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The Productivity and Its Determinants of Broiler Farm Based On Stochastic Frontier Model, Evidence From Kendari City, Indonesia

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Abstract:
Background*: Broilers are a potential farm for the community as a livelihood because demand growth of chicken meat always in line with population growth and regional economic growth. Broiler potential paralleled by farm challenges was in form competition in free trade which required broiler farm competitiveness. High productivity is one of the main capability to confront imported meat products. However, the level of productivity among broiler farms in Kendari City has not been measured so that economic policy to increase competitiveness could not be determined precisely. To uncover this, our paper not only shows the level broiler farm productivity but also showing the factors that determine the level of productivity of farmers.*
Materials and Methods*: The census method is used to determine the census respondents. This determination is based on the advantage of capabiity to see all the characteristics of farms as well as spatial reasons for identification in the efficiency of broiler farming in certain areas. The analytical approach used in this research is inferential analysis. This analysis model try to reveal statistically about the phenomenon of quantitative data. The inferential statistics used are the stochastic frontier production function.*
Results*: Broiler farmers in Kendari City have not achieved maximum technical efficiency in their farming and the level of technical efficiency still varies from one farmer to another, where the average technical efficiency level is 0.923. Variations in the level of technical efficiency of broiler farmers in Kendari City are significantly influenced by the determinants of farmer age, farming experience, number of family dependents, average harvesting age and dummy broiler farming patterns.*
Conclusion:*To reach of high technical efficiency can influenced by the determinants of farmer age, farming experience, number of family dependents, average harvesting age and farming patterns.*
Key Word*: Broiler; Technical Efficiency; Determinants Factors.*

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I. Introduction

Poultry Farm is currently a business that can consistently provide a source of income for the community. This condition occurs due to an increase in the need for animal protein in society. The

Poultry Farmsub-sector has increased exponentially and made the position of chicken meat very important in contributing to the supply of meat in a country[(1);(2)]. Every country is currently facing free trade including in the broiler farming. There is competition between the offers between imported broilers and domestic broilers. The availability of broiler feed originating from international markets makes input prices more volatile. While the share of broiler feed costs contributes 60-70 percent, this condition makes broiler farmers vulnerable to losses[(3)].

Broiler farming has distinctive characteristics, that is dependence and responsiveness to the environment, the level of technical management of cultivation, and the quality of human resources in the farming. In order to achieve a high level of farming productivity and sustainability, proper management is required. In Indonesia, the broiler market has become unstable and fluctuated since 2019. Apart from facing the threat of imported broiler meat from Brazil, Indonesia is also facing expensive imported corn prices. Imported feed raw materials that follow international prices have resulted in feed prices in Indonesia being expensive and volatile. As a result, farmers in Indonesia face two problems, namely market competition and high production costs. Therefore, competition only in the broiler market can only be faced by farmers through increasing

efficiency[4]. Efficient broiler farming management will be able to boost the productivity of broiler farms so as to encourage competitiveness and increase income for the community.

The current condition of Kendari City in Southeast Sulawesi is an area of interest for increasing broiler production because it is an area that has high demand. Kendari City is currently an Administrative City where most of the population works outside the agricultural sector. Even so, the encouragement of rapid growth in the economy will also increase the growth in demand for animal food. This opportunity is a pull factor for broiler farms to increase production. It's just that these opportunities can only be achieved by imported meat or domestic production[5].

The contribution of chicken meat is supported by technological improvements that have helped direct the genetic development of broiler farmingin accordance with the direction of the agricultural business. This technological support makes broiler farms an important farm to support most of the animal protein needs in every country around the world[6]. The genetic development of these farmingalso directs broilers towards changes in the management of rearing patterns to become more precise because broiler become more vulnerable on changes in the micro and macro environment. To achieve the proper production level, good technical skills are needed to manage the maintenance and input of broiler farming. The achievement of production that are not in proper level will increase the cost per unit of output so that it will reduce the competitiveness of farmers.

Comparative measure of the actual production level achievement and the production level achievement which should be an indicator of productivity. The value of this indicator is highly considered by policy makers in terms of increasing the output of a broiler farming. In another definition that is in line, productivity is also a measure of the number of resources spent in a number of broiler production. As a Decision-Making Unit (DMU) productivity between farmers can be calculated from the level of technical management success in a set of inputs to produce a number of broiler outputs. The way to measure technical management success can be measured by measuring technical efficiency[5]; [7]; [8].

Basically, there are always differences in the environment faced by farmers and the level of ability of farmers that are not the same is the main determinant of differences in technical efficiency achievements. This capability is indicated by the ability to use a number of production factor input sets to produce a number of production. Differences in capabilities and environment will also produce different levels of technical efficiency. Increasing efficiency will have an impact on the income and competitiveness of their broiler farming. From this description, what is important to study is the level of diversity in production performance in each broiler business unit in Kendari City in terms of the level of relative technical efficiency. Therefore, this research in general aims to analyze the level of technical efficiency of broiler farms in Kendari City. In order to achieve this general objective, it is carried out by achieving the following specific objectives: (1) measuring the average and distribution of the level of technical efficiency of broiler farmers, and (2) determining the determining factors for achieving the level of efficiency of broiler farms.

II. Material And Methods

The scope of this research is the study of the economics of production, the object of which is broiler farming in Kendari City, either with a partnership program or not participating in the partnership program. By measuring technical efficiency and at the same time thinking about the factors that influence this efficiency. This research emphasizes the analysis of farmer skills to manage a broilerfarmingwith the main goal of increasing the farm production in order to increase the farming income.

Research location: The location of this research was in KendariCity, Southeast Sulawesi, Indonesia. The research location was determined deliberately with the consideration that the research location is one of the new growth areas with the potential for the transportation and communication sector and the trade, hotel and restaurant sector which are the main drivers of economic growth in the region.

Respondent Determination Method: The census method is used to determine the census respondents. So, all broiler farmers in the Kendari City, Southeast Sulawesi Province were the respondents in this study. This determination is based on the advantage of being able to see all the characteristics of farmers such as spatial condition for identification in the efficiency of broiler farming in certain areas.

Data Analysis Method: The analytical approach used in this research is inferential analysis. This analysis model was purposed to reveal statistically about the phenomenon of quantitative data. The inferential statistics used were the stochastic frontier production function. The stochastic frontier production function is a method of determining the technical efficiency of broiler farmingwhich is able to reveal the distribution of technical efficiency levels in each observation and the factors that determine technical efficiency. Knowing the size and distribution of technical efficiency values/indices, it can be estimated the factors that influence efficiency. The data analysis method in this study uses the Cobb-Douglass multiple regression estimation method with Ordinary

Least Square (OLS) estimation and Maximum Likelihood Estimator (MLE) as a tool to measure value/index as a level of technical efficiency. The mathematical formula in this multiple regression analysis is as follows:

$$\ln Y = \beta o + \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + \beta_3 \ln(X_3) + \beta_4 \ln(X_4) + \beta_5 \ln(X_5) + \beta_6 \ln(X_6) + \varepsilon$$

Where :
Y = Amount of broiler production per farmer in one period per Kilogram (kg)
X_1 = Amount of DOC (Day Old Chicken)for each farmer in one period in units of tails (heads)
X_2 = Feed for each farmer in one period per Kilogram (kg)
X_3 = Vaccines, broiler medicines per farmer in one period per gram (g)
X_4 = Vitamins in each farmer in one period per gram (g)
X_5 = Labor per farmer in one period of male equivalent working hours (JKSP)
X_6 = Brooding fuel for each farmer in one period per Rupiah (Rp)
β_o = Constant
β_i = Predicted variable input variable parameter
ε = residual element

To determine the level of technical efficiency of each broiler farmers, the measurement of the level of technical efficiency is based on Coelliet al,[9], where the Technical Efficiency (TE) achieved by the i-th farm is calculated by using the ratio between the i-th farmer's output level the observed results (y_i) and the output that is potentially produced (y_i*), at a certain level of input use xi. Then the equation is as follows:

$$TE_i = \frac{y_i}{y_i^*} = \frac{\exp(x_i\beta - u_i)}{\exp(x_i\beta)} = exp(-u_i)\ 0 \leq TE_i \leq 1$$

Because the variables are expressed in natural logarithms, the size of the ratio above is the same as the exponential value ($-u_i$). Where TE_i is the technical efficiency of the ith farmer, $\exp(-u_i)$ is the expected value (mean) of u_i with the condition εi, so $0 \leq TE_i \leq 1$. The above measures are between zero and one.

Factors that are closely related to management in broiler farmingwhich directly determine efficiency improvements are very closely related to the characteristics of farmers and the business environment around the farmers themselves which in this case is the partnership program they participate in. With that in mind, to determine the parameter value of the technical efficiency determinant factor, the following is applied:

$$TE_i = \delta 0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5 + \varphi_6 Z_6 + \varphi_7 Z_7 + \varepsilon$$

Where :
TE_i = Technical Efficiency Level
Z_1 = Farmer's Age (Years)
Z_2 = Breeding experience (Years)
Z_3 = Education level (Year)
Z_4 = Number of Family Dependents (Person)
Z_5 = Average Harvest Age (Days)
Z_6 = Dummy Broiler FarmingPattern (0 = Partner Farmers 1 = Independent Farmers)
Z_7 = Dummy Broiler Farm Status of (0 = Side Job 1 = Main Job)
δ_i = Presumed variable input variable parameter
φ_i = Dummy variable parameter
ε = residual element

III. Result

The production function of the Stochastic Frontier in a farming is closely related to the physical relationship between a certain proportion of inputs (factors of production) and a number of outputs (products of production) which will determine the amount of production costs and the sales price of products using the Stochastic Frontier rule. The results of this functional analysis of broiler farming in Kendari City, based on the Ordinary Least Square Estimator (OLSE) are presented in Table 1.

Table 1. Parameter Estimation of the Stochastic Frontier Production Function using Ordinary Least Square (OLS)

Variable	OLS		
	Coefficient	Std.Error	t-ratio
Constant	-0, 353[tn]	(0, 266)	-1, 323
Seeds	0,211***	(0,054)	3, 861
Feed	0,728***	(0,055)	13,233
Vaccine	-0,037[tn]	(0,028)	-1,301
Broiler medicines	0, 154***	(0,046	3, 318
Vitamin	-0,110**	(0,045)	-2, 447
Labor	0,077*	(0,052)	1, 704
Brooding Fees	0,032[tn]	(0,022)	1,433
F hit	1126,00		
R^2	0,992		
σ^2	0, 8315	0,0035	3,356
γ	0,0117	0,1297	6,413
LR *Test*	68,517728		

Source: Processed data (2011) with SPSS 16.0 and FRONTIER 4.1.
Information :
*** significant effect on the 99 percent confidence level
** significant effect at the 95 percent confidence level
* significant effect at the 90 percent confidence level
[tn]no real effect

Based on the results of the regression analysis of the production function using the Ordinary Least Square (OLS) method for broiler farming in Kendari City, which has been shown in detail in Table 1, the coefficient of determination (R^2) is 0.992, which means that 99.2 percent of the total variation in broilerproduction is determined by independent variables, namely factors included in the production function model, namely seeds, feed, vaccines, broiler mediciness, vitamins, labor and brooder costs together, while 0.8 percent of the dependent variable is explained by the variables that not included in the model.

Based on the results of the student's t-test partially, it shows that almost all of the variables included in the production function equation model have a significant effect. The variables that have a very significant effect at the 99 percent confidence level and had positive sign regression coefficients were seeds (DOC), feed and medicine. Then the variables that have a significant effect on the 95 percent confidence level but had negative sign regression coefficients are vitamin and the variable that has a significant effect on the 90 percent confidence level and positive sign regression coefficient is labor, while the variables that have no significant effect are vaccines and brooder costs.

Testing the equation of the production function using the Maximum Likelihood Estimator to estimate the level of efficiency is also conducted using the LR test. The results of the LR test in Table 1 show a value of 68.518, while the critical value χ^2 obtained from the critical value table χ^2 with the number of restrictions = 1 at the 99 percent confidence level, which is 5.412. By comparing the value of the LR test (68.518) and the critical value χ^2 (5.412), it can be seen that the LR test > χ^2 at the 99 percent confidence level means that the stochastic frontier production function model is very good.

Table 2 Tabulation Results of the Distribution of Technical Efficiency Levels in Broiler Farm in Kendari City

Technical Efficiency Level	Total	Percentage (%)
0,700 - 0,749	1	1,60
0,750 - 0,799	0	0
0,800 - 0,849	3	4,80
0,850 - 0,899	10	15,80
0,900 - 0,949	25	39,70
0,950 - 0,999	24	38,10
Total	63	100
Maximum	0,985	

Minimum	0,743
Average	0,923

Source: Data processed with FRONTIER 4.1.

The σ^2 (sigma-squared) value is the error term variation of the regression equation resulting from the external random variation variance (σ^2_v) and the error variance of Technical Inefficiency(σ^2_u). σ^2 (sigma-squared) indicates the deviation of broilerproduction level between the actual production (γ) and the estimated production level (γ) of Broiler Farm in Kendari City. As presented in Table 1, the σ_2 value indicates a σ_2 value of 0.0117 and is significant at the 99 percent confidence level with the student's t-test, so this value indicates that Broiler Farm in Kendari City is significantly determined by outside factors of input production.The γ value shown in Table 1 is 0.832 and has a very significant effect on the 99 percent confidence level in the student's t-test, this indicates that there is a technical inefficiency effect that affects the production level of each farmer resulting was not achieving the level of maximum technical efficiency. The value of 0.832 means that the percentage effect of the farmer technical inefficiency error variance (σ^2_u) on the diversity of farmer inefficiencies to achieve maximum production in broiler farming in Kendari City is around 83.2 percent.The results of the estimation of the level of technical efficiency for each broiler farmer are presented in Table 2.

As we know, every farmer is someone who is responsible for managing the managerial management of his broiler farming, whose level of performance success in organizing, formulating and using a set of proportions for a collection of production factors (inputs) in producing a number of production results can be approached from technical efficiency measures. The level of efficiency between one farm and another will differ from one another because the managerial abilities are also different, and in this study these differences are described by the level of technical efficiency in each farm as a unit of observation.

The factors that have an effect on increasing the productivity of the broilerfarm are those factors that are closely related to the managerial skills applied by the farmer so that they are the cause of not achieving the expected level of technical efficiency. The factors that influence the technical efficiency of broiler farming in the study in Kendari City are presented in Table 3 below.

Table 3 Estimation of Factors Affecting Technical Efficiency

Variable	Coefficient	Standart Error	t-ratio
Farmer's Age (Years)	0,00108**	0,0054	2,01
Breeding experience (Years)	0,00446**	0,00179	2,600
Education level (Year)	0,00034^{tn}	0,00178	-0,191
Number of Family Dependents (Person)	-0,00704*	0,00358	-1,968
Average Harvest Age (Days)	0,00342**	0,00144	2,377
Dummy Broiler Farming Pattern	-0,036***	0,011	-2,987
Dummy Broiler Farm Status	-0,002 ^{tn}	0,012	0,203

Source: Data processed with FRONTIER 4.1.

IV. Discussion

The variables DOC, feed and medicine are the most influential variables among the other variables and have a positive regression coefficient, so the effect of these variables were very important role in determining the amount of broiler production which, if these variables amount were added, it will increase broiler production. This findings is in line with research conducted by Yunus**(10)**which states that the DOC variable has a significant effect on broiler production and Suharno**(11)**, which states that DOC, feed, and medicines are often referred to as broiler production factor which are the three farm components that determine the success of broiler agribusiness.

The amount of DOC used determines the scale of the broiler farming, considering that the addition of DOC means an expansion of the farm scale which requires an increase in the capacity of the cage and the density of broiler per meters. As stated by Fadilah**(12)** that the number of DOC must be adjusted to the harvest plan, broilerdensity and farm capacity. The expansion of farm capacity is a long-term plan, because it requires investment capital which is used to finance the procurement of all permanent infrastructure and farm facilities. The infrastructure and facilities for a long period of time can be two years, five years or 15 years.

According to characteristics of broiler farming in Kendari City, which is high variation in farm scalebetween 100 to 4,000 Chicken, and the average farm scale about 1,711 Chicken and demand for broiler

product supply is still large. Therefore, the addition of farm scale could be meet the demand for supply of broiler chickens while at the same time increasing the income of the Broiler Farm.

The vitamins also had a significant effect but at the 95 percent level and had a negative regression coefficient with a regression coefficient of -0.111. The results of this analysis will literally provide an interpretation that every addition of 10 percent of vitamins will reduce broilerproduction by 1.11 percent, but this indicates that there is a level of vitamin use that is not too different between broiler farmers in Kendari City, so that it can indicate the presence of giving vitamins with excessive doses or the existence of some farmers who are able to efficiently provide vitamins to chickens.

Although the labor variable only has a significant effect on the 90 percent significance level with a positive regression coefficient of 0.077 as shown in Table 1 but it still shows that if there is an additional 10 percent male equivalent working hours, it will increase chicken production by 0.77 percent. The labor variable less significance due to the wide variety of activity patterns and work time allocations in managing the livestock business due to the farmer's experience, the period of raising chickens, the scale of the farm and the differences type of broiler farm equipment so that it has an impact on differences in the total number of working hours in daily activities or every period. The difference in the allocation occurs in the total time allocation for feeding, giving drinking water, washing drinking water places and cleaning cages. Although there is a very large difference, the difference in working hours is not too great between farmers because the amount of working hours for on-farm activities is not too much needed in broiler farm.

As for the brooding cost variable which shows a positive effect with a regression coefficient of 0.032 but has no significant effect on broilerproduction even at the 90 percent confidence level. In the term of broiler production, the brooding period is an important factor of raising DOC because it supports the growth of early chickens so that the standard weight can be achieved. However, it is not absolutely only the effectiveness of the brooding period that determines the achievement of the standard weight of chickens, but also due to the achievement of feed intake which also plays a major role. Thats way, the proportion of influence on the weight gain of the meat is very less due to the brooding period. In addition, the broiler farm in the study area confront withthe variations of type of material heating sources, heating time and the prices of heating source during the brooding period. So spending on brooding costs does not vary too much with a linear increase in chicken weight production.

The feed variable shows a positive effect and has an effect on the 99 percent confidence level on broilerproduction with a regression coefficient value of 0.729 as shown in Table 1. The regression coefficient shown by the feed variable is 0.729 which means that if there is an increase in the amount of feed used by 10 percent then there is a tendency for broilerproduction to increase by 7.29 percent, this is in line with research conducted by Sarwanto[(13)] which states that feed has a very significant effect on broilerproduction.

Then the feed variable has a very large t-ratio value of 13,233 compared to the variables of DOC and medicines. The effect of the feed variable is greater than the variables in the model because feed is the only input that can directly increase the weight of the chickens, so planning for the final weight harvested will determine the amount of feed given to the chickens. According to Suprijatna[(14)]suggests that in terms of biological aspects, maximum growth and production is achieved when the quality and quantity of feed is adequate, then production will be efficient if the need for nutrients is met.Furthermore, according to Rasyaf[(15)] the growth of broiler chickens is influenced by the consumption of rations given ad libitum, each broilerhas its standard consumption determined at a certain limit so that the prime ability of the broilerwill appear.

Based on Table 3, it can be seen that the vaccine cost variable shows a negative relationship to broiler production but does not show a significant effect even at the 90 percent level. With the addition of vaccine costs, it will not have a good effect on increasing or reducing broilerproduction in Kendari City.The non-influence of the vaccine variable on broilerproduction is actually more due to the function of the vaccine which does not really have a very big role in the process of chicken weight growth which is a measure of the production efficiency of a broiler farming. It can be interpreted that actually in the use of vaccines between farmers, there is not too much difference in the pattern of vaccine injection, but the total cost of vaccines is also not too far apart.

A positive and significant effect at the 99 percent significant level is also shown by the broiler medicines variable. This means that the greater the amount of broiler medicineswas used, the greater the amount of broilerproduction. The broiler medicines variable has an influence on broilerproduction with a regression coefficient of 0.155 which means that if there is an additional 10 percent amount of broiler medicines administration, it will tend to increase broilerproduction by 1.55 percent. According this effect, the broiler medicines variable has a very important function in the broiler farming to prevent mortality. The function of the broiler medicines as stated by Rasyaf[(15)] is that the actual function of the broiler medicines is not only for treatment, but is more aimed at preventing and accelerating the growth of broilers.

Based on Table 2 which shows that the technical efficiency of broiler farming in Kendari City ranges from the lowest value of 0.743 to the highest value of 0.985. When compared with the level of technical efficiency in broiler farming in Palu City as stated by Yunus[(10)], the technical efficiency range is between 0.800 -

0.950 with an average level of technical efficiency of 0.869 percent, when viewed from the range of efficiency levels technically, broiler farmers in Palu City are the least technically efficient in 0.800 while broiler farmers in Kendari City the most inefficient farmer in 0.743, but observation onPalu City farmers,the most efficient farmer in 0.950 while farmers in Kendari City could reach technically efficient index in 0.985. The diversity of efficiency levels of broiler farmers in Kendari City is greater than the diversity of technical efficiency levels of broiler farmers in Palu City, but shows that the range of efficiency levels is not too much different.

Then based on Table 2 it is also known that the average level of efficiency achieved by farmers in Kendari City is 0.923. This value means that the overall average productivity of broiler chickens achieved by farmers in Kendari City is around 92 percent of the frontier, namely the maximum productivity that can be achieved with the best technical broiler farmingmanagement system (the best practiced).

Based on Table 2, it can be seen that the distribution of farmers according to the level of technical efficiency achieved. Table 2 shows that the majority of farmers, namely as much as 77.80 percent, are in the efficiency level interval between 0.900-0.999, this indicates that indeed the majority of broiler farmers in Kendari City as a technical managerial in their business, are almost close to the frontier (TE=1). Then only as much as 22.20 percent in the efficiency level interval between 0.700 – 0.899. With an average level of efficiency achieved by farmers in Kendari City of 0.923, this means that overall the average broiler productivity achieved by farmers in Kendari City is around 92 percent of its frontier, so this reflects the managerial skills of a farmer which is quite high.

Farmer Age (Z_1). This factor is included in the technical efficiency determinant model which is hypothesized to have a negative effect on the technical efficiency of farmers. According to the findings, it can be described that older farmers show higher average productivity than younger farmers. The characteristics of farmers in Kendari City are at a productive age sothis the advantage in broiler farmingmanagement because with a higher age of farmers, the ability to adopt technology and the honed skill would be increase so that they capable to manage broiler farming well.The findings is in line with the research of Sumaryanto[16] and Hasan[17] which states that the age of farmers affects physical abilities, work and thinking. Farmers who are young and healthy have greater physical abilities and work longer hours than those who are old. In addition, age also affects the ability of farmers to accept, understand and apply technology, especially regarding farming production.

The age characteristics of farmers in Kendari City showed that the ranges age of farmers from 18 years to 65 years with an average age of farmers is 39 years. This shows that most of the farmers are still in their productive age, based on the criteria of a productive age of 15 - 64 years. Based on this, it can be seen that the age of farmers in Kendari City as a whole is still in the productive age. During the productive period the farmer will experience an increase in work ability and will be more optimal in managing the broiler farmingas optimally as possible. The relatively old age of the farmer reflects the accumulated experience and wisdom in making decisions on farming management. Furthermore, the older farmer is more experience in farming and more careful in making decisions, because they become wiser to considerall farm risks. All that capability in farm management madeolder farmersv became more efficient. This findings is in line with the opinion of Hernanto[18]. With optimal management and work ability during the addition of age during the productive period, it will make farmers more technically efficient.

Broiler FarmingExperience (Z_2). The effect of farming experience on technical efficiency is shown in Table 3 which shows that farming experience has a significant positive effect at the 95 percent confidence level, with a regression coefficient value of 0.00446. Based on the results of the statistical analysis, it predicts that the longer a farmer operates broiler farming more efficient his capability to managebroiler farmingand more technically efficient. The interpretation of the regression coefficient of 0.00446 is that farmers with one year of farming experience will be more technically efficient in their farming with a gap level of 0.00446.

This description shows that in the broiler farming in Kendari City, farmers who have experience in managingbroiler famingfor a longer period of time have higher productivity gains when compared to farmers who have less farming experience. The longer a person manage his farming, the more technical improvement efforts are made by the farmer and they become better in rearingbroiler come near to the best practice. Inaddition, the more proficient technically, the farmers near to achieve the maximumincome. Increasing farming experience made broiler farmers skills would be better and more capable to make the critial adjustments of farming in extreme environmental conditions. At this point they become an efficient farmers.

Education Level (Z_3). Kebede[19] suggests that the educational factor is a proxy for the managerial ability of farmers. In this way, the longer the farmer's education is taken, the better the ability of the farmer to process the transforming factors of production into a number of production results. The determinant effect of the level of education on the level of technical efficiency is shown in Table 3 which shows that the level of education has no significant effect on the level of technical efficiency even at the 90 percent confidence level. Based on the results of the statistical analysis, it shows that both farmers who have a high or low level of education do not affect the achievement of technical efficiency.

In this study, the education level of the farmers showed a positive effect on the level of broiler farming efficiency, but statistically it had no significant effect. The results of this finding are thought to be due to the characteristics of the farmers in the study area indicating that most farmers had formal education for more than 9 years with an average of 12 years (high school level) for all farmers, thus the level of education is already quite high on average. The differences in the ability to adopt technology, insight into thinking and rationality of farmers to interpret technological information do not differ much on average between farmers.

Number of Family Dependents (Z_4). The number of family dependents is closely related to the potential of human resources that come from within the family or if not active in the broiler farmingis a burden for expenses. Table 3 shows that the number of family dependents has a negative effect on technical efficiency at the 90 percent confidence level, with a regression coefficient of 0.00704. Based on the results of the statistical analysis, it gives a prediction that the more dependents the farmer's family has, the lower the level of efficiency of his farming from a technical point of view. Furthermore, the farmer whose number of family dependents lasts a year will have a lower level of technical efficiency in his broiler farmingwith a level difference of 0.00704 or more low. This figure shows that smaller number of family dependents on broiler farmers in Kendari City show a higher level of farm productivity achievement compared to the productivity achievement of farmers who have a larger number of family dependents.

Average Harvesting Age (Z_5). The average harvesting age is one illustration of the weight of the chickens harvested and market preferences in a region for broiler chickens. This average harvest age factor as a determinant of technical efficiency shows a positive and significant effect on the 95 percent confidence level, with a regression coefficient value of 0.00342 as presented in Table 3. Based on the results of the statistical analysis, it gives a prediction that the longer the harvest time broiler, the more efficient the broiler farmingwill be from a technical point of view and farmers harvesting their chickens a day longer will be more technically efficient in increasing the weight of the chickens with a difference level of 0.00342 better. Based on this description, this gives a prediction that the longer the harvest period, the higher the level of technical efficiency which is illustrated by the productivity per kilogram. This figure shows that in the study area with a longer harvesting age, broiler farmers in Kendari City showed a higher level of productivity per kilogram of broilerthan the achievement of productivity per kilogram of farmer chickens with a faster harvest age.

Dummy Broiler FarmingPattern (Z_6). This variable suggests the confrontation of the influence on farmers whose broiler farmingpattern is in partnership (denoted = 0) or independently (denoted = 1), if the regression coefficient of the dummy variable is positive then the technical efficiency of the broiler farmingpattern independently is better than the broiler farmingpattern partnership and if dummy has a negative sign, the technical efficiency of the partnership broiler farmingpattern is better than the independent broiler farming pattern.

The effect of the dummy variable on broiler farmingpattern on technical efficiency is shown in Table 3 which shows that the broiler farmingpattern has a significant positive effect at the 99 percent confidence level, with a regression coefficient value of 0.00446. Based on the results of the statistical analysis, the decision was made that the pattern of partnership broiler farmingwould affect the achievement of technical efficiency for broiler farmers in the city of Kendari. This finding is in line with the results of research conducted byRamaswami[20] regarding efficiency and distribution in contract farming for broiler farmingcases in India which stated that the production of contract farmers is more efficient than the production of non-contract farmers.

As is the actual condition in the study area, the member of Partnership Broiler FarmingPattern (Plasma Farmers)alwaysreceive information and technical guidance so that it become an effort to accelerate obtaining a good level of skill in rearingbroiler.Besides that, there is technical standardization, equipment and cages so that maintenance management becomes better and there are efforts to increase productivity in order to reduce mortality and increase efficiency in the use of factors of production (especially feed) due to the pursuit of increasing the weight of chickens as a basis for selling prices.

Dummy Broiler FarmStatus (Z_7). Describing is a determinant in seeing that the broiler farming becomes the main job or becomes a side job, this is related to the allocation of working time in the farming. If a farmer has another job besides his broiler farm, then indirectly the allocation of working time in the broiler farm will decrease and it will disrupt the farming process to reach an efficient level.

The effect of the dummy variable broiler farming status on technical efficiency is shown in Table 3 which shows that broiler farming status has no significant effect even at the 90 percent confidence level. These results statistically indicate that although the broiler farming status dummy has a positive effect, it does not have a significant effect on technical efficiency. In this way, the results of this finding mean that even farmer has other work besides his broilerfarming, it does not affect the farming activities so that the farmer can achieve an efficient level.In addition, costs required for broiler farming in very high so that the role of work outside the farmingis very helpful for farmers in providing farm capital both at the beginning and near the end of the farmingperiod. Provision of sufficient capital both at the beginning and at the end is one of the anticipation and

technical adjustments for farmers in the event of extreme conditions in the farm. With increased capital capacity, it will be easier for farmers to obtain production factors with better quality at the right time when they are needed.

V. Conclusion

Based on the results of the analysis and discussion of the factors that influence production, the estimation of the level of technical efficiency, and the determinants of the efficiency factors that have been described previously, as well as taking into account the objectives set in this study, it can be concluded as follows:

1. In the production function of broiler farming, it shows that the amount of DOC, feed, broiler medicines, and labor has a significant positive effect on broilerproduction and the use of vitamins also has a significant but negative effect
2. Broiler farmers in Kendari City have not achieved maximum technical efficiency in broiler farmingand the level of technical efficiency still varies from one farmer to another, where the average technical efficiency level is 0.923.
3. Variations in the level of technical efficiency of broiler farmers in Kendari City are significantly influenced by the determinants of farmer age, farming experience, number of family dependents, average harvesting age and dummy broiler farmpatterns.

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