THE EFFECT OF COST EFFICIENCY ON STOCK PERFORMANCE OF LISTED BANK IN INDONESIA

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Abstract
The aim of this research was to investigate the effect of cost efficiency on stock performance of listed bank in Indonesia. DEA was employed to measure cost efficiency of each bank, while linear regression used to analyze the effect of cost efficiency on stock performance. Abnormal return was used as proxy of stock performance. Based on the result of study, cost efficiency gave no impact on stock performance. Shareholders tend to observe the company's profits than the cost of the company.

Keywords: Cost Efficiency, Stock Performance, Abnormal Return, Data Envelopment Analysis

I. Introduction

The ultimate financial goal for the company is creating value. It can be achieved by having good management of resources and internal process. The process of goods or services production requires the transformation from resources to be finished goods or services. The more efficient the process the higher value of added goods or services produced (Heizer and Render, 2009: 18). Increasing productivity means improving the efficiency of the company, while the concept of efficiency is a comparison between inputs and outputs. Input is the resources used to produce the output, while the output is the results after all. Efficiency is one of the parameters of banks’ performance, and that performance measures it underlying the organization. Farrel (1957) gives a contribution to measure efficiency and productivity in micro level.

Previous researchers found that efficiency gives impact on stock performance. Chu and Lim (1998) found that changes in stock prices reflect changes in efficiency. Liadaki and Gaganis (2010) stated that profit efficiency can improve the performance of the stock. Aftab et al (2011) did the research of the Bank listed on the Karachi Stock Exchange, and they found that the efficiency of the bank's influence on shares performance.

Efficiency ratio will produce a value between 0 and 1. The amount 1 indicates that Decision Making Unit (DMU) is in full efficient condition. There are two methods to measure the efficiency, parametric and nonparametric. Parametric estimate the efficiency by statistical methods. On the other hand, non-parametric methods rely on linear programming to calculate linear segments related to the frontier. Parametric method determines the level of inefficiency based on explicit functional form either from the frontier itself or standard deviation frontier. Contrary to the nonparametric method, parametric method does not formulate the assumption of
the functional form of the frontier as well as assumptions about the distribution of efficiency. Defining the input-output which is used to calculate the efficiency is one of the important stages, either by using the method of parametric or nonparametric.

Data Envelopment Analysis (DEA) is a nonparametric approach used to measure the efficiency. DEA is a technique to evaluate the relative efficiency of decision-making units (DMU). DEA uses linear program as the base of measurement (Fiorentino et al. 2006), that allows to compare the efficiency of a combination of several units of input (Cooper et al., 2000: 52), and several units of output (Casu and Molineux, 1999). The advantage of DEA if it is compared with traditional financial ratio is that DEA is able to reveal the precise relationship between various input and output that cannot be explained by traditional financial ratio (Wang et al., 2004).

According to Berger and Mester (1997), cost efficiency can provide a result of calculation of the difference between the costs incurred by the bank against the best practice cost to generate a set of output in the same condition. To calculate the cost-efficiency, cost minimization need to be calculated in advance, and can be calculated by using the approach of DEA. The calculation formula of DEA cost minimization (Coelli, Rao and Battese, Donnel, 2005: 184) is as follow:

\[
\begin{align*}
\text{Min} & \quad \lambda x_i^* w_i', \lambda x_i^*, \\
& - q_i + Q \lambda \geq 0, \\
& x_i^* - X \lambda \geq 0, \\
& I 1' \lambda = 1 \\
\lambda \geq 0 & \quad \text{........................................(1)}
\end{align*}
\]

Where : \(w_i' = NX1\) vector of input prices for Bank-i  
\(x_i^* = \text{cost minimizing vector}\) from input quantity bank-i

The total of cost efficiency of the bank is:

\[
\text{CE} = w_i' x_i^*/w_i' x\text{...........................................(2)}
\]

Sources: (Coelli et al., 2005: 184)

According to Berger and Mester (1997), the ratio of cost efficiency is the proportion of costs or resources used efficiently. Furthermore, when banks generate cost efficiencies of 70%, it means that there has been a waste of 30% of the costs when it is compared to best practice condition. Distance (range) of the efficiency is 0 to 1. The result which is equivalent to 1 shows that the bank has reached best practice.

The capital market research found that the information of stock price was related to profit information although the magnitude of change in the stock price does not always reflect the magnitude of the change in profit (Kothari 2001). Chu and Lim (1998) found that changes in stock prices reflect changes in efficiency. Liadaki and Gaganis (2010) stated that profit efficiency can improve the performance of the stock. Furthermore, Aftab et al (2011) did research on the
Bank listed on the Karachi Stock Exchange and found that the efficiency of the banks influence on performance shares. Banking as an intermediation institution has an important role in the economy of the country, so it is required to have good performance. One of important aspects in banking performance measurement is efficiency that can be enhanced through cost reduction in the production process. Efficiency is one of the principles which are being foundation to guide the bank in a safe and healthy condition (Sitompul, 2004). Input and output management are able to streamline the operational activities of the bank so that the bank has a high power competition. The purpose of the company is to achieve stockholder’s wealth which is reflected by the return obtained from stock. More efficient bank will improve through its performance that can be reflected on stock prices, while the shareholders’ wealth can be achieved with the rise in stock prices. Efficiency is a crucial issue, Liadaki and Gaganis (2010) stated that profit efficiency can improve the performance of the stock. These findings were support the research conducted by Chu and Lim (1998). They found that changes in efficiency are reflected on stock price changes. Fiordelisi and Molyneux (2010) found that the efficiency was the determinant of shareholders’ value creation, and it can increase shareholders’ value. Based on the description above, the research hypotheses can be formulated as follows:

\[ H_1: \text{Cost efficiency give positive impact on abnormal return} \]

**Research Methodology**

The unit of analysis in this study was bank, and the population of this research is listed bank in the Indonesia Stock Exchange of 2004 to 2011. The data is taken in the form of a combination of data time series and cross sectional (panel data), so the number of observation data is 112 during 2004 up to 2011.

1. **Independent variable: cost efficiency.**

   Efficiency level measurement techniques of banking institutions can be divided into two major groups: non-parametric and parametric. In this study, the method used to calculate the efficiency score is a non-parametric, Data Envelopment Analysis (DEA).

   Intermediary approach is employed to determine inputs and outputs. Inputs are used to calculate the efficiency score, such as: deposits, labor, and capital; while the output is for calculating loans and investments. Deposit is a third-party fund held by banks, labor is the operational costs incurred related costs for employees, while the capital is capital owned by bank. Loan is the amount of credit granted by Bank balance sheets or reports obtained from the consolidated financial position, while investment is obtained from the securities data owned by the bank and shown in the balance sheet or the consolidated financial position and noted to the financial statements.

2. **Dependent variable : market performance (abnormal return)**

   The performance of the stock market reflects the appreciation of the company. If the company is considered to have good performance, then the market will react positively. Otherwise, once the company has bad performance, then markets will react negatively. This research does not use change in stock prices as a reference stock performance change as a research conducted by Lim Chu (1998), as well as Liadaki and Gaganis (2010), but it is using the abnormal return. The approach used to calculate abnormal return is to use Adjusted Market Model. Adjusted Market model assumes that estimator is
the best side to estimate return from securities market index at the moment. The advantage of using this model is it is not necessary to use estimation period to form the model estimation due to return securities that are being estimated with market index return. So your expected return is equal with the market return at that time. The formula used is as follows:

\[
ARit = Rit - ER
\]

Where:
\[
\begin{align*}
Arit & = \text{abnormal return (i share at t day)} \\
Rit & = \text{actual return (i share at t day)} \\
ER & = \text{expected return .(calculated using formula)} \\
ER & = (IHSHt - IHSGt-1) \div IHSGt-1
\end{align*}
\]

As the first stage of a two stages, analysis is done by calculating the score of each Bank's efficiency by using Data Envelopment Analysis (DEA). This method is a non-parametric frontier method that uses linear programming models to calculate input and output ratio comparisons for all units in a compared population. The purpose of the method is to measure the levels of DEA efficiency of decision-making unit related to the bank of its kind when all these units are at or below curve efficiency frontier. So, this method is used to evaluate the relative efficiency of multiple objects (benchmarking of the performance). DEA method is to calculate technical efficiency for the entire unit. Efficiency score for each unit is relative, depending on the level of efficiency of other units in the sample.

Each unit in the sample is considered to have positive (not-negative) efficiency level, and the value is between 0 and 1 with the provisions of the single that shows a perfect efficiency. Furthermore, the units that have a value of one are used in making the envelope for the efficiency frontier, whereas other units that exist within the envelope indicate the level of inefficiency.

Next is conducting an analysis of the influence of the efficiency of the stock performance of the variable. Statistics inference analysis that is used to analyze the data in this study is the ordinary least square. Linear regression was used to see the relationship between two variables. The equation for the second model is:

\[
Y = \beta_1 + \beta_2X_i + \epsilon_i
\]

Where:
\[
\begin{align*}
Y & = \text{stock performance- abnormal return (dependent variable)} \\
X & = \text{efficiency score (independent variable)} \\
\epsilon_i & = \text{error level}
\end{align*}
\]

Linear regression has a basic assumption that must be met to generate a good estimation. The assumptions are homoscedastic happens, but multicollinearity and auto correlation doesn't happen.

Linear regression analysis is employed to determine the influence the cost efficiency on abnormal return. Prior to analysis, first test underlying the assumptions does regression analysis, among others, the assumption of normality, not the occurrence of
autocorrelation, and homoscedasticity. The assumption of normality test is using *kolmogorov-smirnov*. If the value of the significance of *kolmogorov-smirnov* is > 0.05, it indicates that the assumption of normality is fulfilled, and if the value of the *kolmogorov-smirnov* is < 0.05, it indicates that the assumption of normality is not met. From the results of the analysis of obtained values, the significance of *kolmogorov-smirnov* of 0.068 is >0.05, the assumption of normality is fulfilled.

There are no autocorrelation based on test (non-autocorrelation) using the Durbin Watson. The result of test showed that D value is 2.046. From the table of statistics, it showed that dL is 1.624 and dU is 1.645. Therefore, the value of D obtained is located between dU and 4-dU (2.046 between 1.645 until 2.355). So, non-autocorrelation assumptions are fulfilled.

Test of *homoscedasticity* assumption is tested using the Spearman Rank correlation coefficient test in which the correlations with the residual absolute regression results between all the variables are free. If the value of Sig (probability) is > 0.05, it indicates that heteroscedasticity does not occurred, but if the value of Sig is < 0.05, it indicates the occurrence of heteroscedasticity. The following is non-heteroscedasticity test table for all variables:

**Table 1.1: Assumption Test (Non-Heteroskedasticity)**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Probability (p)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Efficiency (X)</td>
<td>0.423</td>
<td>Homoskedasticity</td>
</tr>
</tbody>
</table>

Sources: processed data

Table 1.1 indicates that a variable contains no heteroscedasticity because the value of probability >0.05. The test results reveal that all assumptions are met, so that they can be done to further analysis stage of regression analysis with the prediction models parameter. The following is presenting the results of the information of regression analysis:

**Table 1.2: The Result of Hypotheses Regression Analysis**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Hypotheses</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Efficiency (X)</td>
<td>H1</td>
<td>0.368</td>
<td>0.115</td>
</tr>
<tr>
<td>Dependent Variabel = AR (Y)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 = 0.022</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The regression equation is as following:

\[
Y = -0.220 + 0.368X + e
\]

Where:

- \(Y\) : Abnormal Return (AR)
- \(X\) : Cost efficiency
- \(e\) : error level
The result of calculation of the value of R2 is 0.022. It indicates that diversity is dependent variable abnormal return. It only can be explained by 0.2% by the dependent variable that is cost efficiency, whereas the rest 99.8% is explained by other variables than those variables.

To test the hypothesis, t-test is used to test the influence of variable cost-efficiency on abnormal return, and it obtained the value of the coefficient of 0.368 with p-value of 0.115. Since the p-value is greater than 10% (0.115 > 0.10), then it can be said that cost efficiency variable give no significant effect abnormal return. That means regardless of the value of cost efficiency will not result in a change in the value of abnormal return.

The research hypothesis stated that cost-efficiency gives impact on market performance. Based on the results of a statistical analysis of inferential acquired, the cost-efficiency evidence of performance affects the market with positive coefficients. Banking as one of the financial institutions which have a key role is expected to have good performance. One important aspect in banking performance measurement is greater efficiency among others that can be enhanced through cost reduction (reducing cost) in the production process. This is because the efficiency is one of the principles which the Foundation of the banking arrangement is saved and healthy (Sitompul, 2004).

Market performance indicates the market respond to and assesses the outstanding shares. The stock price will show when investors give an assessment of the performance of a company. Investors assess the performance of a company based on the information obtained. The efficient market theory depends on the assumption that all market participants cultivate information rationally. When there is some new information on the market, investors make adjustments by purchasing or selling securities, so the current prices of those securities represent the latest developments in the market. Market which has ideal conditions in the capital markets is efficient. This means that the prices of securities are fully reflecting the knowledge and expectations of the investors at any given time. The more efficient capital market, the more likely securities valued at or close to their intrinsic value.

Several studies by Affandi and Utama (1998), stated that test the level of efficiency of the capital markets showed that Indonesian Stock Exchange has a weak form efficiency and does not show the shape of the half strong among others. This research showed that the level of cost efficiency of banking indicates the absence of influence of the abnormal return stocks. Strengthened the research above, information on the bank's cost-efficiency could be vital information that was not being used by investors in taking decisions. Ioannidis, Molyneoux and Pasiouras (2008) stated that abnormal return gives positive impact on profit efficiency; otherwise cost efficiency does not show any effect. It encouraged because shareholders are more motivated to observe the company's profits, compared to the cost of the company. Dividends earned shareholders such excuse behavior because dividends are distributed based on how much profit the company earned.

Moreover, these studies examine the effects of cost-efficiency performance against banking market. The research results indicate that cost efficiency does not affect the performance of the banking market as measured by using the abnormal return. The results of earlier research show that Indonesia's stock market efficiency is in the form of weak. This indicates that the stock price does not reflect the information that exists on the market. Furthermore, the shareholders tend to observe the company's profits than the cost of the company.
References
Fiordelisi, Franco and Molyneux, Phil. 2010. The Determinants of Shareholder Value in European Banking. Journal of Banking and Finance. 34: 1189-1200