Jurnal Ekonomi Malaysia 55(2) 2021 xx-xxx
http://dx.doi.org/10.17576/JEM-2021-5502-3

The Role of Microcredit Program and Micro Enterprises in Poverty Reduction
(*Peranan Program Kredit Mikro dan Perusahaan Mikro dalam Mengurangkan Kemiskinan*)

Atik Purmiyati
Airlangga University

Retno Setyowati
Airlangga University

Marta Sabila Rakhima
Airlangga University

ABSTRACT

This study analyzes the technical efficiency micro-enterprises in agricultural sector and its determinants. It further investigate the effect of the microcredit program of Kredit Perniagaan Rakyat (KUR) on the efficiency of micro-enterprises in East Java Indonesia hence the poverty reduction. In achieving the aforementioned objectives, three methods are employed namely Data Envelopment Analysis (DEA), Tobit Regression, and Logistic Regression. The estimation results of the Micro Enterprises efficiency using DEA shows that under the assumption of Variable Return to Scale 62 percent of the samples have reached full efficiency. However, under the assumption of Constant Return to Scale, 28 percent of the samples have reached full efficiency.. The factors that influence the efficiency based on tobit regression analysis are profit, asset, credit amount, KUR access, realization tempo, age, labor, and business location. Furthermore, factors affecting poverty status based on logistic regression analysis are income, gender, KUR access, and number of household.

Keywords: Agriculture; microcredit; efficiency; micro-enterprises; poverty
JEL Codes: D13, D24, G51, I32, I38, O120

ABSTRA

Kajian ini menganalisis kecekapan teknikal perusahaan-mikro dalam sektor pertanian dan faktor penentunya. Ia seterusnya mengkaji kesan program mikrokredit Kredit Perniagaan Rakyat (KUR) ke atas kecekapan perusahaan-mikro di Jawa Timur Indonesia seterusnya pengurangan dalam kemiskinan. Untuk mencapai objektif yang disebutkan di atas, tiga kaedah digunakan, iaitu "Data Envelopment Analysis" (DEA), Regresi Tobit, dan Regresi Logistik. Hasil anggaran kecekapan Perusahaan Mikro menggunakan DEA menunjukkan bahawa di bawah andaian Skel Pulangan Berubah 62 peratus dari sampel telah mencapai kecekapan sepenuhnya. Namun, di bawah andaian Pulangan Skala Malar, 28 peratus dari sampel mencapai kecekapan sepenuhnya. Faktor-faktor yang mempengaruhi kecekapan berdasarkan analisis regresi tobit adalah keuntungan, aset, jumlah kredit, akses KUR, tempo realisasi, usia, tenaga kerja, dan lokasi perniagaan. Tambahan lagi, faktor yang mempengaruhi status kemiskinan berdasarkan analisis regresi logistik adalah pendapatan, jantina, akses KUR, dan bilangan isi rumah.

Kata kunci: Pertanian; mikrokredit; kecekapan; perusahaan-mikro; kemiskinan

INTRODUCTION

The economy of East Java Province largely depends on the manufacturing, trade and agriculture sectors which contribute 74% of the provincial economy. Although the agricultural sector has a high contribution to East Java's economy, more than 60% of the poorest households in East Java work in the agricultural sector with employment absorbed in the agricultural sector. The absorption of labor in the agricultural sector is 44.8% of the total labor in East Java (World Bank, 2011). The level of productivity and low rates of return in the

agricultural sector are the reasons why the proportion of poverty in districts tends to have higher levels of poverty than in cities. This is the reason for the greater number of poor people in East Java in the districts than in the cities (Central Bureau of Statistics, 2013).

However, despite the various economic potentials that exist, the people who are engaged in the agricultural sector in East Java are mostly in micro-enterprises. Micro enterprise is a business that has a turnover of less than Rp. 300 million. Based on the understanding of micro enterprises there are several obstacles faced in carrying out the production process, so that poverty alleviation is rare. Therefore, East Java needs a revitalization strategy to improve the performance of the agricultural sector, especially micro-agriculture.

Barriers experienced by micro-enterprises according to the World Bank include: (i) the majority of unskilled workers with low levels of productivity, (x) limitations on capital because agriculture is still considered a bank risk, (y) limited land availability, (iv) added value low because of high production costs, (v) narrow market access. A study conducted by Wang (2016) concerning the growth barriers to Small Medium Enterprises in a developing country showed that SMEs consider access to finance as the most significant barriers hindering their business growth. External reasons for the financing dilemma include the high cost of borrowing and a lack of consultant support.

Productivity and low rates of return in the agricultural sector, as well as a higher risk of failure compared to the manufacturing and trade sectors cause agriculture to be considered a risky sector if it experiences difficulties in terms of production, marketing and capital, so farmers have difficulty developing their agricultural businesses. Because the nature and characteristics of micro-enterprises are feasible but not bankable, it causes farmers to face capital problems.

To overcome this problem, the government issued a poverty alleviation program for Micro, Small and Medium Enterprises (Poverty Alleviation Cluster III concerning People's Business Credit (KUR) Number: KEP-15/D.I.M.EKON/10/2011) by strengthening capital through KUR. The KUR Program helps Micro, Small and Medium Enterprises both in groups or individually to assist the poor to escape from poverty so that they can increase their income. The KUR program from the government is a micro credit with the advantage that it has less interest than other types of bank credit. The target of this program is micro-enterprises that have difficulty obtaining regular credit and reaching micro-businesses in remote areas.

Based on the existing phenomenon that agricultural products are products needed by many people, the performance of agricultural sector managers, especially in micro-enterprises, is vulnerable to poverty, so there needs to be interference from the government in strengthening business capital through People's Business Credit (KUR). Most previous studies examined efficiency and the factors that influence it or efficiency and poverty. This study aims to analyze the technical efficiency of agricultural sector micro-enterprises, determine the factors affecting technical efficiency and obtain the determinants of poverty from micro entrepreneurs in the agricultural sector.

LITERATURE REVIEW

Novotna & Volek (2015) in their research on production efficiency and financial performance in the agricultural sector show that above average agricultural enterprises (high growth in labor productivity and fixed assets), regardless of size, have indicators of higher profitability, higher debt, and a lower quick ratio. Nguyen, et al. (2019) in their research discussing the production efficiency of rice farming in Hanoi, Vietnam showed that rice farming in Hanoi performed quite good in 2018. The difference in the specific performance of each farm can be explained by the characteristics of the farmers (age, education and gender of household head) as well as by certain external factors (support programs or distance to the city center). The results also found that independent learning through experience did not significantly increase the efficiency of agricultural production, while education and training were essential. Similar research on wheat growing farmers found that the variables age, education, farm size, improved seeds, training, and credit had an effect on the technical efficiency of farmers (Dessale, 2019). A study on agricultural efficiency in three different years in European Countries by Rusielik and Beata (2020) found that most of the countries had increased efficiency each year. Research on the efficiency of tomato farming in Kenya shows that the efficiency of tomato production is still inefficient. The efficiency value of tomato production using a greenhouse is better than using open land (Mwangi, et al, 2020). Dube et al. (2018) examined the determinants of inefficiency among potato farmers in Ethiopia and found that owner age, education, land ownership, extension conctact, family size, fragmentation, and livestock ownership had a significant effect on the inefficiency of potato farmers. Other agricultural efficiency research on red pepper farmers in Ethiopia by Abate, et al. (2019) states that factors of age, educational status, land size, land fragment, extension service, credit access, and market information have an effect on technical efficiency. Efficiency research on coffee farmers in Rwanda by Ngango & Kim (2019) found that the outcome variables showed that the level of education, extension, access to credit, land consolidation, improvement in coffee tree varieties, and planting systems would significantly increase farmer’s technical efficiency.

Research conducted by Taha (2012) argues that there are positive impacts of microcredit programs on increasing income, expenditure, and increasing the profitability of the recipient's business. Dacuycuy & Lim (2014) state that the factors which influence poverty in the Philippines are the level of education of household head, number of household members, age of household members, positive shock/new jobs with higher/more wages, negative shock/loss of employment/income reduction, negative shock/disaster/poor health, conflict areas, rural areas, one family member with health insurance.

Another study conducted by Chimai (2011) presents the results of research that technical efficiency in sorghum production is influenced by several factors, namely household and agricultural members, access to credit, dependents, scale of food crop production, asset value and income from livestock activities which improve technical efficiency . On the other hand, household size, use of animal design power, farm size and location in low rainfall areas reduce efficiency. Another study by Kaboski and Townsend (2009) suggested that income, consumption, and investment in agriculture increased among micro credit recipients, as well as overall wage increases in a village in Thailand. Furthermore, Fadzim, et., Al. (2016) argue that factors such as the ratio of labor according to land size, farmer experience, recording, basic knowledge of cocoa farming and the status of farmers involved in cocoa cultivation are important determinants of efficiency among smallholder cocoa farmers in Malaysia. Tenaye (2020) conducted research on smallholder farmers in Ethiopia found that policies, education level of family heads, number of family members, size of fields, land fragmentation, soil quality, credit, extension service, off-farm job, and crop sharing affect the efficiency of smallholder farmers. Mwangi et al. (2020) also stated that household size, types of seeds, fertilizers, production system, extensions and market information had a significant positive effect on the technical efficiency of tomato farmers. Another study by Ogunmodede and Awotide (2020) found that factors that had a significant positive effect on gross production were experience, education level, costs for worker salaries, seeds, fertilizers, and land size. Meanwhile, the farmer's age has a negative effect.

A study on household poverty was conducted by Khairati and Syahni (2020) in West Sumatra, Indonesia. The results of the study using logistic regression show that the factors that affect household poverty are involvement in the family planning program, number of family members, age of the head of the family, education of the head of the family, and the skills of the head of the family. The same study by Adeleke, et al. (2020), the logistic regression results found that the age of the head of the household, the number of family members and days lost to sickness significantly increased the incidence and severity of poverty among farm households, while access to school and electricity significantly reduced the incidence of poverty and severity among agricultural households. Islam, et al. (2017) in their research found that the factors that significantly influence poverty in Bangladesh are age, rural-urban distribution, marital status, disability, remittances, education, region.

DATA AND METHODS

In this study, sample determination was done by Purposive Sampling. To determine the size of the research sample from the population, the Slovin formula can be used by Sevilla et al. (1993) in Pratiwi (2010).

$$n = \frac{N}{1 + Ne^2}$$

where,

n = Sample size

N = Population size

e = The desired critical value (percentage of tolerance due to inaccuracy because of population sampling error) is 10%

If the required mistake rate (e) is 10% with the micro enterprise population in East Java that is N = 6,825,931, the number of samples studied is as follows:

$$n = \frac{6{,}825{,}931}{1 + 6{,}825{,}931(0.1)^2} = 99.99$$

Based on the Slovin formula above, this research uses minimum 100 samples of micro-enterprises that were taken with a standard expenditure of Rp. 321,761 per month per person. Based on the scope of the study, samples were taken from 38 districts/cities in East Java Province. However, not all districts / cities in East Java were sampled, namely only seven districts/cities. The criteria for the selection of seven districts/cities are based on representatives of three levels of high, medium and low Gross Regional Domestic Product. To obtain research

data, a survey was carried out directly at the location with a prepared questionnaire that was conducted in September 2016.

Requirements for respondents are the owner micro enterprises in the agricultural sector who receive micro credit from the KUR program and non-KUR micro credit. Micro Enterprises according to Law no. 20 of 2008 is a person who has a net worth of not more than IDR 50,000,000 (USD 3.349, USD 1=Rp 14.929), excluding land and buildings for business or has annual sales of at most Rp 300,000,000 (USD 20.094,44, USD 1=Rp 14.929).

Model Frontier DEA (Data Envelopment Analysis)

Data Envelopment Analysis (DEA) is an efficiency boundary method using a non-parametric approach that uses a linear programming model to calculate the output and input ratios, and measures the relative efficiency of the unit. The DEA has a production unit called the Decision Making Unit (DMU) where the DEA efficiency score produced consists of 0-100 percent or 0-1. Data Envelopment Analysis measures the technical efficiency from one input and one output to multi-inputs and multi-outputs by using the relative efficiency value as the input and output ratio. This output-oriented model was chosen because the production capacity of micro enterprises is smaller than the firm level industry, so the required input is also small and the input costs are difficult to suppress.

This study uses the DEA model based on O'Donnell et al. (2008), as follows:

$$\begin{aligned} &\text{Max } \phi_i, \\ &\phi_i, \lambda_i \\ &\text{St} \quad \phi_i y_i - Y\lambda_i \leq 0, \\ &\qquad X\lambda_i - x_i \geq 0, \\ &\qquad j'\lambda = 1 \\ &\qquad \lambda_i \geq 0 \quad (1) \end{aligned}$$

where y_i = output of the i micro enterprises; x_i = N x 1 vector of input quantity from the i-enterprise; Y = Y = L_k x 1 vector of the total output of L_k enterprises; X = N x L_k vector of input quantity for all L_k farmers; j = a constant L_k x 1 vector; λ λ= Lk x 1 weighting vector; ϕ_i = a scalar where the value is more than 1 or equal to 1.

Furthermore, the output-oriented DEA model assuming CRS is:

$$\begin{aligned} &\text{Max}_{\phi\lambda}\, \phi, \\ &\text{St} \quad -\phi y_i + Y\lambda \geq 0, \\ &\qquad X_i - X\lambda \geq 0, \\ &\qquad \lambda \geq 0 \end{aligned}$$

where is the constant vector Ix1; $1 < \infty$; 1 shows the proportion of output increases that can be achieved by the DMU with the same number of inputs. The technical efficiency value is 1 which has a range of values between zero and one.

Coelli, et al. (2005) state that the CRS assumption is suitable if all firms operate at optimal scale. However, imperfect competition, financial constraints, unstable production processes, government regulations, weather constraints, and others can cause firms to be unable to produce optimally. Hence, it is advisable to choose the assumption of variable return to scale (VRS). The CRS assumption is used when a firm does not operate at an optimal scale and will result in technical efficiency values that are confused by scale efficiency. Using the VRS assumption can allow the calculation of technical efficiency without the influence of scale efficient.

TABLE 1. Variable of Data Envelopment Analysis

Variables	Definition	Unit
Output		
Y	Net income of enterprises (rupiah / month)	Rupiah
Input		
X_1	Capital	Rupiah
X_2	Cost of raw materials (rupiah / month)	Rupiah
X_3	Supporting costs (rupiah / month)	Rupiah
X_4	Value of machine (rupiah / month)	Rupiah
X_5	Total labor	Person

Tobit Regression Model

Tobit regression is used to determine the relationship between the independent variable (X) and the dependent variable (Y) with the maximum likelihood estimation. The characteristic of tobit regression is that the dependent variable used (Y) has a discrete scale, which is 0 and has a continuous scale, that is, it has varying values. This data characteristic is known as censored data. Then the selection of observations on the left and right is made based on the minimum and maximum values.

$$y_i = \beta_0 + \beta_1 Z_{1i} + \beta_2 Z_{2i} + \beta_3 Z_{3i} + \beta_4 Z_{4i} + \beta_5 Z_{5i} + \beta_6 Z_{6i} + \beta_7 Z_{7i} + \beta_8 Z_{8i} + \beta_9 Z_{9i} + \beta_{10} Z_{10i} + \beta_{11} Z_{11i} + u_i \quad (2)$$

where yi is the efficiency value of the first DMU obtained based on the estimation of the DEA model, the coefficient β is the unknown parameter to be estimated, and ui is the error term. Z_1, Z_2, ..., Z_{11} are factors assumed to affect technical efficiency. The variables used in the study using tobit regression are as follows:

TABLE 2. Variables for Tobit Regression Analysis

Variables	Definition
Z_1 = Profit	Profit of enterprises (in rupiah)
Z_2 = Age	Age of enterprises owner (in years)
Z_3 = Education	Education of enterprises owner
	1 = ≥ High School
	0 = Junior High School and below
Z_4 = Business Experience	Business Experience of enterprises owner (years)
Z_5 = Assets	Assets for business
Z_6 = Gender	Gender of Entrepreneur Owner
	1 = Male
	0 = Female
Z_7 = Labor	Number of Labor*
Z_8 = Business Location	Business Location
	0= District (Kabupaten)
	1= City (Kota)
Z_9 = Credit amount	Credit amount of enterprises
Z_{10} = Access to the Micro Credit	Access to the Micro Credit
	1 = KUR recipient
	0 = Non KUR recipient
Z_{11} = Credit realization time	Credit realization time:
	1 = ≤ 2 weeks
	0 = > 2 weeks

*The labor variable is used to determine how the probability affects efficiency. In the estimation of the likelihood ratio there is no need for a robustness test.

Logistic Regression Model

The logistic regression model is used because it is a non linear model that produces equations where the dependent variable is categorical (Hosmer & Lemeshow, 2000). In this study using binary logistic regression where there are only two dependent variables (y), y = 1 not poor and y = 0 poor. This study uses two possible dependent variables (y), namely the event or no occurrence of events, so the model used is binary logistic regression. Two categories of possible dependent variables are indicated by numbers 0 and 1, so that they represent specific categories resulting from the probability of occurrence of these categories. So the logistic regression model with five independent variables can be written as follows:

$$y_i = \ln\left(\frac{P_i}{1 - P_i}\right)$$
$$= \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \alpha_8 X_8 + \alpha_9 X_9 + u_i \quad (3)$$

where y_i is the probability of categories 0 and 1 namely y = 1 not poor and y = 0 poor obtained based on poverty line estimation according to East Java Central Bureau of Statistics, Pi is the chance of a successful event, the

coefficient β is the unknown parameter to be estimated, and u_i is an error term. $X_1, X_2, \ldots, X_{11}$ are factors that are thought to affect the probability of poverty status. The variables used in this study using logistic regression are as follows:

TABLE 3. Variables for Logistic Regression Analysis

Variables	Definition
X_1 = Number of household members	Number of household members
X_2 = Income	Income of household head (rupiah)
X_3 = Education	Education of household head: 1 = ≥ Senior High School 0 = Junior High School and below
X_4 = Geographical Location	Geographical Location 1= City (Kota) 0= District (Kabupaten)
X_5 = House area	House area (in m^2)
X_6 = Gender	Gender of Household head 1 = Male 0 = Female
X_7 = Household expenditure	Household expenditure (rupiah)
X_8 = Access to the Micro Credit	Access to the Micro Credit 1 = KUR recipient 0 = Non KUR recipient
X_9 = Technical Efficiency of Micro Enterprises	Technical Efficiency of Micro Enterprises 1 = 0<Efficiency≤0,5 0= 0,5<Efficiency≤1

Hypothesis Testing

Significance testing is done to prove that the independent variables individually and simultaneously have a significant influence on the dependent variable. The null hypothesis (H_0) that the independent variable simultaneously does not affect the dependent variable that can be written:

$H_0 : \beta_1 = \beta_2 = \cdots = \beta_k = 0$

H_1 : At least one regression coefficient is not equal to zero

Furthermore, the estimation of the tested model partially with the null hypothesis (H_0) which mentions that the independent variables partially have no effect on the dependent variable can be written:

$$H_0 : \beta_i = 0$$
$$H_1 : \beta_i \neq 0$$

The estimated logistic regression parameters that have been obtained are then tested simultaneously with the G. test statistic.

The G test statistics are as follows.

$$G = -2ln\left[\frac{\left(\frac{n_1}{n}\right)^{n_1}\left(\frac{n_0}{n}\right)^{n_0}}{\prod_{i=1}^{n}\hat{\pi}_i^{y_i}(1-\hat{\pi}_i)^{1-y_i}}\right] \qquad (4)$$

where

n_0 : The number of observations is Y = 0

n_1 : The number of observations is Y = 1

n : The number of observations

Reject H_0 if $G > \chi^2_{(v,\alpha)}$ (degree of freedom v is the number of parameters in the model without (β_0)) or H_0 is rejected if the probability value < α. After the simultaneous test then a partial test was carried out with Wald test statistics.

Wald test statistics are as follows.

$$W^2 = \frac{\hat{\beta}_i^{\,2}}{\left(SE(\hat{\beta}_i)\right)^2} \qquad (5)$$

H_0 is rejected if $W^2 > X^2_{(1)}$ or *p-value*<α .

DISCUSSION AND RESULTS

Technical Efficiency

The average technical efficiency is based on the estimation of the Data Envelopment Analysis assuming Variable Return to Scale (TE DEA-VRS) is 0.86 in the efficiency range of 0.12-1 with a standard deviation of 0.24. This efficiency value shows that the average performance that can be achieved by enterprises with available technology in the agricultural sector is 86% of the potential maximum yield of this sector. This situation indicates that the achievement of micro enterprises income in the agricultural sector can still increase by around 14% to achieve maximum efficiency.

However, the average value of micro-enterprises technical efficiency in East Java is lower than 0.86 if calculated using Constant Return to Scale (CRS). The average technical efficiency based on the estimation of the CRS DEA model is 0.73 in the efficiency range 0.1-1 with a standard deviation of 0.3 (Table 4), indicating that even though the micro business agriculture sector generates around 86% of the potential output with the available technology, but they only produce around 73% of the potential output if using CRS calculation. The performance of the agricultural sector in East Java can still be increased by around 27% to achieve maximum output using Constant Return to Scale technology.

TABLE 4. Average Technical Efficiency of Micro Enterprises in the Agriculture Sector

	n	Rata-rata	Min	Maks	Standar Deviasi
TE-DEA VRS*	100	0.86	0.12	1	0.24
TE-DEA CRS*	100	0.73	0.1	1	0.3

*TE= Technical Efficiency; VRS= *Variable Return to Scale*; CRS= *Constant Return to Scale*
Source: Data analysis

Distribution of technical efficiency shown in Figure 1 results from the DEA-VRS estimation shows that 100% efficient micro-enterprises (TE = 1) are achieved by 62 enterprises or 62% of the total number of enterprises in the agricultural sector. The remaining 18 (18%) enterprises with technical efficiency levels vary between 0.75 - 0.99, and 20 (20%) enterprises with technical efficiency levels varying between 0.1 - 0.74.

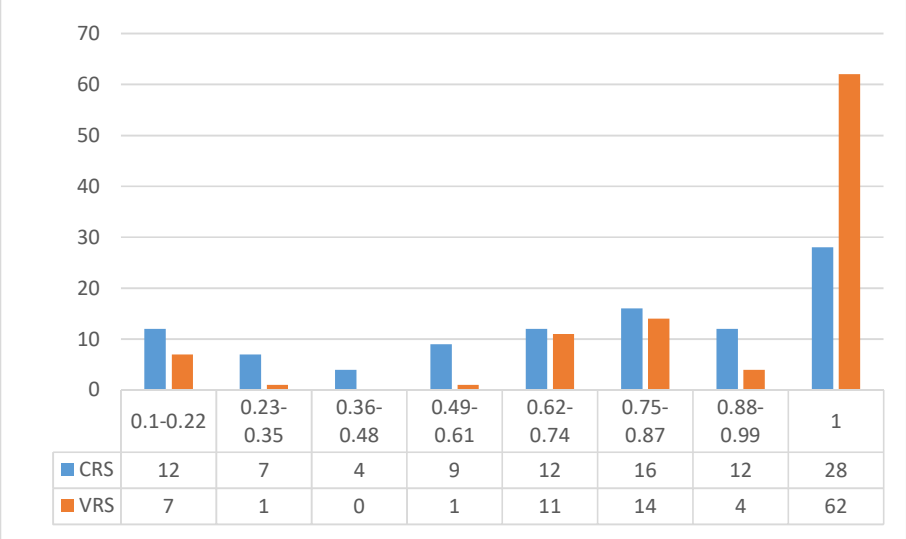

FIGURE 1. Class of Technical Efficiency of Micro Enterprises in the Agricultural Sector
**Source: Data analysis*

The estimation results of the DEA-CRS indicate that 100% efficiency of micro enterprises agriculture sector is achieved by only 28 enterprises or 28% of the total micro-enterprises in the agricultural sector. The number of micro-enterprises with technical efficiency below 0.75 is 44 micro enterprises or 44% of the total micro-enterprises. Besides that, the technical efficiency level of 0.75-0.99 was achieved by 28 (28%) micro-enterprises.

TABLE 5. Actual Output Average and Agricultural Micro Enterprises Output Target

	Observations	Actual Output	Target Output	Output Changes	
				(Rp)	%
DEA VRS	100	2.544.000	2.935.320	391.320	15,38%
DEA CRS	100	2.544.000	3.451.560	907.560	35,67%

**Source: Data analysis*

The level of micro-enterprises technical efficiency in the agricultural sector in this study can still be maximized by the yield potential. The steps that can be taken to increase the micro enterprises technical efficiency level in the agricultural sector is to increase the output produced and also reduce input costs which are a source of micro-enterprises inefficiency. In this context, estimation of the DEA-VRS model provides input targets based on the technology used. Furthermore, to maximize efficiency improvements, it is necessary to analyze the determinants of technical efficiency in the agricultural sector micro-enterprises by using tobit regression.

Determinants of Efficiency

This section will discuss the results of estimation of micro enterprises efficiency models based on calculations of micro enterprises efficiency that have been performed previously. The Likelihood Ratio (LR) test is 488.74 with a probability value of 0,000 less than 0.01 (α). This means that the null hypothesis (H_0) is rejected. In other words, the independent variable affects the dependent variable simultaneously at the 0.01 significance level.

Individually, eight of the eleven independent variables showed a significant effect on the level of technical efficiency at different levels of significance 0.1. Each of the five variables individually shows a positive impact on the level of technical efficiency, namely profit, assets, credit amount, micro credit access, and credit realization time, while the other three variables, namely age, labor and business location show a negative influence on the level of technical efficiency. However, there are three variables that indicate an insignificant influence on the micro-enterprises technical efficiency of the agricultural sector, namely, education, experience, and gender based on probability values exceeding the significance level of 0.1. The normality assumption test shows that the probability value of the Jarque-Bera (0.014) statistic is more than α (0.01), so the test results cannot reject the null hypothesis. This proves that the term ui error has a normal distribution.

TABLE 6. Results of the Maximum Likelihood Estimation of the Agricultural Sector Tobit Regression Model

VariableS		Coefficient	z-Statistic	*Probability*
Constant	C	0.1430173	3.14	0.002***
Profit	Z1	0.0101388	4.48	0.000***
Age	Z2	-0.001064	-3.48	0.001***
Education	Z3	-0.008335	-1.25	0.215
Experience	Z4	-0.000703	-1.06	0.291
Asset	Z5	0.0260858	5.66	0.000***
Gender	Z6	-0.002109	-0.51	0.61
Labor	Z7	-0.08373	-6.24	0.000***
Business Location	Z8	-0.076977	-5.7	0.000***
Amount of credit	Z9	0.0049897	2.74	0.007***
Micro Credit Access	Z10	0.0356166	2.69	0.009***
Credit realization time	Z11	0.0329668	2.61	0.011**
LR			488.74	0.000***
Log Likelihood			175.9996	
Jarque-Bera			0.963	0.014

**Source: Data analysis*

Based on the results of the analysis and seen from the sign on the coefficient, a significant factor can be explained that the increasing business profit will increase production efficiency. If the owner is getting older, the efficiency will decrease (Adhikari, et al., 2018; Dube, et al., 2018; Abate, et al., 2019). Then, if the assets

owned are more and more, it will increase technical efficiency. The variable number of workers that is less will increase efficiency, this means that it is better to have a few workers with a high level of productivity than many workers but low productivity. The location of the business also has an effect on efficiency because if the business location is getting closer to urban areas or markets, it will be easier to market the products and reduce shipping costs. The variable of the amount of credit affects the increase in efficiency if it is used maximally in business development (Taha, 2012). Access to micro credit has a significant effect (Abate, et al., 2019; Ngango and Kim, 2019), namely if entrepreneurs get KUR it will increase efficiency. Lastly, credit realization time, if the time is getting shorter than 2 weeks then it will increase efficiency.

Determinants of Micro Entrepreneur's Poverty

The results of the significance test indicate that the independent variables have a significant influence on the dependent variable. Simultaneously independent variables have a significant effect on poverty status with a significance level of 0.1, as evidenced by a probability value of 0,000 for the LR 488.74 statistical test less than α (0.01). Based on the Likelihood Ratio (LR) test H_0 rejected.

TABLE 7. The Maximum Likelihood Estimation Results of Logistic Regression Model

Variables		**Coefficient**	**Odds Ratio**	**z-Statistic**	***Probability***
Constant	C	-6.6137	0.00134	-2.01	0.045
Number of Household member	X1	-0.6509	0.52154	-1.97	0.049*
Income	X2	0.128	1.13655	1.66	0.096*
Education	X3	0.3489	1.41758	0.22	0.827
Geographical Location	X4	1.2555	3.50965	0.97	0.331
House Area	X5	0.0077	1.00776	0.9	0.367
Gender of Household Head	X6	4.2708	71.5844	3.03	0.002*
Expenditure	X7	-0.157	0.98441	-0.77	0.444
Micro Credit Access	X8	3.5161	33.6529	2.6	0.009*
TE	X9	2.4684	11.8042	1.73	0.084*
LR				107.82	0.000
Pseudo R2				0.792	

**Source: Data analysis*

Table 7 shows that individually, five of the eight variables have influence on the dependent variable, namely, poverty status at 0.1 levels of significance. Each of the four different variables shows a positive impact on poverty status, namely, income, gender, and micro credit access, while household member variable shows a negative impact on status of poverty. However, there are three variables that have no significant influence on poverty status, namely, education, house area, and expenditure as evidenced by probability values above the level of significance of 0.1.

The odds ratio value of the income variable is 1.13655, which means that every one unit increase in income, the opportunity for entrepreneurs to be not poor increases. Increased income means more prosperous and can increasingly meet family needs. Meanwhile, in the district, the citizens are mostly working in the agricultural sector. Then, the gender variable with an odds ratio of 71.5844, which means that if the head of the household is male, it is 71.5844 times more likely to be non-poor than the female head of household (Mohamoud and Bulut, 2020). The variable access to micro credit has a significant positive effect on poverty status with an odds ratio of 33.6529. The probability that entrepreneurs who received KUR were not poor were 33.6529 times than those who received non-KUR credits. The difference that looks significant is that the KUR credit is a government program with easy terms and low interest which greatly eases the burden on entrepreneurs compared to other commercial credit. The last variable, namely the number of family members, has a significant negative effect on poverty status. The odds ratio is 0.52154, that is, if there are more family members 1 unit, the risk of being not poor is 0.52154 times. The findings is in line with previous research by Mohamoud and Bulut (2020) and Woldie et al. (2020). This means that the more family members, the less likely they are to be poor. The more family members, the more needs that must be met. If the addition of family members is not accompanied by an increase in income, basic needs are not met and are more vulnerable to poverty. Family size is a concern of the

Indonesian National Family Planning Coordinating Agency (BKKBN) to make a two-child family planning program sufficient, as one of the objectives, in order to improve the welfare of small families.

CONCLUSION

Based on DEA estimation, the average of technical efficiency DEA-VRS is 0.86 and DEA-CRS is 0.73. Micro-enterprises in the agricultural sector which have technical efficiency equal to 1 in DEA-VRS are 62 micro-enterprises and on DEA-CRS are 28 micro-enterprises. This results shows that the technical efficiency of the agricultural sector of KUR recipient micro-enterprises in East Java can still be improved. In line with this, real income from enterpreneurs still tends to increase to reach maximum potential. The distribution shows that the micro enterprises technical efficiency in the agriculture sector in East Java makes it possible to approach the frontier (maximum potential). Then the results of tobit regression analysis determined the variables that affect significantly the efficiency of the micro enterprises in the agricultural sector, namely profit, assets, credit amount, micro credit access, and the credit realization time, age, labor and business location. The logistic regression analysis concluded that the factors that have significant effect on poverty status are income, gender, micro credit access, and household members.

Agricultural micro-enterprises that have efficiency approaching 1 meaning that increasing output and input that are the same, can affect the increasing income so that it can improve the welfare of micro-entrepreneurs and reduce poverty. To be able to improve efficiency it is necessary to know the factors that influence efficiency; these factors can be individual factors such as age, education, experience, gender, family factors such as household members, house area, and business factors such as income, expenditure, micro credit access, credit realization time. These factors can be maximized so that efficiency is achieved. From the factors that influence efficiency, it can be used again to determine the factors that influence poverty status. Based on this, it is known that the factors that both influence poverty and efficiency, namely micro credit access. These factors affect efficiency and poverty which can be maximized to achieve micro- enterprises efficiency that has an impact on welfare and poverty reduction. However there are other factors outside the analysis that also affect the efficiency and status of poverty.

This research can contribute to micro-enterprises in order to increase their efficiency based on factors that affect efficiency. Then the contribution to the government is by knowing factors that affect poverty can be the basis for decision making in taking poverty reduction policies and as a consideration for the continuation of the KUR program.

REFERENCES

Abate, T. M., Dessie, A. B., & Mekie, T. M. 2019. Technical efficiency of smallholder farmers in red pepper production in North Gondar zone Amhara regional state, Ethiopia. *Journal of Economic Structures*, *8*(1), 1-18.

Adeleke, E. A., Ahungwa, G. T., Mamman, B. Y., & Onibudo, M. Y. 2020. Determinants of Poverty Status of Farm Households around Cement Factories Precincts in Ogun State, Nigeria. *Journal of Agricultural Economics, Environment and Social Sciences*, *6*(1), 51-60.

Adhikari, S. P., Timsina, K. P., Brown, P. R., Ghimire, Y. N., & Lamichhane, J. 2018. Technical efficiency of hybrid maize production in eastern terai of Nepal: a stochastic frontier approach. *Journal of Agriculture and Natural Resources*, *1*(1), 189-196.

Central Bureau of Statistics. 2013. Number of Poor People by Province. https://www.bps.go.id/ indicator/23/185/1/jumlah-penduduk-miskin-menurut-provinsi.html (10 January 2014)

Chimai, B. C. 2011. *Determinants of Technical Efficiency in Smallholder Sorghum Farming in Zambia* (Doctoral dissertation, The Ohio State University).

Dacuycuy, Connie Bayudan, & Anthony Lim. 2014. Chronic and Transient Poverty and Vulnerability to Poverty in the Philippines: Evidence Using a Simple Spells Approach. Social Indicators Research. 118. 389-413.

Dessale, M. 2019. Analysis of technical efficiency of small holder wheat-growing farmers of Jamma district, Ethiopia. *Agriculture & Food Security*, *8*(1), 1-8.

Dube, A. K., Ozkan, B., Ayele, A., Idahe, D., & Aliye, A. 2018. Technical efficiency and profitability of potato production by smallholder farmers: The case of Dinsho District, Bale Zone of Ethiopia. *Journal of Development and Agricultural Economics*, *10*(7), 225-235.

Fadzim, W. R., Aziz, M. I. A., Mat, S. H. C., & Maamor, S. 2016. Estimating the Technical Efficiency of Smallholder Cocoa Farmers in Malaysia. *International Journal of Economics and Financial Issues*, *6*(7S).

Farrell, M.J. 1957. The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society*. *Series A*

(General) 120(3): 253-290.
Hosmer, David W., dan Stanley Lemeshow. 2000. *Applied Logistic Regression Second Edition*. Canada: John Wiley & Sons, Inc.
Islam, D., Sayeed, J., & Hossain, N. 2017. On determinants of poverty and inequality in Bangladesh. *Journal of Poverty*, *21*(4), 352-371.
Kaboski, Joseph P., & Robert M. Townsend. 2000. Policies and Impact: An Analysis of Village- Level Microfinance Institutions. *Journal of the European Economic Association*. 3(1). 1-50.
Khairati, R., & Syahni, R. (2020). Determinant Factors of Household Poverty. *Sumatra Journal of Disaster, Geography and Geography Education*, *4*(2), 182-188.
Mohamoud, A. M., & Bulut, E. 2020. Determinants of Poverty in Somalia: A Logit Model Analysis. *Fiscaoeconomia*, *4*(2), 437-451.
Mwangi, T. M., Ndirangu, S. N., & Isaboke, H. N. 2020. Technical efficiency in tomato production among smallholder farmers in Kirinyaga County, Kenya. *African Journal of Agricultural Research*, *16*(5), 667-677.
Ngango, J., & Kim, S. G. 2019. Assessment of technical efficiency and its potential determinants among small-scale coffee farmers in Rwanda. *Agriculture*, *9*(7), 161.
Nguyen, H. D., Ngo, T., Le, T. D., Ho, H., & Nguyen, H. T. (2019). The Role of Knowledge in Sustainable Agriculture: Evidence from Rice Farms' Technical Efficiency in Hanoi, Vietnam. *Sustainability*, *11*(9), 2472.
Novotná, M., & Volek, T. 2015. Efficiency of Production Factors and Financial Performance of Agricultural Enterprises. *AGRIS on-line Papers in Economics and Informatics*, *7*(665-2016-45076), 91-99.
Ogunmodede, A. M., & Awotide, D. O. 2020. Profitability and technical efficiency of leafy vegetable production: a stochastic frontier production function analysis. *International Journal of Vegetable Science*, *26*(6), 608-614.
Rusielik, R., & Szczecińska, B. 2020. Technical Efficiency Of Agriculture In Eu Countries. *Zbornik Veleučilišta u Rijeci*, *8*(1), 151-168.
O'Donnell, C. J., Rao, D. P., & Battese, G. E. 2008. Metafrontier frameworks for the study of firm- level efficiencies and technology ratios. *Empirical economics*, *34*(2), 231-255.
Pratiwi, Dinar Ika. 2010. Analisis Pengaruh Harapan Pelanggan, Kualitas Produk, Kepuasan Pelanggan Terhadap Loyalitas Pelanggan Internet Flash Unlimited di Semarang. Universitas Diponegoro Semarang.
Sayuti, Husin. 1989. *Pengantar Metodologi Riset*.Jakarta: CV. FajarAgung.
Taha, Sherin Gamaleldin Ahmed. 2012. *The effectiveness of microcredit programmes on alleviating poverty and empowering women in Cairo, Egypt*. Thesis Faculty of Economic and Social Sciences university of Agder: Norwegia.
Tenaye, A. 2020. Technical efficiency of smallholder agriculture in developing countries: the case of Ethiopia. *Economies*, *8*(2), 34.
Wang, Y. 2016. What are the biggest obstacles to growth of SMEs in developing countries?–An empirical evidence from an enterprise survey. *Borsa Istanbul Review*, *16*(3), 167-176.
Woldie, D. T., Haji, J., & Mehare, A. 2020. Intensity and Determinants of Rural Poverty in Banja District of Awi Zone, Amhara National Regional State, Ethiopia. *International Journal of Agricultural Economics*, *5*(3), 49.
World Bank. 2011. Diagnosa Pertumbuhan Ekonomi Jawa Timur . (60959). Jakarta: Author.

Atik Purmiyati*
Faculty of Economics and Business
Airlangga University B Campus
Jl. Airlangga No. 4-6, Surabaya, 60286
INDONESIA.
E-mail: atik-p@feb.unair.ac.id

Retno Setyowati
Faculty of Economics and Business
Airlangga University B Campus
Jl. Airlangga No. 4-6, Surabaya, 60286
INDONESIA.
E-mail:

Marta Sabila Rakhima
Faculty of Economics and Business
Airlangga University B Campus
Jl. Airlangga No. 4-6, Surabaya, 60286
INDONESIA.
E-mail:

* Corresponding author.