International

Under the assumption of VRS, PTE is 92.92%, Scale efficiency equals to 99.64% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.69
BCC Potential Improvement of Bank Arta Graha International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	17,399,114	-1,231,728	0	16,167,386
Net Fixed Capital	726,714	-51,446	-376,727	298,541
Personnel Costs	280,575	-19,863	0	260,712
Interest Expenses	1,033,193	-73,142	-64,670	895,381
Outputs:				
Loans	15,201,934	0	0	15,201,934
Interest Income	1,859,222	0	0	1,859,222

Source: Author's calculation(2013)

Since PTE is 92.92%, there is necessary movement to reach the efficiency frontier, in the case of Bank Arta Graha International Customer Deposit should be reduced by 1,231,728. Net Fixed Capital should be reduced by 428,173. Personnel costs should be reduced by 19,863. Interest Expenses should be reduced by 137,812.

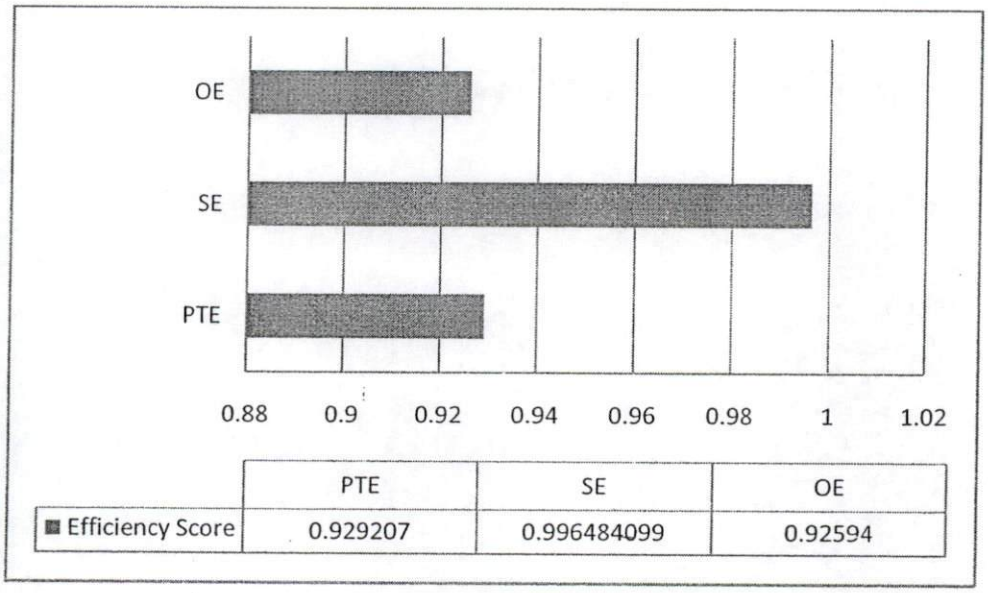

Figure 4.28
PTE, SE, OE scores of Bank Arta Graha

With regards to the question whether the bank works at its optimal level or not, from figure 4.28 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Mayapada International

Under the assumption of VRS, PTE is 86.79%, Scale efficiency equals to 99.55% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.70
BCC Potential Improvement of Bank Mayapada International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	15,160,619	-2,002,745	0	13,157,874
Net Fixed Capital	565,614	-74,719	-270,632	220,263
Personnel Costs	259,726	-34,310	0	225,416
Interest Expenses	821,154	-108,476	0	712,678
Outputs:				
Loans	12,079,060	0	0	12,079,060
Interest Income	1,563,359	0	0	1,563,359

Source: Author's calculation(2013)

Since PTE is 86.79%, there is necessary movement to reach the efficiency frontier, in the case of Bank Mayapada International Customer Deposit should be reduced by 2,002,745. Net Fixed Capital should be reduced by 345,351. Personnel costs should be reduced by 34,310. Interest Expenses should be reduced by 108,476.

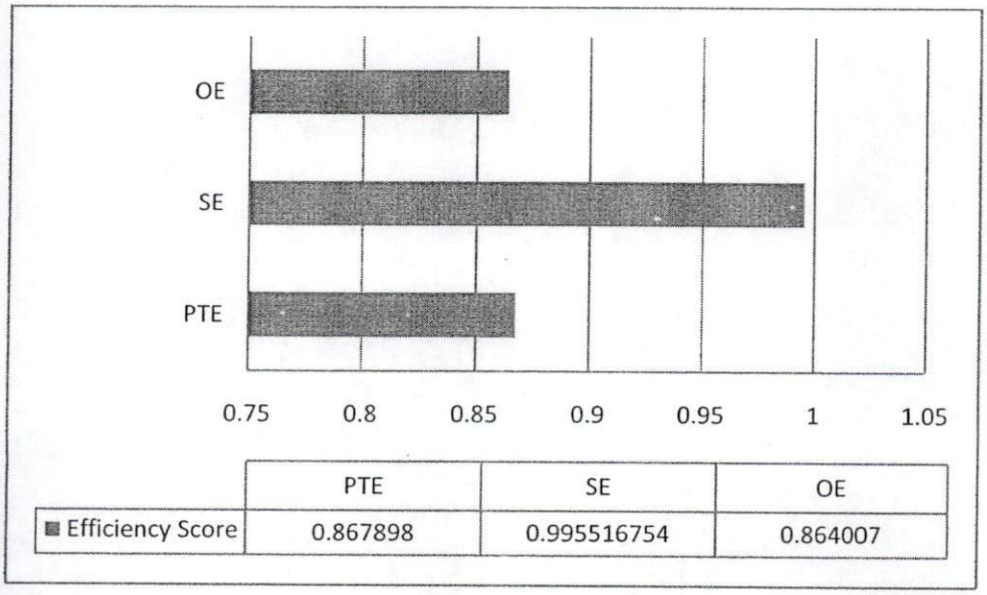

Figure 4.29
PTE, SE, OE scores of Bank Mayapada International

With regards to the question whether the bank works at its optimal level or not, from figure 4.29 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in

the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Windu Kentjana International

Under the assumption of VRS, PTE is 86.97%, Scale efficiency equals to 98.68% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.71
BCC Potential Improvement of Bank Windu Kentjana International

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	5,598,481	-729,068	0	4,869,413
Net Fixed Capital	114,923	-14,966	-30,431	69,526
Personnel Costs	106,988	-13,933	0	93,055
Interest Expenses	330,137	-42,992	-11,139	276,005
Outputs:				
Loans	4,525,245	0	0	4,525,245
Interest Income	598,070	0	0	598,070

Source: Author's calculation(2013)

Since PTE is 86.97%, there is necessary movement to reach the efficiency frontier, in the case of Bank Windu Kentjana International Customer Deposit should be reduced by 729,068. Net Fixed Capital should be reduced by 45,397. Personnel costs should be reduced by 13,933. Interest Expenses should be reduced by 54,131.

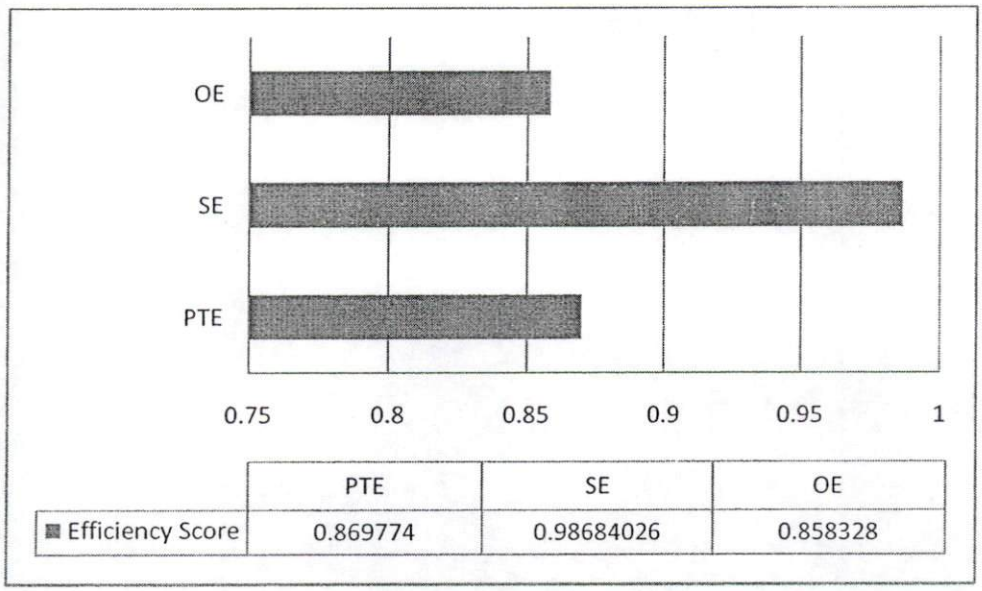

Figure 4.30
PTE, SE, OE scores of Bank Windu Kentjana International

With regards to the question whether the bank works at its optimal level or not, from figure 4.30 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency . So the main source of inefficiency was caused by the inappropriate scale of operation. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Mega

Under the assumption of VRS, PTE is 83.54%, Scale efficiency equals to 98.30% and the results show increasing return to scale. It means if the bank increase inputs, the output will increase also, but with the increasing proportion of outputs to inputs.

Table 4.72
BCC Potential Improvement of Bank Mega

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	50,268,395	-8,271,054	0	41,997,341
Net Fixed Capital	1,887,302	-310,533	-1,169,310	407,459
Personnel Costs	1,164,165	-191,549	0	972,616
Interest Expenses	2,238,937	-368,390	0	1,870,547
Outputs:				
Loans	26,650,298	0	7,672,392	34,322,690
Interest Income	5,581,049	0	0	5,581,049

Source: Author's calculation(2013)

Since PTE is 83.54%, there is necessary movement to reach the efficiency frontier, in the case of Bank Mega Customer Deposit should be reduced by 8,271,054. Net Fixed Capital should be reduced by 1,479,843. Personnel costs should be reduced by 191,549. Interest Expenses should be reduced by 368,390. In regards to outputs, Bank Mega need to target additional Loans by 7,672,392.

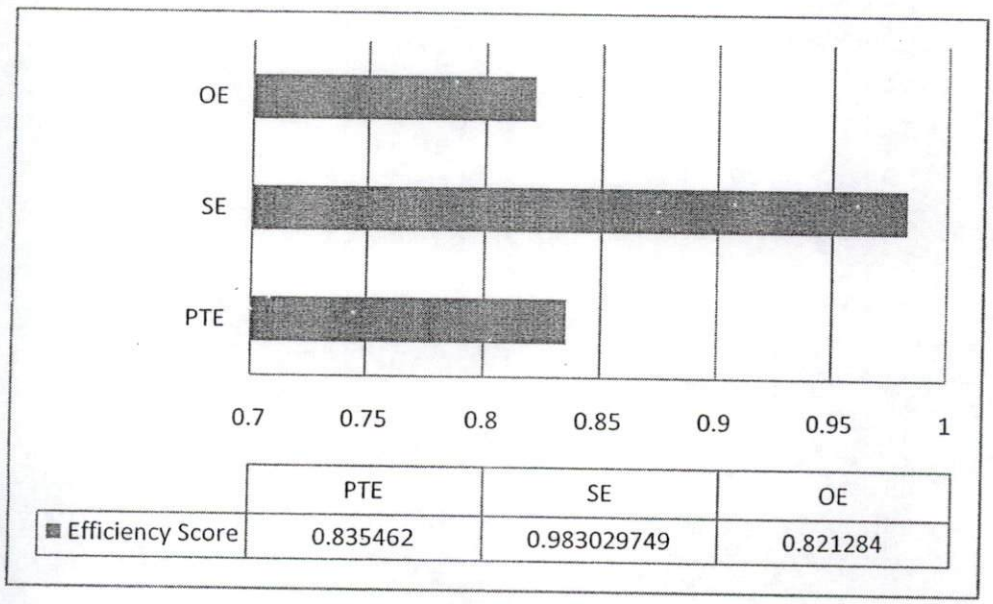

Figure 4.31
PTE, SE, OE scores of Bank Mega

With regards to the question whether the bank works at its optimal level or not, from figure 4.31 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in

the bank's performance was caused by both technical and scale inefficiency. This implies that the bank is not working in its optimal level of operations. Since RTS was increasing, the bank could expande in scale, and then inputs could be enhanced to enhance performance as this would be likely enhance its overall efficiency value.

Results of Bank OCBC NISP

Under the assumption of VRS, PTE is 96.45%, Scale efficiency equals to 99.63% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.73
BCC Potential Improvement of Bank OCBC NISP

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	60,760,680	-2,156,971	0	58,603,709
Net Fixed Capital	801,523	-28,454	0	773,069
Personnel Costs	1,172,793	-41,634	-45,835	1,085,325
Interest Expenses	2,358,155	-83,713	0	2,274,442
Outputs:				
Loans	51,874,088	0	0	51,874,088
Interest Income	4,924,182	0	156,534	5,080,716

Source: Author's calculation(2013)

Since PTE is 96.45%, there is necessary movement to reach the efficiency frontier, in the case of Bank OCBC NISP Customer Deposit should be reduced by 2,156,971. Net Fixed Capital should be reduced by 28,454. Personnel costs should be reduced by 87,469. Interest Expenses should be reduced by 87,469. In regards to output, the bank should target additional Interest Income by 156,534.

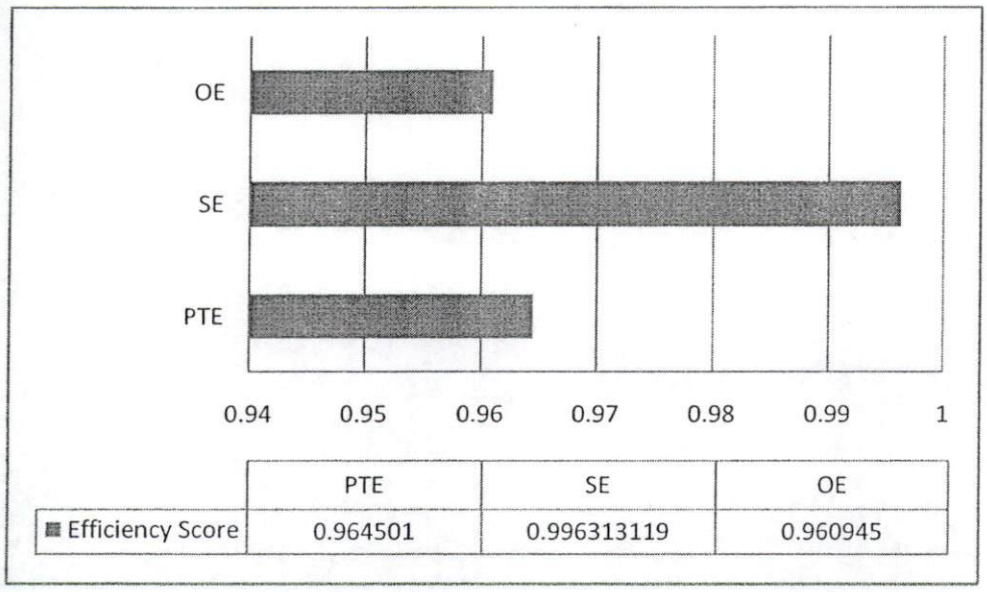

Figure 4.32
PTE, SE, OE scores of Bank OCBC NISP

With regards to the question whether the bank works at its optimal level or not, from figure 4.32 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency. This implies that the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

Results of Bank Pan Indonesia

Under the assumption of VRS, there are no proposed movements since PTE is 100%, see table 4.74.

Table 4.74
BCC Potential Improvement of Bank Pan Indonesia

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	102,695,260	0	0	102,695,260
Net Fixed Capital	2,114,288	0	0	2,114,288
Personnel Costs	1,099,771	0	0	1,099,771
Interest Expenses	6,024,990	0	0	6,024,990
Outputs:				
Loans	91,651,941	0	0	91,651,941
Interest Income	11,498,857	0	0	11,498,857

Source: Author's calculation(2013)

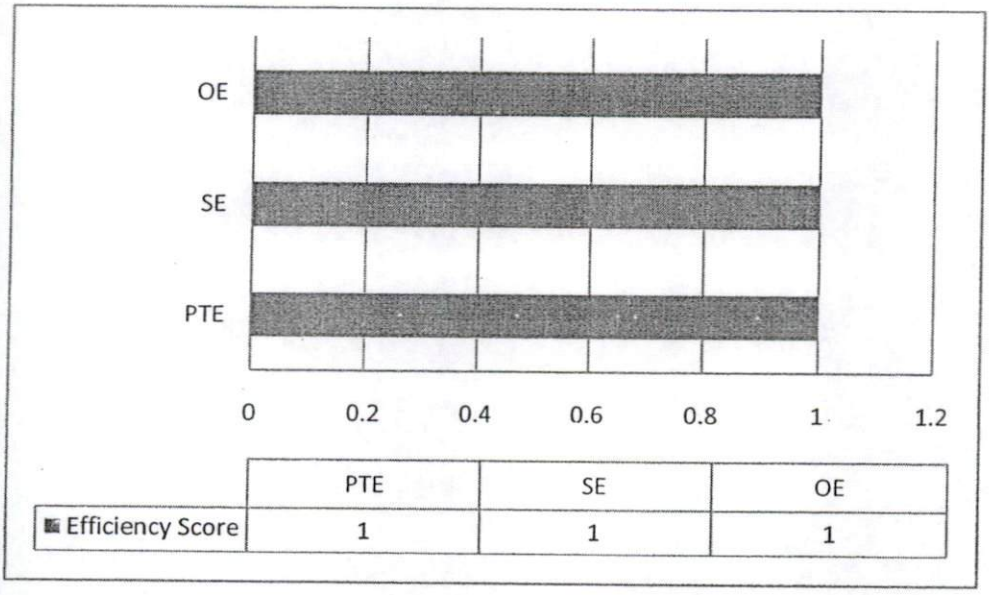

Figure 4.33
PTE, SE, OE scores of Bank Pan Indonesia

And from figure 4.33, we can notice that the bank is working at its optimal level of operation (PTE=1 and OE=1). So that according to DEA no need for any recommendation.

Results of Bank Himpunan Saudara 1906

Under the assumption of VRS, PTE is 94.61%, Scale efficiency equals to 98.57% and the results show decreasing return to scale. It means if the bank increase inputs, the output will increase also, but with the decreasing proportion of outputs to inputs.

Table 4.75
BCC Potential Improvement of Bank Himpunan Saudara 1906

Variables	Original Value	Radial Movement	Slack Movement	Projected Value
Inputs:				
Customer Deposits	6,226,709	-335,635	0	5,891,074
Net Fixed Capital	131,819	-7,105	-45,083	79,631
Personnel Costs	130,690	-7,045	0	123,645
Interest Expenses	369,500	-19,917	0	349,583
Outputs:				
Loans	5,203,977	0	40,966	5,244,943
Interest Income	801,920	0	0	801,920

Source: Author's calculation(2013)

Since PTE is 94.61%, there is necessary movement to reach the efficiency frontier, in the case of Bank Himpunan Saudara 1906 Deposit should be reduced by 335,635. Net Fixed Capital should be reduced by 52,188. Personnel costs should be reduced by 7,045. Interest Expenses should be reduced by 19,917. In regards to output, the bank should target additional Loans by 40,966. -

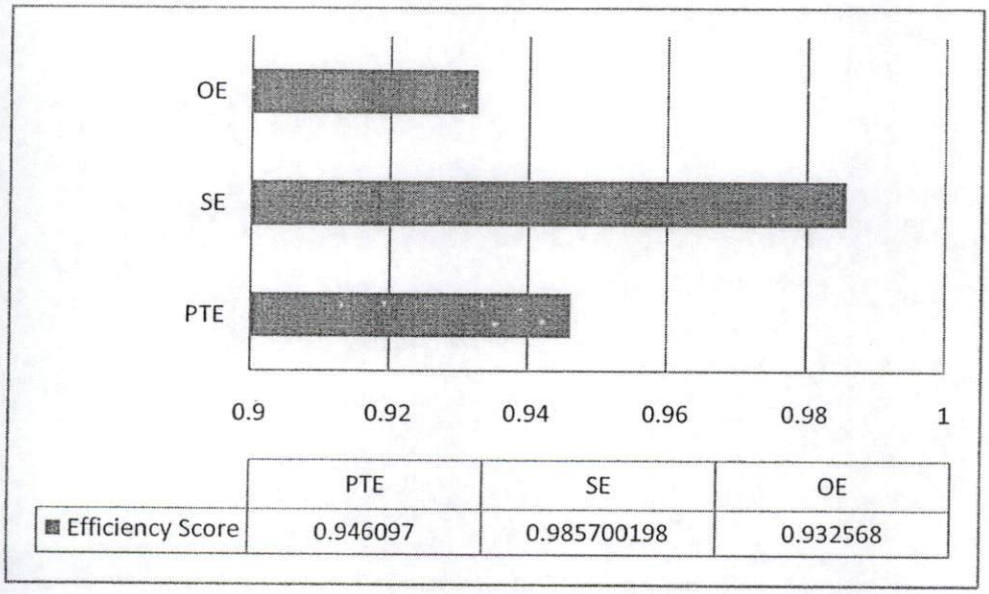

Figure 4.34
PTE, SE, OE scores of Bank Himpunan Saudara 1906

With regards to the question whether the bank works at its optimal level or not, from figure 4.32 we can see that PTE, SE, and OE were all smaller than one. It means the inefficiency in the bank's performance was caused by both technical and scale inefficiency. This implies that

the bank is not working in its optimal level of operations. Since RTS was decreasing, the bank could decrease in scale, and this would be likely enhance its overall efficiency value.

In general, if the inefficiency is technical, management could improve the situation in a relatively short time; however, if it is due to lack of scale efficiency, this would take much longer to address. After an analysis is conducted to determine whether the RTS is increasing or decreasing, an appropriate decision on scale expansion or reduction can be made.

CHAPTER V

CONCLUSION

5.1 Conclusion

This research aim to measure and analyze the efficiency of listed banking companies in BEI for the years 2008-2012. Two approach are employed: traditional financial indicators approach and non-parametric data envelopment analysis. ROA, ROE, NIM, and OER are used as efficiency measurement in traditional financial indicators approach. Data envelopment analysis employ both input-oriented constant return to scale and input-oriented variable return to scale. According to results and analysis in chapter 4, it can be concluded that:

1. In term of ROA, there are six relatively efficient banks: Bank Rakyat Indonesia, BPD Jawa Timur, Bank Tabungan Pensiunan Nasional, Bank Central Asia, Bank Mandiri and Bank Swadesi.
2. In term of ROE, there are six relatively efficient banks: Bank Rakyat Indonesia, Bank Central Asia, Bank Tabungan Pensiunan Nasional, BPD Jawa Timur, BPD Jawa Barat dan Banten and Bank Mega.
3. In term of NIM, there are four relatively efficient banks: Bank Tabungan Pensiunan Nasional, Bank Danamon, Bank Rakyat Indonesia, and Bank Himpunan Saudara 1906.
4. In term of OER there are four relatively efficient banks: Bank Mandiri, Bank Pan Indonesia, Bank Danamon and Bank OCBC NISP.
5. Under data envelopment analysis input-oriented constant return to scale , there are nine banks—Bank Agro Niaga, Bank Nusantara Parahyangan, Bank Rakyat

Indonesia, Bank Tabungan Negara, Bank Danamon Indonesia, BPD Jawa Timur, Bank CIMB Niaga, Bank Swadesi, Bank Pan Indonesia are technically efficient.

6. The average technical efficiency of banking listed in BEI measured by Data Envelopment Analysis input-oriented constant return to scale is 94.97%. It means the banking companies listed in BEI should be able to decrease the costs and expenses by 5.03% without decreasing output.
7. Under Data Envelopment Analysis input-oriented variable return to scale there are eleven banks—Bank Agro Niaga, Bank Nusantara Parahyangan, Bank Rakyat Indonesia, Bank Tabungan Negara, Bank Danamon Indonesia, BPD Jawa Timur, Bank Mandiri, Bank CIMB Niaga, Bank Swadesi, Bank Victoria International, Bank Pan Indonesia which technically efficient. The average technical efficiency measured by Data Envelopment Analysis input-oriented variable return to scale is 96.64%.
8. The inefficiency of bank is caused by technical inefficiency and scale inefficiency. Technical inefficiency means the banks are possible to produce the same outputs with less of one or more inputs. Scale inefficiency means the size of operation of banks should provide more output with less input costs. This implies that the banks are not working at their optimal level of operations.

5.2 Research Limitations

1. This research does not consider macroecomic factors that may be influence the level of efficiency of banking companies especially the financial crisis that hit the world by the the end of 2007 and early 2008.
2. DEA provides insight on which areas need to be improved but it does not have information on how to improve those areas. Further investigations are needed in order

to identify approaches for each bank to increse the level of efficiency by moving towards the efficient frontier.

3. This research employ DEA input-oriented approach. In the input-oriented model, the inputs are minimized and the outputs are kept at their current level. So that, this research suggest reducing input variables that may not applicable to the real world.
4. This research employ intermediation approach in selecting input variables and output variables. So that, DEA only measures the efficieny of banking companies in term of the function as "intermediary agent". Additionally, this research does not measure "fee based income" as one of variable output. Many banks become "transaction banks", which lead to an increased proportion of fee-based income as to compared to traditional output: interest income. Furthermore,

5.3 Research Implications

1. Financial indicators are used by all those interested in evaluating a bank's performance—banking supervision, owners, management or customers. It is advisable to supplement the method of traditional financial indicators with the efficiency measurement by Data Envelopment Analysis approach. Data Envelopment Analysis would provide new insights about the banking sector and its efficiency, strengths and weaknesses of each bank listed in BEI.
2. Bank management should take care about the improvement of the scale efficiency as well as pure technical efficiency and the potential improvement that come from the analysis results in order to improve the efficiency of the inefficient banks.
3. Bank management should consider technical efficiency and cost efficiency analysis as important factor in their profitability and risk analysis and management.

5.2 Suggestions for Further Research

1. This research employ the two basic approaches in data envelopment analysis approach: constant return to scale and variable return to scale. It is recommended to combine the research with more advanced approach in data envelopment analysis such as bootstrapping data envelopment analysis(bootstrapping DEA), principal component analysis data envelopment analysis (PCA-DEA) to enhance the efficiency measurement.
2. It is recommended to conduct time series study covering a wide period of time to identify the changes in efficiency for each bank and for the banking sector as a whole and to find the reasons behind changes. The researcher could employ Data Envelopment Analysis based Malmquist Index for this purpose.

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Inputs and Outputs Variables DEA

2009

o.	DMUs	Deposits (X1)	Fixed	Personnel	Interest	Loans (Y1)	Interest
1	AGRO	2,454,296	9,417	45,723	224,837	1,904,944	354,824
2	BABP	5,942,777	111,991	126,666	430,071	5,188,764	750,381
3	BACA	2,451,524	87,631	19,659	153,322	1,206,115	222,275
4	BAEK	19,002,157	117,883	229,531	843,604	8,160,777	1,675,881
5	BBCA	245,139,946	2,971,269	4,186,617	8,033,181	119,595,661	22,081,673
6	BBKP	31,915,503	628,413	475,635	2,304,828	24,013,722	3,687,295
7	BBNI	188,468,987	3,707,940	3,460,000	8,313,998	113,922,685	18,878,575
8	BBNP	3,473,106	24,865	51,659	252,639	2,539,719	391,112
9	BBRI	255,928,261	1,366,212	6,675,793	12,284,636	194,242,503	35,334,131
10	BBTN	40,214,954	1,236,672	937,075	3,427,732	40,029,401	5,729,941
11	BDMN	67,216,228	1,549,504	3,003,000	6,220,816	58,367,570	15,682,777
12	BJBR	23,137,950	527,855	711,253	1,841,510	18,507,944	3,944,548
13	BJTM	14,531,383	101,448	437,463	720,270	9,935,846	2,108,772
14	BKSW	2,139,958	39,069	39,615	132,286	1,417,668	217,219
15	BMRI	319,550,381	4,963,306	4,853,601	15,675,213	184,690,704	32,598,964
16	BNBA	1,927,093	106,996	47,722	95,151	960,847	219,653
17	BNGA	86,248,005	1,258,532	1,936,133	5,161,062	80,114,845	11,311,112
18	BNII	47,341,248	738,701	1,265,615	3,135,791	36,500,149	6,231,908
19	BNLI	45,720,638	1,129,968	1,155,230	3,192,960	39,809,779	5,722,531
20	BSIM	6,832,422	- 217,524	72,534	470,357	5,322,975	782,390
21	BSWD	1,210,110	13,485	18,429	84,719	967,683	159,217
22	BTPN	18,514,788	345,070	914,533	1,644,604	15,702,404	3,607,548
23	BVIC	5,658,975	162,745	35,787	501,977	2,713,514	623,128
24	INPC	13,071,296	153,448	203,225	1,114,059	10,787,836	1,612,138
25	MAYA	5,949,459	130,527	115,521	475,715	3,418,595	556,820
26	MCOR	5,781,574	247,228	142,123	529,088	4,961,855	918,893
27	MEGA	32,803,732	1,321,268	614,921	2,179,095	18,352,062	3,737,455
28	NISP	30,216,044	804,333	704,375	1,641,134	21,283,245	3,367,537
29	PNBN	56,234,487	1,702,829	533,832	4,150,677	39,967,098	7,375,667
30	SDRA	2,027,791	38,284	53,330	166,218	1,896,719	343,023
	Mean	**52,703,502**	**860,480**	**1,102,220**	**2,846,718**	**35,549,454**	**6,340,913**
	Std. Dev	**84243844.8**	**1182083.395**	**1669594.31**	**3824561.63**	**52360331.8**	**9399751.114**
	Min	**1,210,110**	**9,417**	**18,429**	**84,719**	**960,847**	**159,217**
	Max	**319,550,381**	**4,963,306**	**6,675,793**	**15,675,213**	**194,242,503**	**35,334,131**

Inputs and Outputs Variables DEA

2010

lo.	DMUs	Deposits (X1)	Fixed Capital(X3)	Personnel Costs (X2)	Interest Expense (X4)	Loans (Y1)	Interest Income (Y2)
1	AGRO	333,652,397	1,568,945	8,675,721	11,448,953	232,972,784	44,615,162
2	BABP	7,213,672	64,108	166,285	435,035	6,129,035	829,934
3	BACA	3,617,301	100,653	33,093	237,961	1,817,950	336,727
4	BAEK	18,394,092	119,037	256,150	615,546	11,292,512	1,466,029
5	BBCA	277,627,243	3,406,957	4,544,611	7,723,774	150,016,746	20,660,602
6	BBKP	41,377,255	632,192	556,307	2,036,101	29,398,321	3,832,626
7	BBNI	194,374,685	3,838,079	4,126,640	7,116,680	129,399,567	18,837,397
8	BBNP	4,544,400	33,157	86,878	212,053	3,657,670	436,289
9	BBRI	333,652,397	1,568,945	8,675,721	11,726,559	232,972,784	44,615,162
10	BBTN	47,546,047	1,450,837	1,136,484	3,143,934	50,668,815	6,498,752
11	BDMN	79,642,803	1,771,489	3,838,754	4,509,295	73,268,325	14,417,745
12	BJBR	31,019,700	549,014	696,880	2,254,731	21,491,791	4,894,312
13	BJTM	16,218,749	154,855	537,297	704,403	12,906,721	2,698,293
14	BKSW	2,377,992	40,983	55,375	120,274	1,694,149	231,272
15	BMRI	337,387,909	5,253,057	5,802,173	14,394,598	232,545,259	33,931,650
16	BNBA	2,159,541	108,494	54,401	106,532	1,154,339	239,141
17	BNGA	117,833,233	1,191,857	1,991,272	5,122,137	103,621,924	12,448,430
18	BNII	59,901,960	816,739	1,571,253	2,924,809	48,656,349	6,653,011
19	BNLI	59,864,927	763,735	1,281,960	2,798,118	51,253,361	5,915,777
20	BSIM	9,819,214	227,977	103,905	497,652	6,934,158	916,108
21	BSWD	1,226,475	16,156	21,129	81,993	1,050,806	167,356
22	BTPN	25,603,458	350,782	1,291,406	2,065,517	23,357,507	5,604,781
23	BVIC	8,896,067	146,427	53,139	607,796	3,187,219	726,442
24	INPC	14,681,980	162,601	217,608	918,249	10,987,290	1,505,177
25	MAYA	7,796,431	252,283	170,355	567,061	5,931,676	1,050,087
26	MCOR	3,625,685	141,794	170,355	567,061	2,962,103	1,051,114
27	MEGA	33,980,284	1,554,501	769,947	1,910,379	23,613,208	4,090,908
28	NISP	39,425,954	830,595	893,777	1,641,200	30,918,196	3,634,389
29	PNBN	75,279,720	1,763,280	705,290	3,981,493	55,682,562	8,183,967
30	SDRA	2,550,806	60,449	72,011	181,216	2,507,415	444,148
	Mean	**73,043,079**	**964,666**	**1,618,539**	**3,021,704**	**52,068,351**	**8,364,426**
	Std. Dev	**107288672**	**1261453.304**	**2437298.575**	**3823892.399**	**72226153.6**	**12433389.45**
	Min	**1,226,475**	**16,156**	**21,129**	**81,993**	**1,050,806**	**167,356**
	Max	**337,387,909**	**5,253,057**	**8,675,721**	**14,394,598**	**232,972,784**	**44,615,162**

Inputs and Outputs Variables DEA

2012

lo.	DMUs	Deposits	Fixed	Personnel	Interest	Loans (Y1)	Interest
1	AGRO	450,166,383	2,024,911	9,605,547	13,126,655	336,081,042	49,610,421
2	BABP	6,433,765	41,023	180,892	331,117	5,149,078	688,882
3	BACA	4,778,019	148,955	57,766	269,311	2,813,287	431,486
4	BAEK	20,960,549	239,613	537,940	752,305	17,077,297	1,710,211
5	BBCA	370,507,012	6,406,625	6,154,966	7,647,167	252,760,457	28,885,290
6	BBKP	53,957,758	608,075	720,481	2,664,675	44,594,681	5,126,381
7	BBNI	257,660,841	4,591,588	5,577,867	7,245,524	193,834,670	22,704,515
8	BBNP	6,925,186	36,009	153,001	347,507	5,884,622	735,796
9	BBRI	450,166,383	2,804,366	9,605,547	13,126,655	336,081,042	49,610,421
10	BBTN	80,667,983	1,582,812	1,486,938	4,091,760	80,430,049	8,818,579
11	BDMN	89,897,866	2,095,756	5,163,381	5,936,173	90,828,149	18,858,281
12	BJBR	47,632,863	734,873	967,340	3,140,311	34,768,723	6,795,686
13	BJTM	22,209,673	203,609	495,412	904,646	18,300,663	2,883,065
14	BKSW	3,633,084	118,302	161,441	163,850	3,168,908	336,359
15	BMRI	442,837,863	7,002,690	8,045,716	15,019,850	370,570,356	27,530,592
16	BNBA	2,874,841	133,556	73,524	119,025	2,225,685	311,555
17	BNGA	151,015,119	1,660,505	2,881,704	6,486,352	140,776,159	16,195,571
18	BNII	85,946,647	1,018,434	2,244,098	4,168,848	75,035,586	9,482,583
19	BNLI	104,914,477	749,314	1,939,294	4,377,456	93,705,893	9,185,865
20	BSIM	12,860,714	494,110	227,061	671,392	10,293,836	1,451,584
21	BSWD	1,972,256	17,687	28,739	106,250	1,825,422	203,913
22	BTPN	45,072,603	489,118	1,853,571	3,221,858	38,995,514	9,292,972
23	BVIC	11,515,732	197,375	112,406	778,518	7,580,957	1,117,271
24	INPC	17,399,114	726,714	280,575	1,033,193	15,201,934	1,859,222
25	MAYA	15,160,619	565,614	259,726	821,154	12,079,060	1,563,359
26	MCOR	5,598,481	114,923	106,988	330,137	4,525,245	598,070
27	MEGA	50,268,395	1,887,302	1,164,165	2,238,937	26,650,298	5,581,049
28	NISP	60,760,680	801,523	1,172,793	2,358,155	51,874,088	4,924,182
29	PNBN	102,695,260	2,114,288	1,099,771	6,024,990	91,651,941	11,498,857
30	SDRA	6,226,709	131,819	130,690	369,500	5,203,977	801,920
	Mean	**99,423,896**	**1,324,716**	**2,082,978**	**3,595,776**	**78,998,954**	**9,959,798**
	Std. Dev	**142665794**	**1789612.4**	**2899272.8**	**4164289.69**	**108949083**	**13510704**
	Min	**1,972,256**	**17,687**	**28,739**	**106,250**	**1,825,422**	**203,913**
	Max	**450,166,383**	**7,002,690**	**9,605,547**	**15,019,850**	**370,570,356**	**49,610,421**

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection
1	AGRO	1	AGRO(1.0(	3	-0	-0	2163330	-0	-0	12868	-0	-0	44245
2	BABP	1	BABP(1.00	1	-0	-0	5280391	-0	-0	33859	-0	-0	116699
3	BACA	1	BACA(1.00	0	-0	-0	1000260	-0	-0	73887	-0	-0	11974
4	BAEK	1	BAEK(1.00	0	-0	-0	16104969	-0	-0	106252	-0	-0	183776
5	BBCA	1	BBCA(1.00	6	-0	-0	2.1E+08	-0	-0	2644785	-0	-0	3283965
6	BBKP	0.987043	AGRO(0.9:	0	-356602	-0	27164604	-5280.49	-0	402247.5	-6021.13	-0	458666.9
7	BBNI	0.99227	BBCA(0.42	0	-1261269	-0	1.62E+08	-28855.5	-1819339	1884699	-25500.6	-0	3273385
8	BBNP	1	BBNP(1.00	0	-0	-0	2994752	-0	-0	26121	-0	-0	40245
9	BBRI	1	BBRI(1.00(	7	-0	-0	2.02E+08	-0	-0	1350483	-0	-0	6329075
10	BBTN	1	BBTN(1.00	4	-0	-0	31448744	-0	-0	1072645	-0	-0	772818
11	BDMN	1	BDMN(1.0(	1	-0	-0	73969078	-0	-0	1905024	-0	-0	3058580
12	BJBR	0.934529	BBRI(0.03:	0	-1201204	-0	17145846	-32679.8	-160005	306462.2	-38836.7	-4374.77	549976.5
13	BJTM	1	BJTM(1.00	0	-0	-0	13736356	-0	-0	74484	-0	-0	419316
14	BKSW	0.837642	AGRO(0.0'	0	-323427	-0	1668632	-6667.88	-0	34401.12	-6409.74	-0	33069.26
15	BMRI	0.92613	BBCA(0.89	0	-2.1E+07	-0	2.68E+08	-340065	-0	4263495	-337125	-0	4226643
16	BNBA	0.856802	BBCA(0.00	0	-227033	-0	1358418	-15930.8	-73471.3	21847.9	-6351.4	-0	38002.6
17	BNGA	1	BNGA(1.0(	8	-0	-0	84051174	-0	-0	1183110	-0	-0	1698726
18	BNII	0.850895	BABP(0.88	0	-6489832	-0	37035394	-113856	-0	649741.7	-177416	-6954.89	1005501
19	BNLI	0.956072	BBCA(0.01	0	-1878762	-0	40890087	-54040.3	-660591	515562	-41330.3	-0	899527.7
20	BSIM	1	BSIM(1.00(	0	-0	-0	5275201	-0	-0	161781	-0	-0	59532
21	BSWD	1	BSWD(1.0(	2	-0	-0	1053812	-0	-0	14201	-0	-0	17685
22	BTPN	0.979344	BDMN(0.1(	0	-236270	-0	11202341	-6872.5	-42440.3	283407.2	-10136.7	-46238.2	434374.1
23	BVIC	1	BVIC(1.00(	0	-0	-0	5097147	-0	-0	162088	-0	-0	30845
24	INPC	1	INPC(1.00(	1	-0	-0	10497649	-0	-0	148970	-0	-0	200362
25	MAYA	0.706861	AGRO(0.4!	0	-1499704	-0	3616318	-41650	-18974	81458.99	-40315.1	-0	97213.93
26	MCOR	0.967726	BBTN(0.01	0	-54186.4	-0	1624786	-2493.19	-30731.4	44027.4	-905.014	-0	27136.99
27	MEGA	0.880754	BBCA(0.01	0	-3503579	-0	25877426	-126834	-157027	779765.7	-57267.4	-0	422976.6
28	NISP	0.955637	BBCA(0.01	0	-1203286	-0	25920185	-34493.2	-432518	310506.9	-26941.1	-0	580343.9
29	PNBN	1	PNBN(1.0(	5	-0	-0	46043679	-0	-0	1671786	-0	-0	451605
30	SDRA	1	SDRA(1.0(	8	-0	-0	1493137	-0	-0	36317	-0	-0	49657

Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (Interest Income (Y2))
-0	-0	224659	0	0	1964360	0	0	334005
-0	-0	408995	0	0	4667760	0	0	706862
-0	-0	115997	0	0	669775	0	0	174954
-0	-0	843350	0	0	9757605	0	0	1536199
-0	-0	6944833	0	0	1.1E+08	0	0	19301181
-24669.9	-0	1879262	0	0	22401357	0	0	3371830
-51917	-0	6664339	0	0	1.06E+08	0	901064.7	17529204
-0	-0	203144	0	0	2149250	0	0	315999
-0	-0	8445579	0	0	1.52E+08	0	0	28096633
-0	-0	2606694	0	0	31468636	0	0	4567026
-0	-0	6841478	0	0	63410474	0	0	16118989
-82076.3	-0	1171548	0	0	15525995	0	0	2997885
-0	-0	730057	0	0	7279212	0	0	2024900
-21655.8	-0	111727.2	0	0	1470799	0	0	208337
-913875	-0	11457542	0	0	1.63E+08	0	0	27336237
-13379.6	-0	80054.45	0	155222	1090673	0	0	210117
-0	-0	4997335	0	0	72790651	0	0	9795732
-475148	-0	2711518	0	0	34344477	0	0	5942647
-102345	-0	2227483	0	0	33660871	0	542457.9	4874514
-0	-0	425759	0	0	4228779	0	0	601035
-0	-0	69459	0	0	860909	0	0	126819
-22320.3	-45981.5	1012295	0	0	10125293	0	0	2387577
-0	-0	406684	0	0	2122976	0	0	523425
-0	-0	807116	0	0	9641673	0	0	1137150
-220201	-206306	324677.4	0	0	3531385	0	0	616770
-4056.04	-0	121621	0	0	1409483	0	0	204737
-251874	-0	1860339	0	1728083	20477134	0	0	3699937
-61448.2	-0	1323666	0	0	20401154	0	292068.3	3077799
-0	-0	3451922	0	0	35282456	0	0	6011625
-0	-0	128120	0	0	1498742	0	0	302924

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (
1	AGRO	1	AGRO(1.0(	2	-0	-0	2454296	-0	-0	9417	-0	-0	45723
2	BABP	0.942908	BBTN(0.04	0	-339283	-0	5603494	-6393.76	-0	105597.2	-7231.58	-0	119434.4
3	BACA	0.819423	BVIC(0.00'	0	-442689	-308650	1700186	-15824.1	-20338.5	51468.32	-3549.96	-0	16109.04
4	BAEK	0.982677	AGRO(0.3	0	-329167	-6167246	12505743	-2042.04	-0	115841	-3976.08	-0	225554.9
5	BBCA	0.975691	BBRI(0.60	0	-5959028	-7.9E+07	1.6E+08	-72227.6	-1901583	997458.6	-101771	-0	4084846
6	BBKP	0.917077	BBTN(0.06	0	-2646542	-0	29268961	-52110.1	-0	576302.9	-39441.3	-0	436193.7
7	BBNI	0.927845	BBRI(0.29'	0	-1.4E+07	-3.5E+07	1.4E+08	-267547	-1841201	1599192	-249656	-0	3210344
8	BBNP	1	BBNP(1.00	0	-0	-0	3473106	-0	-0	24865	-0	-0	51659
9	BBRI	1	BBRI(1.00(	10	-0	-0	2.56E+08	-0	-0	1366212	-0	-0	6675793
10	BBTN	1	BBTN(1.00	4	-0	-0	40214954	-0	-0	1236672	-0	-0	937075
11	BDMN	1	BDMN(1.0(	6	-0	-0	67216228	-0	-0	1549504	-0	-0	3003000
12	BJBR	0.933476	BBRI(0.01	0	-1539217	-0	21598733	-35114.8	-66578.3	426161.9	-47315	-0	663938
13	BJTM	1	BJTM(1.00	0	-0	-0	14531383	-0	-0	101448	-0	-0	437463
14	BKSW	0.789609	BBRI(0.00(	0	-450228	-37815.8	1651914	-8219.77	-117.748	30731.49	-8334.64	-0	31280.36
15	BMRI	0.934219	BBRI(0.42	0	-2.1E+07	-5.6E+07	2.43E+08	-326489	-518804	4118013	-319273	-0	4534328
16	BNBA	0.834804	BBRI(0.00	0	-318349	-12344.5	1596400	-17675.3	-78088.2	11232.48	-7883.49	-0	39838.51
17	BNGA	1	BNGA(1.0(	9	-0	-0	86248005	-0	-0	1258532	-0	-0	1936133
18	BNII	0.86169	BBRI(0.02	0	-6547752	-0	40793496	-102169	-23828.7	612702.8	-175047	-0	1090568
19	BNLI	0.913847	BBTN(0.38	0	-3938953	-0	41781685	-97349.7	-165148	867469.8	-99526.1	-90088.9	965615
20	BSIM	1	BSIM(1.00(	1	-0	-0	6832422	-0	-0	217524	-0	-0	72534
21	BSWD	1	BSWD(1.0(	4	-0	-0	1210110	-0	-0	13485	-0	-0	18429
22	BTPN	0.973428	AGRO(1.2(	0	-491975	-0	18022813	-9169.19	-0	335900.8	-24301	-254042	636189.9
23	BVIC	1	BVIC(1.00(	1	-0	-0	5658975	-0	-0	162745	-0	-0	35787
24	INPC	1	INPC(1.00(	2	-0	-0	13071296	-0	-0	153448	-0	-0	203225
25	MAYA	0.653351	BBTN(0.03	0	-2062373	-0	3887086	-45247	-0	85279.97	-40045.2	-0	75475.78
26	MCOR	0.955629	BDMN(0.0(	0	-256532	-0	5525042	-10969.7	-121294	114964.8	-6306.09	-0	135816.9
27	MEGA	0.794735	BBRI(0.03	0	-6733466	-0	26070266	-271210	-509646	540412	-126222	-0	488699.1
28	NISP	0.84251	BBRI(0.04	0	-4758737	-358338	25098970	-126675	-400976	276682.1	-110932	-0	593442.7
29	PNBN	1	PNBN(1.0(	11	-0	-0	56234487	-0	-0	1702829	-0	-0	533832
30	SDRA	1	SDRA(1.0(	6	-0	-0	2027791	-0	-0	38284	-0	-0	53330

Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (Interest Income (Y2))
-0	-0	224837	0	0	1904944	0	0	354824
-24553.5	-0	405517.5	0	0	5188764	0	0	750381
-27686.4	-0	125635.6	0	0	1206115	0	515.5657	222790.6
-14613.4	-0	828990.6	0	1698750	9859527	0	0	1675881
-195276	-0	7837905	0	1735342	1.21E+08	0	0	22081673
-191124	-0	2113704	0	0	24013722	0	0	3687295
-599897	-0	7714101	0	0	1.14E+08	0	0	18878575
-0	-0	252639	0	0	2539719	0	0	391112
-0	-0	12284636	0	0	1.94E+08	0	0	35334131
-0	-0	3427732	0	0	40029401	0	0	5729941
-0	-0	6220816	0	0	58367570	0	0	15682777
-122504	-0	1719006	0	0	18507944	0	0	3944548
-0	-0	720270	0	0	9935846	0	0	2108772
-27831.8	-0	104454.2	0	0	1417668	0	0	217219
-1031125	-0	14644088	0	0	1.85E+08	0	0	32598964
-15718.6	-0	79432.41	0	245533.3	1206380	0	0	219653
-0	-0	5161062	0	0	80114845	0	0	11311112
-433710	-0	2702081	0	0	36500149	0	0	6231908
-275082	-0	2917878	0	0	39809779	0	0	5722531
-0	-0	470357	0	0	5322975	0	0	782390
-0	-0	84719	0	0	967683	0	0	159217
-43700.4	-0	1600904	0	0	15702404	0	0	3607548
-0	-0	501977	0	0	2713514	0	0	623128
-0	-0	1114059	0	0	10787836	0	0	1612138
-164906	-7285.63	303523.3	0	0	3418595	0	0	556820
-23476	-56911.7	448700.4	0	0	4961855	0	0	918893
-447292	-0	1731803	0	1015748	19367810	0	0	3737455
-258463	-0	1382671	0	0	21283245	0	0	3367537
-0	-0	4150677	0	0	39967098	0	0	7375667
-0	-0	166218	0	0	1896719	0	0	343023

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection
1	AGRO	1	AGRO(1.0(	6	-0	-0	3.34E+08	-0	-0	1568945	-0	-0	8675721
2	BABP	1	BABP(1.00	0	-0	-0	7213672	-0	-0	64108	-0	-0	166285
3	BACA	0.870321	BVIC(0.02	0	-469086	-0	3148215	-13052.5	-15282.5	72317.92	-4291.45	-0	28801.55
4	BAEK	0.990122	AGRO(0.0(	0	-181692	-4713129	13499271	-1175.81	-0	117861.2	-2530.18	-0	253619.8
5	BBCA	0.957049	AGRO(0.3	0	-1.2E+07	-7.1E+07	1.95E+08	-146331	-1923096	1337530	-195194	-0	4349417
6	BBKP	0.886347	BNGA(0.17	0	-4702643	-879177	35795435	-71850.4	-0	560341.6	-63225.9	-0	493081.1
7	BBNI	0.896062	AGRO(0.2	0	-2E+07	-7201571	1.67E+08	-398921	-2271180	1167978	-428913	-0	3697727
8	BBNP	1	BBNP(1.00	1	-0	-0	4544400	-0	-0	33157	-0	-0	86878
9	BBRI	1	AGRO(1.0(	0	-0	-0	3.34E+08	-0	-0	1568945	-0	-0	8675721
10	BBTN	1	BBTN(1.00	3	-0	-0	47546047	-0	-0	1450837	-0	-0	1136484
11	BDMN	1	BDMN(1.0(	2	-0	-0	79642803	-0	-0	1771489	-0	-0	3838754
12	BJBR	1	BJBR(1.00	0	-0	-0	31019700	-0	-0	549014	-0	-0	696880
13	BJTM	1	BJTM(1.00	3	-0	-0	16218749	-0	-0	154855	-0	-0	537297
14	BKSW	0.770799	BBTN(0.00	0	-545039	-0	1832953	-9393.35	-1331.4	30258.24	-12692	-0	42682.98
15	BMRI	0.890917	AGRO(0.2(	0	-3.7E+07	-5028121	2.96E+08	-573019	-1065752	3614286	-632919	-0	5169254
16	BNBA	0.742181	BJTM(0.05	0	-556771	-0	1602770	-27971.9	-55857.9	24664.28	-14025.6	-0	40375.37
17	BNGA	1	BNGA(1.0(	12	-0	-0	1.18E+08	-0	-0	1191857	-0	-0	1991272
18	BNII	0.900261	BBTN(0.09	0	-5974579	-0	53927381	-81461	-0	735278	-156716	-166247	1248291
19	BNLI	0.947561	BBTN(0.15	0	-3139245	-0	56725682	-40049.4	-0	723685.6	-67224.5	-186110	1028626
20	BSIM	0.933941	BNGA(0.01	0	-648647	-98022.4	9072544	-15059.9	-21691.2	191225.9	-6863.86	-0	97041.14
21	BSWD	1	BSWD(1.0(	3	-0	-0	1226475	-0	-0	16156	-0	-0	21129
22	BTPN	1	BTPN(1.00	2	-0	-0	25603458	-0	-0	350782	-0	-0	1291406
23	BVIC	1	BVIC(1.00(	1	-0	-0	8896067	-0	-0	146427	-0	-0	53139
24	INPC	0.966315	BNGA(0.0	0	-494562	-1413408	12774010	-5477.21	-0	157123.8	-7330.13	-0	210277.9
25	MAYA	0.864633	BSWD(2.6	0	-1055380	-0	6741051	-34150.8	-86135.1	131997.1	-23060.5	-0	147294.5
26	MCOR	1	MCOR(1.0(	1	-0	-0	3625685	-0	-0	141794	-0	-0	170355
27	MEGA	0.820639	BJTM(0.45	0	-6094750	-0	27885534	-278817	-742019	533664.1	-138099	-0	631848.3
28	NISP	0.930315	AGRO(0.0	0	-2747393	-0	36678561	-57879.9	-441660	331055	-62282.7	-144485	687009.6
29	PNBN	1	PNBN(1.0(	8	-0	-0	75279720	-0	-0	1763280	-0	-0	705290
30	SDRA	1	SDRA(1.0(	3	-0	-0	2550806	-0	-0	60449	-0	-0	72011

Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (Interest Income (Y2))
-0	-0	11448953	0	0	2.33E+08	0	0	44615162
-0	-0	435035	0	0	6129035	0	0	829934
-30858.4	-37442.2	169660.3	0	432773.7	2250724	0	0	336727
-6080.19	-35558.4	573907.4	0	0	11292512	0	0	1466029
-331741	-0	7392033	0	0	1.5E+08	0	3169200	23829802
-231409	-104603	1700089	0	0	29398321	0	0	3832626
-739691	-0	6376989	0	0	1.29E+08	0	1503814	20341211
-0	-0	212053	0	0	3657670	0	0	436289
-0	-277606	11448953	0	0	2.33E+08	0	0	44615162
-0	-0	3143934	0	0	50668815	0	0	6498752
-0	-0	4509295	0	0	73268325	0	0	14417745
-0	-0	2254731	0	0	21491791	0	0	4894312
-0	-0	704403	0	0	12906721	0	0	2698293
-27566.9	-0	92707.05	0	0	1694149	0	0	231272
-1570207	-0	12824391	0	0	2.33E+08	0	0	33931650
-27466	-0	79065.99	0	125098	1279437	0	0	239141
-0	-0	5122137	0	0	1.04E+08	0	0	12448430
-291718	-0	2633091	0	0	48656349	0	0	6653011
-146730	-0	2651388	0	0	51253361	0	366960.6	6282738
-32874.4	-0	464777.6	0	0	6934158	0	65296.97	981405
-0	-0	81993	0	0	1050806	0	0	167356
-0	-0	2065517	0	0	23357507	0	0	5604781
-0	-0	607796	0	0	3187219	0	0	726442
-30931.2	-207088	680229.5	0	0	10987290	0	0	1505177
-76761.4	-0	490299.6	0	0	5931676	0	0	1050087
-0	-0	567061	0	0	2962103	0	0	1051114
-342648	-0	1567731	0	0	23613208	0	0	4090908
-114367	-0	1526833	0	0	30918196	0	447660	4082049
-0	-0	3981493	0	0	55682562	0	0	8183967
-0	-0	181216	0	0	2507415	0	0	444148

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (
1	AGRO	1	AGRO(1.0(	0	-0	-0	3.84E+08	-0	-0	2631958	-0	-0	8700847
2	BABP	0.969611	BBNP(0.40	0	-182679	-0	5828684	-1705	-0	54401	-5463.99	-25410.3	148927.7
3	BACA	0.798118	BJBR(0.01	0	-802610	-0	3173031	-28170	-46757.3	64609.73	-9164.43	-0	36230.57
4	BAEK	1	BAEK(1.00	0	-0	-0	20072498	-0	-0	156694	-0	-0	450401
5	BBCA	1	BBCA(1.00	2	-0	-0	3.24E+08	-0	-0	4144659	-0	-0	5204359
6	BBKP	1	BBKP(1.00	0	-0	-0	47929226	-0	-0	624507	-0	-0	613296
7	BBNI	0.936444	BBCA(0.32	0	-1.5E+07	-0	2.17E+08	-257572	-935373	2859763	-320457	-397296	4324408
8	BBNP	1	BBNP(1.00	2	-0	-0	5653943	-0	-0	36181	-0	-0	120920
9	BBRI	1	BBRI(1.00(	1	-0	-0	3.84E+08	-0	-0	1852818	-0	-0	8700847
10	BBTN	1	BBTN(1.00	2	-0	-0	61970015	-0	-0	1497455	-0	-0	1321601
11	BDMN	1	BDMN(1.0(	2	-0	-0	85978327	-0	-0	1898695	-0	-0	4413075
12	BJBR	1	BJBR(1.00	1	-0	-0	37008488	-0	-0	559884	-0	-0	762652
13	BJTM	1	BJTM(1.00	5	-0	-0	20142131	-0	-0	176457	-0	-0	566650
14	BKSW	0.835934	BDMN(0.0(	0	-433866	-0	2210599	-5058.8	-0	25775.2	-14929.8	-19703	56366.19
15	BMRI	0.939508	BBCA(0.29	0	-2.3E+07	-0	3.61E+08	-365933	-905394	4777919	-409319	-0	6357152
16	BNBA	0.808015	BJTM(0.06	0	-464606	-0	1955409	-21857.8	-70909.3	21084.84	-11470.5	-0	48276.49
17	BNGA	1	BNGA(1.0(	10	-0	-0	1.32E+08	-0	-0	1402994	-0	-0	2227739
18	BNII	0.926911	BBTN(0.06	0	-5139837	-0	65183080	-67452.7	-0	855430.3	-140274	-339513	1439433
19	BNLI	0.95917	BBNP(1.13	0	-3380050	-1356777	78046460	-29844	-0	701088	-61672.6	-0	1448796
20	BSIM	0.903929	BSWD(0.4	0	-1426954	-880095	12546015	-34042.9	-63705.3	256601.8	-13923.2	-0	131002.8
21	BSWD	1	BSWD(1.0(	3	-0	-0	1675844	-0	-0	18328	-0	-0	23844
22	BTPN	1	BTPN(1.00	6	-0	-0	35618000	-0	-0	420170	-0	-0	1382216
23	BVIC	1	BVIC(1.00(	0	-0	-0	9249008	-0	-0	158518	-0	-0	73735
24	INPC	0.963337	BNGA(0.07	0	-597480	-1231851	14467307	-5908.39	-0	155246.6	-8867.59	-0	233001.4
25	MAYA	0.876582	BBTN(0.07	0	-1316536	-0	9350722	-70909.8	-307552	196086.2	-27387.5	-0	194520.5
26	MCOR	0.923163	BNGA(0.01	0	-446709	-0	5366983	-9323.61	-42979.4	69039	-6347.08	-0	76256.92
27	MEGA	0.788685	BJTM(0.96	0	-1E+07	-0	38754930	-390190	-925989	530304	-225270	-0	840767.1
28	NISP	1	NISP(1.00(	2	-0	-0	47419539	-0	-0	835414	-0	-0	949353
29	PNBN	1	PNBN(1.0(	7	-0	-0	85748532	-0	-0	1805408	-0	-0	874835
30	SDRA	0.944765	BJTM(0.00	0	-225800	-0	3862192	-4817.64	-25454.6	56948.73	-5209.64	-0	89108.36

Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (Interest Income (Y2))
-0	-0	13737272	0	0	2.69E+08	0	0	48164348
-14005.2	-83370.6	363490.2	0	0	5105397	0	0	823520
-55590.4	-27716.1	192054.5	0	782114.3	2522904	0	0	385805
-0	-0	656532	0	0	13861166	0	0	1585094
-0	-0	7730157	0	0	1.98E+08	0	0	25783993
-0	-0	2516190	0	0	39851153	0	0	4617461
-476411	-0	7019571	0	0	1.57E+08	0	0	20691796
-0	-0	318641	0	0	4810026	0	0	612590
-0	-0	13737272	0	0	2.69E+08	0	0	48164348
-0	-0	3770231	0	0	62619586	0	0	7556104
-0	-0	6033390	0	0	85462799	0	0	16882491
-0	-0	2915841	0	0	26490566	0	0	5977050
-0	-0	816121	0	0	16034443	0	0	2775461
-22281.9	-0	113529.1	0	0	1983974	0	0	294564
-965097	-0	14988940	0	0	2.99E+08	0	13230437	35006419
-21808.7	-0	91787.3	0	0	1609854	0	0	264371
-0	-0	6864464	0	0	1.23E+08	0	0	14791294
-286507	-34992.3	3598473	0	0	61691239	0	0	8135520
-161960	-0	3804715	0	0	68204434	0	1255975	8963935
-76716.4	-0	721818.6	0	0	10135442	0	141322.2	1451494
-0	-0	81127	0	0	1413686	0	0	177633
-0	-0	2829705	0	0	30439736	0	0	7465651
-0	-0	679073	0	0	5558635	0	0	850905
-35260	-188852	737624.6	0	0	13111321	0	51894.17	1596659
-88133.8	-34630.5	591341.7	0	0	8569366	0	0	1267878
-22965.9	-0	275924.1	0	0	4626933	0	99329.3	589641.3
-525157	-0	1960027	0	0	31406691	0	0	5191379
-0	-0	1931724	0	0	40541352	0	0	4187166
-0	-0	4982909	0	0	69079311	0	0	9973149
-14631.8	-0	250270.2	0	0	3311921	0	0	585141

NO	DMU	Score	Benchmark(Lambda)	Times as a benchmark for another	Proportionate Movement (Deposits	Slack Movement (Deposits (X1))	Projection (Deposits (X1))	Proportionate Movement (Fixed Capital(X3))	Slack Movement (Fixed
1	AGRO	1	AGRO(1.000000)	4	-0	-0	450166383	-0	-0
2	BABP	0.928539	BBNP(0.573115); BNLI(0.010(	0	-459765.9428	-0	5973999.057	-2931.561577	-0
3	BACA	0.792988	BJTM(0.020666); PNBN(0.03:	0	-989108.7552	-8477.619248	3780432.626	-30835.51879	-45529.72196
4	BAEK	0.96028	AGRO(0.006698); BBCA(0.01	0	-832543.4415	-0	20128005.56	-9517.31902	-0
5	BBCA	1	BBCA(1.000000)	4	-0	-0	370507012	-0	-0
6	BBKP	0.967989	BBCA(0.005966); BNGA(0.02(	0	-1727242.768	-3121163.388	49109351.84	-19465.09983	-0
7	BBNI	0.985223	AGRO(0.044446); BBCA(0.42	0	-3807368.8	-0	253853472.2	-67848.37318	-877946.9821
8	BBNP	1	BBNP(1.000000)	1	-0	-0	6925186	-0	-0
9	BBRI	1	AGRO(1.000000)	0	-0	-0	450166383	-0	-779455
10	BBTN	1	BBTN(1.000000)	6	-0	-0	80667983	-0	-0
11	BDMN	1	BDMN(1.000000)	2	-0	-0	89897866	-0	-0
12	BJBR	1	BJBR(1.000000)	0	-0	-0	47632863	-0	-0
13	BJTM	1	BJTM(1.000000)	5	-0	-0	22209673	-0	-0
14	BKSW	0.918027	BBTN(0.011426); BNGA(0.01!	0	-297815.864	-0	3335268.136	-9697.604663	-63980.67646
15	BMRI	1	BMRI(1.000000)	1	-0	-0	442837863	-0	-0
16	BNBA	0.881621	AGRO(0.001978); BDMN(0.0(	0	-340320.0636	-0	2534520.936	-15810.19139	-91204.70922
17	BNGA	1	BNGA(1.000000)	7	-0	-0	151015119	-0	-0
18	BNII	0.93026	BDMN(0.098206); BNGA(0.33	0	-5993923.343	-0	79952723.66	-71025.63671	-0
19	BNLI	1	BNLI(1.000000)	1	-0	-0	104914477	-0	-0
20	BSIM	0.910634	BBTN(0.017230); BJTM(0.18(	0	-1149310.023	-0	11711403.98	-44156.61333	-264672.4743
21	BSWD	1	BSWD(1.000000)	4	-0	-0	1972256	-0	-0
22	BTPN	1	BTPN(1.000000)	8	-0	-0	45072603	-0	-0
23	BVIC	0.99124	BSWD(0.494082); PNBN(0.0(	0	-100878.673	-1361936.954	10052916.37	-1729.019752	-0
24	INPC	0.92594	BBTN(0.100286); BTPN(0.01(	0	-1288574.643	-0	16110539.36	-53820.28264	-356963.6876
25	MAYA	0.864007	BBTN(0.062382); BJTM(0.07!	0	-2061732.625	-0	13098886.38	-76919.34193	-251234.5501
26	MCOR	0.858328	BBTN(0.030334); BTPN(0.01!	0	-793148.7169	-0	4805332.283	-16281.38597	-8947.784668
27	MEGA	0.821284	BJTM(1.577993); BTPN(0.07(	0	-8983757.932	-0	41284637.07	-337290.7433	-1134719.727
28	NISP	0.960945	BBCA(0.000349); BMRI(0.059	0	-2373013.504	-0	58387666.5	-31303.54866	-0
29	PNBN	1	PNBN(1.000000)	9	-0	-0	102695260	-0	-0
30	SDRA	0.932568	BBTN(0.011439); BJTM(0.021	0	-419879.6323	-0	5806829.368	-8888.822852	-24781.67827

Slack Movement	Projection (Interest Income (Y2))
0	49610421
0	688882
0	431486
325402	2035613.072
0	28885290
0	5126381
0	22704515
0	735796
0	49610421
0	8818579
0	18858281
0	6795686
0	2883065
23243.1	359602.1367
0	27530592
0	311555
0	16195571
0	9482583
0	9185865
0	1451584
0	203913
0	9292972
0	1117271
0	1859222
0	1563359
0	598070
0	5581049
141802	5065983.825
0	11498857
0	801920

Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (Interest Income (Y2))
-0	-0	224659	0	0	1964360	0	0	334005
-0	-0	408995	0	0	4667760	0	0	706862
-0	-0	115997	0	0	669775	0	0	174954
-0	-0	843350	0	0	9757605	0	0	1536199
-0	-0	6944833	0	0	1.1E+08	0	0	19301181
-0	-0	1903932	0	0	22401357	0	0	3371830
-0	-0	6716256	0	0	1.06E+08	0	0	16628139
-0	-0	203144	0	0	2149250	0	0	315999
-0	-0	8445579	0	0	1.52E+08	0	0	28096633
-0	-0	2606694	0	0	31468636	0	0	4567026
-0	-0	6841478	0	0	63410474	0	0	16118989
-16613.4	-0	1237011	0	0	15525995	0	0	2997885
-0	-0	730057	0	0	7279212	0	0	2024900
-18975.1	-0	114407.9	0	0	1470799	0	11073.25	219410.3
-0	-0	12371417	0	0	1.63E+08	0	0	27336237
-0	-0	93434	0	0	935451	0	0	210117
-0	-0	4997335	0	0	72790651	0	0	9795732
-286107	-68911.8	2831647	0	0	34344477	0	0	5942647
-98393.8	-0	2231434	0	0	33660871	0	557555.5	4889611
-0	-0	425759	0	0	4228779	0	0	601035
-0	-0	69459	0	0	860909	0	0	126819
-2550.72	-41589.3	1036457	0	0	10125293	0	0	2387577
-0	-0	406684	0	0	2122976	0	0	523425
-0	-0	807116	0	0	9641673	0	0	1137150
-212778	-223144	315261.5	0	0	3531385	0	0	616770
-710.895	-0	124966.1	0	0	1409483	0	3377.189	208114.2
-230783	-0	1881430	0	1650558	20399609	0	0	3699937
-56384.2	-0	1328730	0	0	20401154	0	312273.7	3098005
-0	-0	3451922	0	0	35282456	0	0	6011625
-0	-0	128120	0	0	1498742	0	0	302924

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection
1	AGRO	1	AGRO(1.0(	2	-0	-0	2454296	-0	-0	9417	-0	-0	45723
2	BABP	0.94516	BBTN(0.04	0	-325902	-0	5616875	-6141.58	-0	105849.4	-6946.36	-0	119719.6
3	BACA	1	BACA(1.00	0	-0	-0	2451524	-0	-0	87631	-0	-0	19659
4	BAEK	1	BAEK(1.00	0	-0	-0	19002157	-0	-0	117883	-0	-0	229531
5	BBCA	0.975841	BBRI(0.60:	0	-5922337	-7.9E+07	1.6E+08	-71782.9	-1906627	992859	-101144	-0	4085473
6	BBKP	0.944877	BNGA(0.1(	0	-1759293	-507630	29648581	-34640.3	-0	593772.7	-26218.6	-0	449416.4
7	BBNI	0.9376	BBRI(0.25:	0	-1.2E+07	-3E+07	1.47E+08	-231375	-1811586	1664978	-215904	-0	3244096
8	BBNP	1	BBNP(1.00	0	-0	-0	3473106	-0	-0	24865	-0	-0	51659
9	BBRI	1	BBRI(1.00(	8	-0	-0	2.56E+08	-0	-0	1366212	-0	-0	6675793
10	BBTN	1	BBTN(1.00	4	-0	-0	40214954	-0	-0	1236672	-0	-0	937075
11	BDMN	1	BDMN(1.0(	6	-0	-0	67216228	-0	-0	1549504	-0	-0	3003000
12	BJBR	0.934666	BBRI(0.00(	0	-1511694	-0	21626256	-34486.9	-18329.5	475038.7	-46469	-0	664784
13	BJTM	1	BJTM(1.00	0	-0	-0	14531383	-0	-0	101448	-0	-0	437463
14	BKSW	0.855178	BBRI(0.00:	0	-309913	-28109.6	1801935	-5658.05	-16733	16677.93	-5737.13	-0	33877.87
15	BMRI	1	BMRI(1.00(	1	-0	-0	3.2E+08	-0	-0	4963306	-0	-0	4853601
16	BNBA	1	BNBA(1.00	0	-0	-0	1927093	-0	-0	106996	-0	-0	47722
17	BNGA	1	BNGA(1.0(	10	-0	-0	86248005	-0	-0	1258532	-0	-0	1936133
18	BNII	0.864351	AGRO(0.3(	0	-6421816	-0	40919432	-100204	-0	638496.6	-171680	-0	1093935
19	BNLI	0.913901	BBTN(0.38	0	-3936492	-0	41784146	-97288.9	-168869	863809.9	-99463.9	-92550.7	963215.4
20	BSIM	1	BSIM(1.00(	0	-0	-0	6832422	-0	-0	217524	-0	-0	72534
21	BSWD	1	BSWD(1.0(	6	-0	-0	1210110	-0	-0	13485	-0	-0	18429
22	BTPN	0.977721	AGRO(0.7:	0	-412487	-0	18102301	-7687.74	-0	337382.3	-20374.7	-230958	663200.7
23	BVIC	1	BVIC(1.00(	0	-0	-0	5658975	-0	-0	162745	-0	-0	35787
24	INPC	1	INPC(1.00(	2	-0	-0	13071296	-0	-0	153448	-0	-0	203225
25	MAYA	0.654775	BBTN(0.02	0	-2053901	-0	3895558	-45061.2	-0	85465.83	-39880.7	-0	75640.27
26	MCOR	0.969227	BBTN(0.03	0	-177918	-0	5603656	-7608.02	-97489.2	142130.8	-4373.59	-0	137749.4
27	MEGA	0.796156	BBRI(0.03:	0	-6686852	-0	26116880	-269333	-521892	530043.2	-125348	-0	489572.9
28	NISP	0.843351	BBRI(0.04:	0	-4733321	-387021	25095702	-125998	-414377	263957.5	-110340	-0	594035.2
29	PNBN	1	PNBN(1.0(	9	-0	-0	56234487	-0	-0	1702829	-0	-0	533832
30	SDRA	1	SDRA(1.0(	6	-0	-0	2027791	-0	-0	38284	-0	-0	53330

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (	Proportion	Slack Move	Projection (
1	AGRO	1	AGRO(1.0(	6	-0	-0	3.34E+08	-0	-0	1568945	-0	-0	8675721
2	BABP	1	BABP(1.00	0	-0	-0	7213672	-0	-0	64108	-0	-0	166285
3	BACA	0.965507	BSWD(0.7(	0	-124770	-122120	3370411	-3471.78	-42164.3	55016.92	-1141.46	-0	31951.54
4	BAEK	0.991932	AGRO(0.0(	0	-148394	-4716542	13529156	-960.332	-0	118076.7	-2066.49	-0	254083.5
5	BBCA	0.96029	AGRO(0.3!	0	-1.1E+07	-7.1E+07	1.95E+08	-135289	-1912679	1358988	-180465	-0	4364146
6	BBKP	0.887794	BNGA(0.17	0	-4642756	-935076	35799423	-70935.4	-0	561256.6	-62420.7	-0	493886.3
7	BBNI	0.896535	AGRO(0.2(	0	-2E+07	-7259720	1.67E+08	-397105	-2273024	1167950	-426961	-0	3699679
8	BBNP	1	BBNP(1.00	1	-0	-0	4544400	-0	-0	33157	-0	-0	86878
9	BBRI	1	AGRO(1.0(	0	-0	-0	3.34E+08	-0	-0	1568945	-0	-0	8675721
10	BBTN	1	BBTN(1.00	4	-0	-0	47546047	-0	-0	1450837	-0	-0	1136484
11	BDMN	1	BDMN(1.0(	1	-0	-0	79642803	-0	-0	1771489	-0	-0	3838754
12	BJBR	1	BJBR(1.00	1	-0	-0	31019700	-0	-0	549014	-0	-0	696880
13	BJTM	1	BJTM(1.00	3	-0	-0	16218749	-0	-0	154855	-0	-0	537297
14	BKSW	0.943883	AGRO(0.0(	0	-133447	-95932.9	2148612	-2299.86	-18219.8	20463.38	-3107.51	-7130.98	45136.52
15	BMRI	1	BMRI(1.00	1	-0	-0	3.37E+08	-0	-0	5253057	-0	-0	5802173
16	BNBA	0.935366	BJTM(0.02	0	-139580	-368260	1651701	-7012.39	-81391.7	20089.92	-3516.15	-15115.8	35769.08
17	BNGA	1	BNGA(1.0(	8	-0	-0	1.18E+08	-0	-0	1191857	-0	-0	1991272
18	BNII	0.900454	BBTN(0.08	0	-5962985	-0	53938975	-81302.9	-0	735436.1	-156412	-176277	1238564
19	BNLI	0.947987	BBTN(0.13	0	-3113740	-0	56751187	-39724	-0	724011	-66678.3	-192351	1022930
20	BSIM	0.969185	BNGA(0.0(	0	-302575	-508166	9008473	-7025.01	-34744.5	186207.5	-3201.79	-0	100703.2
21	BSWD	1	BSWD(1.0(	8	-0	-0	1226475	-0	-0	16156	-0	-0	21129
22	BTPN	1	BTPN(1.00	2	-0	-0	25603458	-0	-0	350782	-0	-0	1291406
23	BVIC	1	BVIC(1.00(	1	-0	-0	8896067	-0	-0	146427	-0	-0	53139
24	INPC	1	INPC(1.00(	0	-0	-0	14681980	-0	-0	162601	-0	-0	217608
25	MAYA	0.874142	BBTN(0.02	0	-981239	-0	6815192	-31751.7	-39933.8	180597.5	-21440.5	-0	148914.5
26	MCOR	1	MCOR(1.0(	2	-0	-0	3625685	-0	-0	141794	-0	-0	170355
27	MEGA	0.845095	BBTN(0.13	0	-5263710	-0	28716574	-240800	-753556	560144.8	-119268	-0	650678.5
28	NISP	0.943674	AGRO(0.0:	0	-2220711	-0	37205243	-46784.2	-457851	325959.5	-50343	-124988	718445.8
29	PNBN	1	PNBN(1.0(	5	-0	-0	75279720	-0	-0	1763280	-0	-0	705290
30	SDRA	1	SDRA(1.0(	3	-0	-0	2550806	-0	-0	60449	-0	-0	72011

NO	DMU	Score	Benchmark	Times as a	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection	Proportion	Slack Move	Projection
1	AGRO	1	AGRO(1.0(	2	-0	-0	3.84E+08	-0	-0	2631958	-0	-0	8700847
2	BABP	0.984111	BBNP(0.41	0	-95511.8	-0	5915851	-891.442	-0	55214.56	-2856.79	-29454	147491.2
3	BACA	0.908067	BSWD(0.9	0	-365493	-0	3610148	-12828.1	-68974.5	57734.43	-4173.3	-0	41221.7
4	BAEK	1	BAEK(1.00	0	-0	-0	20072498	-0	-0	156694	-0	-0	450401
5	BBCA	1	BBCA(1.00	1	-0	-0	3.24E+08	-0	-0	4144659	-0	-0	5204359
6	BBKP	1	BBKP(1.00	2	-0	-0	47929226	-0	-0	624507	-0	-0	613296
7	BBNI	0.959452	AGRO(0.0	0	-9378483	-0	2.22E+08	-164328	-1299171	2589209	-204447	-1024524	3813190
8	BBNP	1	BBNP(1.00	2	-0	-0	5653943	-0	-0	36181	-0	-0	120920
9	BBRI	1	BBRI(1.00(	1	-0	-0	3.84E+08	-0	-0	1852818	-0	-0	8700847
10	BBTN	1	BBTN(1.00	3	-0	-0	61970015	-0	-0	1497455	-0	-0	1321601
11	BDMN	1	BDMN(1.0(	3	-0	-0	85978327	-0	-0	1898695	-0	-0	4413075
12	BJBR	1	BJBR(1.00	0	-0	-0	37008488	-0	-0	559884	-0	-0	762652
13	BJTM	1	BJTM(1.00	3	-0	-0	20142131	-0	-0	176457	-0	-0	566650
14	BKSW	0.885802	BDMN(0.0(	0	-301993	-0	2342472	-3521.19	-0	27312.81	-10391.9	-30945.2	49661.9
15	BMRI	1	BMRI(1.00	0	-0	-0	3.85E+08	-0	-0	6049246	-0	-0	6766471
16	BNBA	0.937565	BDMN(0.0(	0	-151095	-0	2268920	-7108.4	-82547	24196.63	-3730.33	-13436.1	42580.54
17	BNGA	1	BNGA(1.0(	7	-0	-0	1.32E+08	-0	-0	1402994	-0	-0	2227739
18	BNII	0.92791	BBTN(0.06	0	-5069585	-0	65253332	-66530.7	-0	856352.3	-138357	-343548	1437315
19	BNLI	0.96311	BBNP(0.52	0	-3053901	-1324577	78404809	-26964.3	-0	703967.7	-55721.7	-0	1454747
20	BSIM	0.920247	BSWD(0.8	0	-1184573	-977770	12690721	-28260.4	-75155.2	250934.4	-11558.3	-0	133367.7
21	BSWD	1	BSWD(1.0	10	-0	-0	1675844	-0	-0	18328	-0	-0	23844
22	BTPN	1	BTPN(1.00	5	-0	-0	35618000	-0	-0	420170	-0	-0	1382216
23	BVIC	1	BVIC(1.00(	2	-0	-0	9249008	-0	-0	158518	-0	-0	73735
24	INPC	0.965098	BBKP(0.02	0	-568784	-1408094	14319760	-5624.62	-0	155530.4	-8441.69	-0	233427.3
25	MAYA	0.885213	BBTN(0.06	0	-1224468	-0	9442790	-65950.9	-327952	180644.7	-25472.3	-0	196435.7
26	MCOR	0.924291	BBKP(0.04	0	-440147	-0	5373545	-9186.64	-47126.3	65029.1	-6253.84	-0	76350.16
27	MEGA	0.789515	AGRO(0.0	0	-1E+07	-0	38795748	-388656	-957104	500723.2	-224384	-0	841652.6
28	NISP	1	NISP(1.00(	1	-0	-0	47419539	-0	-0	835414	-0	-0	949353
29	PNBN	1	PNBN(1.0(	6	-0	-0	85748532	-0	-0	1805408	-0	-0	874835
30	SDRA	0.96296	BBTN(0.00	0	-151418	-0	3936574	-3230.65	-31336.1	52654.22	-3493.52	-0	90824.48