2 LITERATURE REVIEW

Generally, this chapter reviews some previous studies on rice milling and efficiency relative. First, it starts with overview of rice milling industry in Indonesia. Second, it describes a few previous studies about efficiency of production function. Finally, the last section of this chapter gives information about efficiency study in the previous studies.

2.1 Rice Milling Industry Overview

Based on production capacity, rice milling business was divided into three categories. First, Small Scale Rice Mill (SSRM) had a production capacity of 0.5 tons per hour. Most of that consist of Engelberg Rice Mill (ERM). Second, Medium Scale Rice Mill (MSRM) had a production capacity between 0.5-1.0 tons per hour. This category consists of Rice Mill Unit (RMU) and SSRM. Third, larger scale rice mill (LSRM) had a production capacity of more than 10 tons per hour (Winarno, 2004).

In the Karawang regency, production capacity of milling was the main factor that distinguishes between large and small-scale rice milling (Arief, 2008). Other differing factors were owned capital, milling machine capacity, partnerships with BULOG (Mainstay of Food Security), and the owner education level.

In Indonesia, there were a few types of rice milling. It was divided by production capacity, technology, business activity, and so on. In Cikarawang Village, rice millers tend to only offer milling service (Chaerunnisa Sd, 2007). Rice miller cannot take chances in selling rice. It was related to a few reasons, including opportunities, funding, and management.

Based on the technology usage, rice mill industry in Indonesia was still using simple technology (Amsari, 2006). This became one of the causes of low quality and yield of rice produced. Rice produced was less than the production capacity of rice miller in Indonesia. Most rice milling business did not work optimally. Even the average working was approximately one third of maximum capacity.
The production capacity was one characteristic to distinguishing rice miller (Arief, 2008). This referred to the ability of rice miller to produce rice a day. This was closely related to the engine used, capital, amount of grain, and other related factors.

In his research, located in Karawang, the average production capacity of the rice miller was equal to 29.23 tons of rice per day. The largest production capacity was about 60 tons of rice per day and the smallest production capacity was about 20 tons of rice per day. This was related to the ability of large miller to buy grain in large quantities and also supported by the ability of big capital. In addition, small rice miller had an average production capacity about 5.91 tons of rice per day. The largest production capacity was about 15 ton of rice per day and the smallest production capacity was about 2 tons of rice per day.

Most of rice miller in Karawang Regency did drying and processing activities only for 9-10 months a year. The remaining time was used to store and repurchase stock for the next process because at that time farmers had a period of rest or famine.

When viewed from business activities described in this study, rice millers were a private rice miller. Rice miller did activity start from purchase grain, drying, processing, packaging or storing, until sale of rice.

2.2 Efficiency of Variables Used in Study

There were three performance models in the study of technical and scale efficiencies Australian universities (Avkiran, 2001). All model showed slack whether input and output. Input slack means an over-utilized resource. While output slack means less production by uses a set input. Overall, slacks were small.

The other study about efficiency was done in Italian National Parks (Bosetti & Locatelli, 2006). The study used management costs, variable costs, and area extension as input variables. While in output side, they used number of visitors, number of park employees, number of economic businesses, number of protected species and number of students. The results showed that partially the Italian
National Parks in this study still have potential improvements to obtain efficiency. It means whether input used and output produced still inefficient.

The other study was about benchmarking productive efficiency of selected wheat areas. The study used three inputs and single output in her study. There were slacks in two inputs used. It means that areas could reduce both input usage to produce output in the same level. Generally, the wheat areas were inefficient in input used. In addition, it produced output efficiently. It can be seen by zero slack on the output variable.

3. Efficiency Relative

The study described the industry in Central Java (Rejekiningsih, 2011). Measurement of efficiency for each sector in the industrial processing was performing using the DEA assuming variable returns on scale (VRS). It will efficient when the industry has a 100 of efficient score.

The study was uses a sample of 21 industries. The data used some of the output and several inputs used during the period 2000-2005 from each sector the manufacturing of medium and large. Therefore, the input and output were varies, then the efficiency was calculated by transforming a single input and output through the appropriate weighting.

Based on research results, for the period 2000-2005 concluded that the efficiencies were achieved in a very diverse industry. Average efficiency scores for each industry did not reach 100 which means that each sector has not been working efficiently. This suggests of no proper allocation of resources that lead to the less achievement of industrial output. These results are different when compared with the analysis performed for each year. For each year, there are some efficient industries with 100 efficient values. In 2005, the number of the efficient industries more than inefficient industries.

The relative efficiency Among South African universities was done (Taylor Harris, 2004). This study also used the DEA and the 10 universities as the samples. Relative efficiency analysis performed for each year from 1994 to 1997. The analysis begins by specifying DEA models to be used. Of the seven DEA models are analyzed, the model DEA6 was chosen as the model used in the study.
Model selection based on the degree of consistency and stability in the efficiency measures for all universities as samples. Besides, the model was chosen DEA6 because it has high correlation between input and output variables.

Based on the results of the study, the average efficiency is different every year. The samples is said to be efficient when its position in appropriate efficiency frontier. However, the limitations of the DEA are not able to explain the reason for the difference (efficient and inefficient). The study adds the cost accounting profession's analytical review technique to complement the DEA. The study are attempted to explain differences in the efficiencies between the sample characteristics by connecting the inputs used in terms of both quantity and quality of the efficiencies that may occur (positive or negative). Generally, South African universities were inefficient in every year.

The research is technical and economic efficiency measures under short run profit maximizing behavior (Cherchye, Kuosmanen, & Leleu, 2010). Differ with previous researches; this research has examined the measurement of economic and technical efficiency in the framework of short run profit maximization behavior, drawing special attention on the corresponding duality relationship. Research is dividing into two steps. First, is by searching alternative profit efficiency (PE) measures through literature review. Then identify Varian’s percentage profit efficiency measure for evaluating short run profit efficiency. Second, is establishing the dual link between the economic efficiency measure and the (quantity based) McFadden gauge function. (1) The technical efficiency (TE) should be interpretable as the PE at the input and output shadow price vectors; (2) The TE should provide an upper bound for the PE at all prices. The McFadden gauge as such a technical efficiency measure. This is capturing the maximal radial expansion of the variable input and output vectors (simultaneously).

The McFadden gauge function has considered the choice of measurement direction from the perspective of the evaluated firm within the general directional distance function framework. The McFadden gauge function is the optimal measurement direction for the evaluated firm in the sense that the corresponding reference production plan and associated shadow prices implies minimal profit inefficiency.
DEA was used to examine the relative efficiency of Australian universities (Avkiran, 2001). This study used cross section data for 1995 of 36 Australian universities. Three performance models were developed, namely overall performance, performance on delivery of educational services, and performance on fee-paying enrolments. This study is under both of output maximization and Variable Return to Scale (VRS). The results of this study are list of universities which is efficient and inefficient, list of universities which is operate at Increasing Return to Scale (IRS), Most Productive Scale Size (MPSS), and Decreasing Return to Scale (DRS), and slack of each university. Generally, three performance models showed that universities were inefficient.

The other research analyzed the level of bank efficiency on using approach DEA (Jemric & Vujcic, 2002). This study analyzed the level of bank efficiency Croatia. Usage of the DEA method is able to classify efficient and inefficient banks based on a certain size that have been previously defined. The research is also able to identify the factors of leading cause of inefficiency in the banking system in Croatia.

DEA method was also used to analyze the technical efficiency of usage of production input in on-farm of paddy rice in Central Java (Purnomo, 2006). Usage of the DEA method can determine efficient and inefficient production inputs. In this study, he conducted a study comparison between regression and DEA methods. Based on the study, it can be concluded that the comparative study with many efficient data is bad to estimate the regression mode of production function. Finally, he advised not to use regression to assess technical efficiency.