

TECHNICAL EFFICIENCY OF SAVING AND LOAN COOPERATIVES IN GERBANGKERTASUSILA, EAST JAVA PROVINCE: A TWO-STAGE ANALYSIS

Mochamad Fajar Insani*¹

Atik Purmiyati² 

^{1,2}Department of Economics Airlangga University, Indonesia

ABSTRACT

The purpose of this research is to assess the level of technical efficiency of the Savings and Loans Cooperative (KSP) in Gresik, Bangkalan, Mojokerto, Surabaya, Sidoarjo, and Lamongan (Gerbangkertasusila), Indonesia, and to identify the factors that influence the level of technical efficiency of the Savings and Loans Cooperative in Gerbangkertasusila. Two Stage Analysis that used are Data Envelopment Analysis and Tobit regression. Variables are used in the DEA as output, specifically the remainder of the cooperative's business (SHU), whereas input includes the number of members, own capital, number of employees, and business volume. The second stage involves analyzing the determinants of technical efficiency using Tobit regression, with the independent variables being cooperative age, external capital, assets, and managers. The results showed that the average level of technical efficiency of the KSP was 60.4 percent, with 16 KSP being the most efficient. Meanwhile, the Tobit regression results show that simultaneously the variables have an influence on the level of technical efficiency of the KSP. Partially the cooperative age and external capital variables have no significant effect on savings and loan cooperatives, while asset and managers have a significant positive effect on the level of technical efficiency of savings and loan cooperatives.

Keywords: Technical Efficiency, Tobit Regression, Savings and Loans Cooperative, Gerbangkertasusila

JEL: D13, D24, G51

*Korespondensi:
Mochamad Fajar Insani
E-mail:
fajarinsani96@gmail.com

ABSTRACT

Tujuan dari penelitian ini adalah untuk menilai tingkat efisiensi teknis Koperasi Simpan Pinjam (KSP) di Gresik, Bangkalan, Mojokerto, Surabaya, Sidoarjo, dan Lamongan (Gerbangkertasusila), Indonesia, serta mengidentifikasi faktor-faktor yang mempengaruhi tingkat tersebut. efisiensi teknis Koperasi Simpan Pinjam Gerbangkertasusila. Dua Tahap Analisis yang digunakan adalah Analisis Data Envelopment dan Regresi Tobit. Variabel yang digunakan dalam DEA sebagai output, khususnya sisa usaha koperasi (SHU), sedangkan input meliputi jumlah anggota, modal sendiri, jumlah

karyawan, dan volume usaha. Tahap kedua melibatkan analisis faktor-faktor penentu efisiensi teknis menggunakan regresi Tobit, dengan variabel independen adalah usia koperasi, modal eksternal, aset, dan manajer. Hasil penelitian menunjukkan rata-rata tingkat efisiensi teknis KSP sebesar 60,4 persen, dengan 16 KSP yang paling efisien. Sedangkan hasil regresi Tobit menunjukkan bahwa secara simultan variabel berpengaruh terhadap tingkat efisiensi teknis KSP. Secara parsial variabel umur koperasi dan modal eksternal tidak berpengaruh signifikan terhadap koperasi simpan pinjam, sedangkan aset dan pengelola berpengaruh positif signifikan terhadap tingkat efisiensi teknis koperasi simpan pinjam.

Kata Kunci: Efisiensi teknik, Regresi Tobit, Tabungan dan Pinjaman Perusahaan, Gerbangkertasusila

JEL: D13, D24, G51

Introduction

Cooperatives, along with State-Owned Enterprises (BUMN) and Private-Owned Enterprises, are among the many economic actors in Indonesia (BUMS). Cooperatives act as a buffer or pillar in the national economy, and their presence in society is expected to improve community welfare (Sitio, 2001: 128). Cooperatives have existed in Indonesia from the country's inception to the present, with ups and downs corresponding to the country's economic development. In this case, cooperatives in Indonesia are used to accelerate national development, particularly during the New Order era (1965-1998), so the existence of cooperatives in society is flexible because it responds to the needs of the community to improve welfare. East Java was named the province that drives the best cooperatives and entrepreneurship development in 2017 based on the large number of cooperatives that are spread out (Communications and Information Department, East Java Province, 2017). The people of East Java understand the value of cooperatives because they provide numerous benefits to the community's economic process.

From 2015 to 2019, the growth of East Java cooperatives has consistently increased, demonstrating the flexibility of space to move to choose the form of business required by members. According to Article 83 of the Cooperative Law No. 17 of 2012, the form and type of cooperative business are Marketing Cooperatives, Consumer Cooperatives, Producers Cooperatives, Service Cooperatives, and Savings and Loans Cooperatives (KSP). However, based on current developments, the majority of cooperatives are in the savings and loan business forms. A savings and loan cooperative is similar to a miniature bank.

East Java is divided into sections to equalize the spread of national development and the expansion of industrial areas. According to the number of savings and loan cooperatives (KSP) in various regions of East Java, the Horseshoe area (Tapal Kuda), which includes the districts of Pasuruan, Probolinggo, Lumajang, Jember, Situbondo, Bondowoso, and Banyuwangi, has the most. The Mataraman Wetan area has the most KSP, followed by Kediri, Nganjuk, Trenggalek, Tulungagung, Blitar, and Madiun. The Gerbangkertasusila region has a number of KSPs in the following order: Gresik, Bangkalan, Mojokerto, Surabaya, Sidoarjo, and Lamongan, which are metropolitan areas that serve as economic and industrial centers and have access to East Java transportation such as ports and airports. Following this is the Mataraman Kulon area, which includes Pacitan, Ngawi, Magetan, and Ponorogo, and finally the Malang Raya area, which includes Malang and Batu.

A Savings and Loans Cooperative (KSP) is a business that acts as a middleman or channel for member capital. Savings and loan cooperatives in Indonesia are similar to Grameen

Bank in Bangladesh in terms of function. The difference between savings and loan cooperatives in Indonesia and Grameen Bank is that savings and loan cooperatives benefit members in particular and society in general, whereas Grameen Bank alleviates poverty and provides credit for the poor because it can help increase income and repay loans (Yunus, 2004; Farhan, 2018).

The Minister of Cooperatives and Small and Medium Enterprises established Regulation No. 15 / Per / M.KUKM /IX/2015, article 1 paragraph 2, for the operation of a Savings and Loan Cooperative business entity in Indonesia. According to the rules, cooperatives must improve performance and servants with the ultimate goal of increasing member welfare. The well-being of the members is reflected in the annual receipt of remaining income (SHU) of the members, as well as the cooperative's activities.

According to Andjar et al., (2005) in Saputra et al., (2016), the establishment of a cooperative business is inextricably linked to competitors of other business entities that share the same goal of bringing prosperity to the community. Savings and loan cooperatives must have a strategy to compete, which includes addressing internal and external issues. Thus, according to paragraph 1 of Article 33 of the 1945 Constitution of the Republic of Indonesia, "the economy is structured as a joint effort based on the principle of kinship," increasing productivity and performance by assessing efficiency.

Savings and loan cooperatives must conduct performance evaluations when carrying out their activities in order to improve. This is because all activities in savings and loan cooperatives aim to benefit the cooperative's members. It will be able to conclude improvements in savings and loan cooperatives through performance evaluation. The purpose of this research is to determine the performance of savings and loan cooperatives in Gerbangkertasusila through technical efficiency analysis using Data Envelopment Analysis, as well as to identify the determinants of savings and loan cooperative technical efficiency. Cooperatives can use the results of the technical efficiency analysis to evaluate their activities and determine estimates for increasing or decreasing inputs and outputs. Furthermore, the Tobit regression analysis results can be used to develop policies to improve cooperative performance.

The research gap between this study and previous studies is that previous studies' discussions of technical efficiency are more about technical efficiency in terms of economics or finance (Madau et al., 2018; Brandano et al., 2019). Technical efficiency research in economics or finance focuses on financial variables and financial management in cooperatives. Meanwhile, this research looks at cooperative technical efficiency in terms of not only financial but also managerial resources in cooperative management. Furthermore, to clarify the research, after obtaining the efficiency value, additional analysis is performed to determine the factors that have a significant influence on cooperative efficiency. Because one of the requirements for achieving an efficient cooperative is how employees manage cooperatives, compassionate human resources are required to develop cooperatives. A similar method, such as Gezahegn et al. (2020), has been used with agricultural cooperatives as research subjective but with different input and output. There are other studies that are similar (Yamori et al., 2017; Yu and Huang, 2020), but their research focuses on cooperative finance rather than cooperative management variables.

Literature Review

Previous research on technical efficiency and its determinants in Baitul Maal Wat Tanwil (sharia cooperative). The outcomes of both efficiency are still not technically efficient (Ali and Ascarya, 2014; Ina et al., 2020). An efficiency analysis was performed on 11 cooperatives from

five areas of Jakarta, and it was discovered that only four of the 11 cooperatives had achieved efficiency (Suendarti, 2019). The same study was conducted on cooperatives in Tangerang, Indonesia, and it was discovered that cooperatives with business volumes greater than business capital have achieved technical efficiency (Budiasih and Mardika, 2019).

Savings and loan cooperatives in Tanzania were studied using DEA, and it was revealed that cooperatives with high operating costs were less efficient. It is recommended that cooperatives in Tanzania make effective use of savings, savings, and expenses to improve their efficiency (Magali and Pastory, 2013). Furthermore, research on the efficiency of agricultural cooperatives in South Africa discovered that some cooperatives were inefficient. The age and size of the cooperative, the gender of the manager, and indicators of how to manage and train it are all factors that influence this inefficiency (Yobe et al., 2020).

Definition of Efficiency

Farrel (1957) and Coelli (1998) distinguish three types of efficiency: technical efficiency, allocative efficiency, and economic efficiency. Technical Efficiency (TE) refers to a company's ability to maximize output while spending the least amount of money on inputs. Allocative Efficiency (AE) is a company's ability to use expenditure in the best possible proportion with a given price and production technology. The combined efficiency of the two combinations will be referred to as EE-Efficiency Economic or total efficiency.

Production Theory

The production function is an equation, graph, or table that shows the maximum number of goods produced per unit in a specified time for each input combination (Salvatore, 1994). The production function is a combination of input production factors that produce output in a company. The production function summarizes what companies need about mixing various inputs to produce outputs (Nicholson & Snyder 2010). The production function's equation is as follows:

$$Q = f(K, L) \quad (1)$$

Where:

Q = total of output or goods

K = total of capital

L = labor

Data and Research Methods

Data Envelopment Analysis (DEA)

This analytical model is used to measure technical efficiency in savings and loan cooperatives relating to input and output. The term variable return to scale (VRS) refers to the fact that each addition of one unit of input variable can be followed by unequal output variables (could be more or less). The VRS assumption was chosen with the understanding that increasing the input by one unit does not always result in an increase in output by one unit. Especially in the research subject of cooperatives, where increasing input also includes external factors and other variables that contribute to the production of output. Meanwhile, if you use constant return to scale (CRS), which means that increasing one unit of input increases one unit of output, it becomes less precise if the production process is not at the optimal scale (Coelli, et al., 2005). Using the DEA model in analyzing the efficiency of savings and loan cooperatives,

namely the variable return to scale (VRS) model:

$$\text{Virtual input} = v_1x_1 + \dots + v_Ix_I = \sum_{i=1}^I v_ix_i \quad (2)$$

$$\text{Virtual output} = u_1y_1 + \dots + u_Jy_J = \sum_{j=1}^J u_jy_j \quad (3)$$

Where v_i is the weight given to x_i input and u_j is the weight assigned to y_j linear output.

VRS Model

$$\begin{aligned} & \text{Max} \sum_r v_r x_{rj_0} + u_0 \\ & u_r, v_i \\ & \text{s.t.} \\ & \sum_r u_r y_{rj} - \sum_i v_i x_{ij} + u_0 \leq 0; \forall_j \\ & \sum_i u_r y_{rj_0} = 1 \\ & u_r, v_i \geq 0 \forall_r \forall_i \end{aligned} \quad (4)$$

Where :

- y_{rj} = the amount of output r produced by KSPj,
- x_{ij} = the amount of input i used by KSPj,
- u_r = weight given to output r, (r = 1, ..., t and t is output total),
- v_i = the weight given to the input i, (i = 1, ..., m and m is input total)
- n = total of KSP
- j_0 = KSP rated.

Tobit Regression

The second stage is analyzing the determinants of technical efficiency using Tobit model. Tobit regression is one of the statistical methods used to determine the effect of the independent variable on the dependent variable, Y, when the data is censored or has a zero value. This method is used because the variable Y is an efficiency value with a value ranging from 0 to 1.

$$\begin{aligned} y_i^* &= x_i' \beta + \epsilon_i, \\ y_i &= 0 \text{ if } y_i^* \leq 0, \\ y_i &= y_i^* \text{ if } y_i^* > 0, \end{aligned} \quad (5)$$

Where :

- y_i = dependent vector variable,
- y_i^* = dependent variable matrix $l \times 1$,
- x_i' = independent variable matrix,
- β = the coefficient of the measuring vector $k \times 1$ is unknown, where k is the number of parameters
- ϵ_i = residual model with filtered normal distribution (0, σ^2)
- $l = 1, 2, \dots, l$.

The Tobit Model are follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 D + \beta_3 X_3 + \beta_4 X_4 + e_i$$

Where :

Y = Efficiency of DEA

α = Constant

X = Cooperative Age

$X_2 = D_0$ = Do not have external capital; D_1 = Having external Capital

X_3 = Asset

$X_4 = D_0$ = Doesn't Have a Manager; D_1 = Have a Manager

e = Error

Variables and Data

The data source used is secondary data obtained through the Office of Cooperatives and Micro, Small and Medium Enterprises (MSMEs) of East Java Province in the 2019 period, from various cooperatives that are used as research facilities. The following is an operational definition of the variables used in the model.

Data Envelopment Analysis (DEA)

Input

Number of Members

The number of members is a number of people who participate for the same interest in developing a cooperative business. Unit in the form (person).

a. Owner's equity

Owner's equity is capital that comes from members of the cooperative itself consisting of principal savings, mandatory savings, and voluntary savings. Units in the form (million rupiah)

b. Number of employees

The number of employees is the number of people or workers who carry out every activity in the cooperative business. The unit is (person).

c. Business volume

Business volume is the total value of sales or receipts from goods and services in the cooperative's annual fiscal year. The unit is (million rupiah).

Output

a. Remaining Operating Results (SHU)

Remaining Operating Results is the Cooperative's income earned in one financial year minus expenses, depreciation and other liabilities including taxes in the fiscal year concerned. Units in the form (million rupiah).

Tobit Regression

Dependent Variable

a. Technical Efficiency

The ability of savings and loan cooperatives to obtain maximum output from a given set of inputs is analyzed using the DEA resulting in a value of 0 to 1.

Independent Variable

b. Cooperative Age

The duration of cooperative business is the time that has been taken in running the cooperative business. Units in the form (year).

c. External Capital

External capital is capital that comes or is obtained from outside the cooperative business. External capital can be in the form of loan funds from banks, issuance of bonds and other debt securities, and other legal sources. External capital in this study is a dummy variable where the cooperative means (D_1) has a value of 1 and has external capital and (D_0) is 0 means it has no external capital. The unit is (million rupiah).

a. Asset

Asset is the total wealth owned by a cooperative in the form of money or in kind. Units in the form (million rupiah).

b. Manager

Manager is someone who is in charge of managing a process of running a business and has the authority to regulate and direct its members. The manager in this study is a dummy variable where the cooperative means that (D_1) has a manager and (D_0) is 0 which means that it does not have a manager. The unit is (person).

Finding and Discussion

Table 1 shows the average technical efficiency level of savings and loan cooperatives in Gerbangkertasusila is 0.604. This means that the average level of technical efficiency of the KSP is 60.4%. So it is necessary to make improvements to each input in order to improve the level of technical efficiency of the KSP. The standard deviation of 30% is significantly higher than the average, indicating an unequal level of technical efficiency in the Gerbangkertasusila area.

Table 1: Statistical Description of KSP Technical Efficiency Variables at Gerbangkertasusila

	N	Average	Min	Max	Standard Deviation
	KSP	KSP	KSP	KSP	KSP
TE-DEA VRS	66	0.604	0.14	1	0.300

TE-DEA VRS = Technical Efficiency - Variable Return to Scale

The Tobit model will be used to analyze the factors that affect the level of technical efficiency of the KSP at Gerbangkertasusila, so the entire procedure in this study is referred to as a Two-Stage Data Envelopment Analysis. The estimation results in Table 2 show that the Likelihood Ratio (LR) test has a significant effect simultaneously on technical efficiency; LR is a substitute for the F-statistic which functions to test the independent variables jointly affecting the dependent variable. This is evidenced by the probability value Z of 0.000, less than 0.05 (α) so H_0 is rejected. Partial testing of cooperative age has a positive but insignificant effect on the technical efficiency of savings and loan cooperatives, as evidenced by a probability value

of z of 0.098, which is greater than 0.05 with a dy/dx value of 0.00829., so H_0 is accepted and H_1 is rejected. Testing the effect of external capital (dummy) on the level of technical efficiency of savings and loan cooperatives shows that external capital has an insignificant negative effect on the level of technical efficiency of savings and loan cooperatives, evidenced by the z probability value of 0.062 which is greater than 0.05 and with a dy/dx value of -0.29190, it is concluded that H_0 is accepted and H_1 is rejected.

The asset variable has a significant positive effect on the level of technical efficiency of savings and loan cooperatives, because the probability value of z is 0.043, which is less than 0.05 with dy / dx of 0.00001, implying that H_0 is rejected and H_1 is acceptable. Following that, the manager variable demonstrates that it has a significant positive effect on the level of technical efficiency of savings and loan cooperatives, because the probability value of z is 0.013, which is less than 0.05, with dy / dx of 0.19588, implying that H_0 is rejected and H_1 is accepted.

Table 2: Maximum Estimation of the Tobit Regression Likelihood

Variabel	Kode	dy/dx	Standard Deviation	Z-Statistik	Probability
Constant	C	0,39238	0,16959	2,31	0,024
Cooperative Age	X_1	0,00829	0,00501	1,65	0,098
External Capital	X_2	-0,29190	0,15645	-1,87	0,062
Asset	X_3	0,00001	0,00001	2,02	0,043*
Manager	X_4	0.19588	0,07867	2,49	0,013*
LR				23,97	0,000
Log Likelihood				-18,55	
Significant Level (0,05)					

Source: Data Analysis

*) Significant at $\alpha = 5\%$

Data Envelopment Analysis (DEA)

Based on the total population of 197 cooperatives and a sample of 66 cooperatives, the average DEA result in KSP technical efficiency level of 60.4%, which indicates that there is an abnormal distribution. From the total of 66 samples of KSP in Gerbangkertasusila, there are 16 cooperatives which have a technical efficiency level of 1 and if the efficiency value is far from the average value, then the cooperative is said to be relatively inefficient. Most of the distribution of the cooperative is in Mojokerto City (4 KSP), Surabaya (4 KSP), Sidoarjo (4 KSP), Gresik (2 KSP), Mojokerto Regency 1 KSP, and Lamongan (1 KSP).

Based on the number of technically efficient cooperatives scattered in several regions, showing that most of them are in urban areas, this indicates that the city area is an administrative center that has an attraction for cooperative members in carrying out various businesses. KSP that has reached the perfect efficiency value shows that in management it has utilized the most optimal resources so as to provide maximum output.

Meanwhile, 50 KSPs in Gerbangkertasusila that have not reached perfect technical efficiency indicate a lack of empowerment level of human resources (members) and cooperative capital so that the output of SHU is not maximal. There are 31 KSP that are below the average efficiency value; KSP which is still below the average efficiency technically needs to make improvements in order to increase the efficiency value.

Based on the results of DEA analysis, the average KSP contribution to Gerbangkertasusila requires improvements such as increasing the number of members, and with more cooperative members who save, the more KSP activities will be increased. Based on the theory

put forward by [Sitio and Tamba \(2001: 79\)](#), the higher the share of members, the higher the benefits received by members. According to research by [Ayuk et al. \(2013\)](#), the amount of savings has a negative and insignificant effect on the SHU of savings and loan cooperatives in Badung Regency in Bali Province. Savings in cooperatives are used as equity and loans from members so that the cooperative is required to pay remuneration (Law No. 25 of 1995).

According to [Rusmana \(2015\)](#), increasing the number of employees has an effect on SHU. Adding a number of employees with good skills in order to improve KSP's performance in serving members well. With good employee abilities, the aspect of business volume run by KSP will also increase, resulting in an increase in output in the form of SHU. Technical efficiency was discovered to reflect the KSP's ability to maximize output from the input used ([Farrell, 1957](#)). This research is in line with [Ali and Ascarya \(2014\)](#) stated the results of the DEA show that resource use is still not optimal in production, so that it can be further improved and the existing input factors are maintained. This study agrees with [Suendarti \(2019\)](#) that every year the number of member increases, an increase in the number of members will have an impact on increasing the amount of capital, assets, loans and profits.

The results of other research by [Prasetya \(2017\)](#) regarding the level of efficiency which is useful for measuring the performance of cooperatives using the integration between the Balanced Scorecard and Envelopment Analysis show that there are at least two cooperatives that are able to optimize resources in each cooperative, or at least six cooperatives have not achieved maximum efficiency.

Tobit Regression

Based on DEA analysis in the form of input on the number of members, own capital, number of employees, and the volume of business used to produce output in the form of SHU, the ratio between input and output in the DEA produces a level of technical efficiency for savings and loan cooperatives. Tobit regression is used to test the factors that affect the level of technical efficiency in the form of cooperative age, external capital, assets, and managers in savings and loan cooperatives.

Based on the simultaneous test, the R^2 value is 0.3925, this value indicating that the determinant coefficient is 39.25%. This means that variations in changes in the level of technical efficiency can be explained by changes in variations in cooperative age, external capital, assets, and managers by 39.25%, while the remaining 60.75% is explained by variations in other variables not included in the study.

This research is in line with [Ali and Ascarya \(2014\)](#) and the results of Tobit regression show that capital strength and Baitul Mal Wa Tamwil (BMT) size have a significant positive effect on the technical performance of BMT MMU and BMT UGT as a whole. According to the journal [Faza and Hosen \(2013\)](#), there are several variables that have a negative or positive influence. However, not all variables have a significant effect, or it can be said that there are several variables that have no real effect.

Cooperative age or duration of business has a positive and insignificant effect on the level of technical efficiency of savings and loan cooperatives. This is because although the KSP has not had enough experience, the cooperative has gained knowledge about running a business, including cooperative business by imitating or observing an advanced KSP. In addition, new KSPs are more likely to accept changes so that they can survive and compete with other KSPs. It can be said that members as users as well as owners of cooperatives have an important role in the performance of the cooperative. There is no influence on how long the cooperative has been established if the performance of the members is good, the profitability

of the cooperative will be better.

This research is in line with [Rahmatia \(2019\)](#) that the longer a person's trading activity does not affect the level of income earned, and the higher the working time someone uses in trading, it does not affect the level of income earned. This research is also in line with [Nanggiholan \(2016\)](#) which states that the timing of setting up a business has no effect on MSME income. The survey results show that the majority of respondents in Surabaya are traders. There are MSMEs that are only one year old, but the income received is almost the same as UMKM holders who have been around for twenty years. In addition, it is necessary to evaluate the owners of MSMEs who have been around for a long time but have not made significant progress.

External capital has a negative and insignificant effect on the level of technical efficiency of savings and loan cooperatives. The results of these studies prove that the addition of external capital does not have an increasing effect on the level of technical efficiency of KSP. This happens because external capital originating from debts from members, other cooperatives, banks, or bonds cannot be used to increase the technical efficiency of the cooperative, so it will only increase the burden that comes from the remuneration for the loan.

The results of this study are in accordance with [Sudaryanti \(2017\)](#) and [Aziar, et al \(2012\)](#) in using and increasing external capital borrowing, the management and managers of the cooperative need to consider it well, because by empowering loan capital from outside will burden the cooperative so that it can reduce the SHU obtained.

The results of the study are different from the research of [Purmiyati, et al. \(2019\)](#) stated that efficiency will be an assessment for micro businesses in order to increase the efficiency of their enterprises. Efficiency improvement can be done by looking at the factors that affect the technical efficiency of micro businesses. The government in this case is the Office of Cooperatives and Small and Medium Enterprises which by knowing the effectiveness of micro businesses can help micro companies receiving KUR and KK to improve production efficiency and sales of their products.

Total assets have a value of 0.00001, this shows that if the asset increases by 1% it will increase the level of technical efficiency by 0.0001% assuming other factors remain. Everything related to wealth and managed to run its operations by the cooperative is a cooperative asset. The asset component consists of current assets that have immediate future benefits of less than one year, and non-current assets include investment and depreciation expense.

The results of this study are in line with the research of [Faza and Hosen \(2013\)](#). This is due to the many assets that allow companies to operate more freely and optimize their resources. In addition, banks with large assets will automatically adopt new technology that can increase profits and minimize management costs.

The manager has a value of 0.19588, which shows that if there is a manager it will increase the level of technical efficiency; if there is no manager it will not increase the level of technical efficiency. A manager is a professional staff who has the ability as a manager at the management level, who is appointed and dismissed by the management after being consulted with the supervisor, whose function is to coordinate all business activities, administration, organization and management as well as to provide administrative services to Managers and Supervisors.

Cooperative management appoints a manager to help run the cooperative, so that the manager must be accountable for his work to the management. The manager can only do

something if authorized by the management; for example when dealing with the bank, the manager can only contact the bank regarding matters authorized by the management. Apart from what is allowed, the manager may not have a relationship with the bank, but with the management himself.

This study is in accordance with [Manossoh \(2008\)](#), the manager in budgeting and the role of managers in budget control affects profit achievement in Civil Servant cooperatives in Manado, where an increase in the role of managers in budget preparation and the role of managers in budget control will increase, followed by an increase in profit achievement.

Conclusion

The purpose of this study was to determine the level of technical efficiency of the KSP in Gerbangkertasusila and to determine the factors that affect the level of technical efficiency of the KSP. So the conclusion of this study is:

1. Based on the results of the analysis using the DEA, the average technical efficiency level is 60.4%; this illustrates that the technical efficiency level of the KSP at Gerbangkertasusila is still far from technically efficient, which is 1 or 100%.
2. The factors that affect the level of technical efficiency of the KSP at Gerbangkertasusila using the Tobit regression. Simultaneously, cooperative age, external capital, assets, and managers have a significant effect on the level of technical efficiency of the KSP. Then partially, cooperative age has a positive and insignificant effect and external capital has a negative and insignificant effect on the level of KSP technical efficiency, while assets and managers have a significant positive effect on the level of KSP technical efficiency.

Based on the research results that have been concluded previously, the following are some suggestions that can be used:

Suggestions for the Office of Cooperatives and Small Medium Enterprises, East Java Province.

- a. There needs to be an increase in coaching to the KSP at Gerbangkertasusila which still has not reached technical efficiency and continue to monitor the efficient KSP so that it can maintain technical efficiency levels;
- a. Provide training, education, and assistance to cooperatives and cooperative management so that they are able to manage and provide good services;
- b. It is necessary to be active in the sharing of information systems and open access to data to make it easier for researchers to conduct research.

Suggestions for Savings and Loans Cooperatives

- a. It is necessary to increase the performance of the inefficient KSP to increase technical efficiency by increasing the input of each KSP;
- b. Welfare for members can also help cooperative members to be more active in managing the cooperative for the better.

Suggestions for Further Researchers

- a. This research can be used as material to review the measurement of the technical efficiency level of savings and loan cooperatives in the next research;
- b. Analyze the level of technical efficiency of savings and loan cooperatives in East Java;

- c. Adding variables in technical efficiency analysis and using different analytical methods.

References

- Ali, M. M., & Ascarya, I. (2014). Analisis Efisiensi Baitul Maal Wat Tamwil Dengan Pendekatan Two Stage Data Envelopment Analysis (Studi Kasus Kantor Cabang BMT MMU Dan BMT UGT Sidogiri). *Tazkia Islamic Finance and Business Review*, 5(2).
- Aigner, D., Lovell, C. A. K., & Schmidt, P. (1977). *Formulation and estimation of stochastic frontier production function models. Journal of Econometrics*, 6(1), 21–37.
- Andjar Pachta, W., Bachtiar, M. R., & Benemay, N. M. (2005). Hukum Koperasi Indonesia. *Pemahaman, Regulasi, Pendirian dan Modal Usaha, Kencana, Jakarta*.
- Appleyard, D., Field, A., & Cobb, S. (2006). *International Economics*. 5th Edition. New York: Mc Graw.
- Ardiana, P. A., & Sari, L. K. E. (2010). Pengaruh Variabel Aset Lancar, Debt To Total Assets, Umur, Dan Jumlah Anggota terhadap Rentabilitas Ekonomi di Koperasi Simpan Pinjam dan Koperasi Kredit di Kecamatan Buleleng, Kabupaten Buleleng: Sebuah Pemodelan Ekonometrika. *AUDI Jurnal Akuntansi dan Bisnis*, 2.
- Ayuk, N. M. T., & Utama, I. M. S. (2013). Pengaruh Jumlah Anggota, Jumlah Simpanan, Jumlah Pinjaman dan Jumlah Modal Kerja terhadap Sisa Hasil Usaha (SHU) Koperasi Simpan Pinjam (KSP) di Kabupaten Badung Provinsi Bali. *E-Jurnal Ekonomi dan Bisnis Universitas Udayana*, 2(9), 642.
- Arifin Sitio dan Tamba Halomoan. (2001). *Koperasi : Teori dan Praktik*. Jakarta : Erlangga
- Astiyah, S., & Husman, J. A. (2006). Fungsi Intermediasi dalam Efisiensi Perbankan di Indonesia: Derivasi Fungsi Profit. *Buletin Ekonomi Moneter dan Perbankan*, 8(4), 529-544.
- Aziar, A., Malik, A., & Fitri, Y. (2012). Analisis Determinasi Modal Terhadap Sisa Hasil Usaha Koperasi Unit Desa Di Kabupaten Muaro Jambi. *Jurnal Ilmiah Sosio-Ekonomika Bisnis*, 15(1).
- Brandano, M. G., Detotto, C., & Vannini, M. (2019). Comparative efficiency of agricultural cooperatives and conventional firms in a sample of quasi-twin companies. *Annals of Public and Cooperative Economics*, 90(1), 53-76.
- Baswir. (2000). *Koperasi Indonesia Edisi Pertama*. Yogyakarta : BPFE.
- Budiasih, Y., & Mardika, I. H. (2019). Tingkat Efisiensi Koperasi di Kota Tangerang Selatan dengan Pendekatan Data Envelopment Analysis (DEA). *MPU PROCURATIO*, 1(2 Oktober), 236-243.
- Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., & Battese, G. E. (2005). *An introduction to efficiency and productivity analysis*. Springer science & business media.
- Coelli, T. J. (1996). Centre for efficiency and productivity analysis (CEPA) working papers. *Department of Econometrics University of New England Armidale, Australia*.
- Coelli, T.J., D.S. Prasada Rao, and G. E. Battese. (1998). *An Introduction to Efficiency and Productivity Analysis*. Kluwer Academic Publisher. Boston.
- Cooper, W. W., Seiford, L. M., & Tone, K. (2006). *Introduction to data envelopment analysis*

and its uses: with DEA-solver software and references. Springer Science & Business Media.

- Dennis, A., Lovell, C. A., & Peter, S. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics*.
- Dinkopukm.jatimprov.go.id. (2019). Dinas Koperasi dan UMKM Provinsi Jawa Timur.
- Fadwiwati, A. Y., Hartoyo, S., Kuncoro, S. U., & Rusastra, I. W. (2016). Analisis efisiensi teknis, efisiensi alokatif, dan efisiensi ekonomi usahatani jagung berdasarkan varietas di Provinsi Gorontalo. *Jurnal Agro Ekonomi*, 32(1), 1-12.
- Farhan, I. (2018). Respon Agama Terhadap Persoalan Sosial-Ekonomi: Studi Pemikiran Tokoh Muslim Muhammad Yunus Di Bangladesh. *Jurnal Yaqzhan: Analisis Filsafat, Agama dan Kemanusiaan*, 4(2).
- Farrel, M.J. (1957). The Measurement of Productive Efficiency. *Journal of The Royal Statistical Society, Series A*, 120:253-290.
- Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society: Series A (General)*, 120(3), 253-281.
- Faza Firdaus, M., & Hosen, M. N. (2013). Efisiensi bank umum syariah menggunakan pendekatan two-stage data envelopment analysis. *Buletin Ekonomi Moneter dan Perbankan*, 16(2), 167-188.
- Ganitri, P. T., Suwendra, I. W., Yulianthini, N. N., & SE, M. (2015). Pengaruh Modal Sendiri, Modal Pinjaman, dan Volume Usaha terhadap Selisih Hasil Usaha (SHU) pada Koperasi Simpan Pinjam. *Jurnal Manajemen Indonesia*, 2(1).
- Gezahegn, T. W., Van Passel, S., Berhanu, T., D'haesed, M., & Maertens, M. (2020). Do bottom-up and independent agricultural cooperatives really perform better? Insights from a technical efficiency analysis in Ethiopia. *Agrekon*, 59(1), 93-109.
- Giannakas, K., Tran, K. C., & Tzouvelekas, V. (2003). On the choice of functional form in stochastic frontier modeling. *Empirical Economics*. 28(1). 75-100.
- Gunawan. (2003). *Koperasi Simpan Pinjam dan Pengelolaannya*. Cetakan Pertama. Bayumedia. Malang.
- Hadad, M. D., Hall, M., Santoso, W., Glass, K., & Simper, R. (2009). Productivity changes in Indonesian banking: application of a new approach to estimating Malmquist indices.
- Hou, Y. (2007), *The Non-performing Loans: Some Bank-level Evidences. The 4th Advances in Applied Financial Economics, the Quantitative and Qualitative Analysis in Social Sciences conferences*.
- Ina, P., Erie, F., & Dian, M. (2020). Alleviating Poverty through Islamic Microfinance: Outreach and Efficiency (Study on BMT and Islamic Cooperatives in Indonesia). *Экономика региона*, 16(4).
- Isdaryadi, F. (2004). Pengembangan KUKM (Koperasi Usaha Kecil menengah) dan Tantangannya di Yogyakarta. *Jurnal Ekonomi (Terakreditasi)*, Juni, Vol.7, No.2.
- Jatimprov.go.id. (2017). Jatim Terima Penghargaan Provinsi Penggerak Koperasi Terbaik. Diakses pada (1 Mei 2020).

- Kementeriankoperasi.com. (2018). Jenis-Jenis Koperasi Berdasarkan Jenis Usahanya. Diakses pada (13 September 2020).
- Madau, F. A., Furesi, R., & Pulina, P. (2018). The technical efficiency in Sardinian fisheries cooperatives. *Marine Policy*, 95, 111-116.
- Maflachatun. (2010). *Analisis Efisiensi Teknik Perbankan Syariah di Indonesia dengan Metode Data Envelopment Analysis (DEA) (Studi Kasus Pada 11 Banj Syariah Tahun 2005-2008)*. Skripsi tidak diterbitkan. Semarang Fakultas Ekonomi Universitas Diponegoro.
- Manossoh, H. (2008). Peran Manajer dalam Penyusunan Anggaran dan Pengendalian terhadap Pencapaian Laba pada Koperasi Pegawai Negeri di Manado. *Jurnal Riset Akuntansi Going Concern*, 3(1), 128-146.
- Magali, J., & Pastory, D. (2013). Technical efficiency of the rural savings and credits cooperative societies in Tanzania: A DEA Approach. *International Journal of Management Sciences and Business Research*.
- Meeusen, W., & van Den Broeck, J. (1977). *Efficiency Estimation from Cobb Douglas Production Functions with Composed Error*. *International Economic Review*, 18(2), 435-443.
- Miller, R. L., & Meiners, R. E. (2000). Teori Ekonomi Mikro Intermediate. *Raja Grafindo Persada, Jakarta*.
- Mulyadi. (2000). *Manajemen Usaha Kecil dan Koperasi*. Cetakan Kedua. Lembaga Penerbit Universitas Brawijaya.
- Nainggolan, R. (2016). Gender, tingkat pendidikan dan lama usaha sebagai determinan penghasilan UMKM Kota Surabaya.
- Ngo, D. T. (2010). Evaluating the efficiency of Vietnamese banking system: An application using Data Envelopment Analysis.
- Nicholson, W., & Snyder, C. (2010). *Theory and application of intermediate microeconomics*. South-Western, Cengage Learning.
- Nurul Sofia, G. E. S. A. N. G. (2016). Analisis faktor penentu tingkat efisiensi perbankan di Indonesia pada tahun 2012-2014 dengan menggunakan pendekatan two stage data envelopment analysis. *Jurnal Ilmu Manajemen (JIM)*, 4(1).
- Prasetya, H. E., Subroto, B., & Saraswati, E. (2017). Analisis Kinerja Perusahaan dengan Menggunakan Balanced Scorecard dan Data Envelopment Analysis. *Jurnal Reviu Akuntansi dan Keuangan*, 5(1).
- Purmiyati, A., Berma, M., Talib, B. & Rakhima, M. (2019). The Role of Banking Capital in Industrial Sector Micro Enterprises for Poverty Alleviation: A Study in East Java, *Indonesia*. *Foundations of Management*, 11(1) 131-142. <https://doi.org/10.2478/fman-2019-0011>
- Rahmatia, R., Madris, M., & Nurbayani, S. U. (2019). Pengaruh Modal Usaha, Tenaga Kerja Dan Lama Usaha Terhadap Laba Usaha Mikro Di Kota Palopo Provinsi Sulawesi Selatan. *Jurnal Manajemen STIE Muhammadiyah Palopo*, 4(2).
- Rusmana, I. M. A., Bagia, I. W., & Yudiaatmaja, F. (2014). Pengaruh Pertumbuhan Kredit Bermasalah Dan Simpanan Anggota Koperasi Terhadap SHU Pada Koperasi Simpan Pinjam. *Jurnal Manajemen Indonesia*, 2(1).

- Salvatore, D. (1992). *Theory and Problems of Microeconomic Theory, 3rd edition*. McGraw-Hill.
- Salvatore, D. (1994). *Teori Mikro Ekonomi*. Terj. Rudy S. Dan Haris Munandar. Jakarta: PT. Grafindo Persada.
- Samuelson, Nordhaus. (2005). *Economics 18th Edition*. New York: Mc Grew Hill-Irwin.
- Sitio, A. (2001). *Koperasi: Teori dan Praktek*. Erlangga.
- Sudaryanti, D. S. (2017). Pengaruh Jumlah Anggota, Modal Luar, Dan Total Asset Terhadap Sisa Hasil Usaha (Studi Empiris pada Koperasi Simpan Pinjam di Kota Tasikmalaya tahun 2016). *Ekspektra: Jurnal Bisnis dan Manajemen, 1(2)*, 156-172.
- Suendarti, M. (2019). Pengukuran Dan Perbandingan Efisiensi Koperasi Simpan Pinjam Milik Masyarakat Umum Di Jakarta Dengan Menggunakan Metode Data Envelopment Analysis (Dea). *Mpu Procuratio, 1(1 April)*, 40-67.
- Sueyoshi, T. (1999). DEA non-parametric ranking test and index measurement: slack-adjusted DEA and an application to Japanese agriculture cooperatives. *Omega, 27(3)*, 315-326.
- Suputra, I. G., Susila, G. P. A. J., SE, M., & Cipta, W. (2016). Pengaruh modal sendiri, total aset, dan volume usaha terhadap Sisa Hasil Usaha (SHU) pada koperasi simpan pinjam. *Jurnal Manajemen Indonesia, 4(1)*.
- Utami, D., & Sufian, S. (2011). *Analisis Efisiensi Bank Umum Menggunakan Metode Non-Parametrik Data Envelopment Analysis (DEA)(Periode Tahun 2006-2008)* (Doctoral dissertation, Universitas Diponegoro).
- Yamori, N., Harimaya, K., & Tomimura, K. (2017). The efficiency of Japanese financial cooperatives: An application of parametric distance functions. *Journal of Economics and Business, 94*, 43-53.
- Yobe, C. L., Ferrer, S. R. D., & Mudhara, M. (2020). Measuring the financial efficiency of agricultural cooperatives in South Africa: an application of the Simar–Wilson methodology. *Agrekon, 59(3)*, 269-286.
- Yu, L., & Huang, W. (2020). Non-economic societal impact or economic revenue? A performance and efficiency analysis of farmer cooperatives in China. *Journal of Rural Studies, 80*, 123-134.
- Yunus, M. (2004). Grameen Bank, microcredit and millennium development goals. *Economic and Political Weekly, 4077-4080*.