



The Analysis Of Broiler Price Fluctuations in Indonesia

Analisis Fluktuasi Harga Ayam Broiler Di Indonesia

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ABSTRAK

Kondisi industri broiler secara nasional tengah menghadapi kendala. Sering terjadi peningkatan biaya input produksi, pada saat yang sama juga terjadi penurunan harga ayam hidup (*livebird*) sebagai output produksi. Tujuan penelitian ini adalah menganalisis faktor-faktor yang mempengaruhi fluktuasi harga broiler di Indonesia. Data yang diolah pada penelitian ini adalah data sekunder yang berasal dari Badan Statistik Indonesia. Analisis yang digunakan adalah regresi data panel untuk mengetahui pengaruh harga pakan, harga DOC, permintaan dan penawaran terhadap ayam broiler. Data dikumpulkan adalah data *time series* dan data *cross section* yaitu dalam lima tahun untuk masing-masing propinsi. Data dikumpulkan dari 34 propinsi di Indonesia. Hasil penelitian diperoleh bahwa harga pakan, harga DOC, dan penawaran broiler berpengaruh signifikan terhadap harga broiler. Sedangkan permintaan broiler tidak berpengaruh terhadap harga ayam broiler.

ABSTRACT

The broiler industry condition nationally is facing an obstacle. It is often appearance an increase in production input cost, at the same time, it is also happened a decrease in the price of livebird as production output. This research purpose is, to analyzes factors what influence the broiler price fluctuations in Indonesia. Data processed in this research is a secondary data from Indonesian Statistics Agency. The used analysis is a panel data regression to know about the effects of feed and day old chicken (DOC) prices, the demand and supply on the broiler chickens. Data were collected from the time series data and cross section data, namely for five years each provinces. The data were collected from 34 provinces in Indonesia. The research result is found that the feed price, the Doc price and the broiler supply get significant effect on the broiler price. So the broiler demand no effected in the broiler chicken prices.

1. Introduction

Along with population growth and increase with nutrition awareness, animal protein consumption especially broiler chickens will continue to increase. The broiler chickens can substitute beef as protein food on the orginal animal. They have advantages more than other animal products. Their prices are cheaper, the numbers on

the market are more over, if it's easily obtained. All Indonesian society layers almost consume the broiler chickens. This makes the demand for them increase every year. On the producer side, since 2010, Indonesia has already been self-sufficient with chicken meat, that the need for chicken meat can be fulfilled through a domestic farm. The difference between the production value and the consumption value shows a positive value. The domestic production is still sufficient with the domestic consumption needs. Broiler chicken production in 2023 will reach 3,730,640 tons. Meanwhile, the demand for broiler meat reaches 3,505,998 tons (Indonesian Ministry of Agriculture, 2023). There is a potential surplus of broiler meat of 375,131 tons or around 10.70 percent of total national production. Therefore it is necessary to maintain the price stability of the broiler chickens so as not to interfere with the fulfillment of needs from Indonesian people. Efforts to create a market balance must be done so that the prices remain stable. In a microeconomic perspective, the market tends to lead to equilibrium where the demand quantity is the same as the amount of supply. Price changes will occur if the demand and supply are not in balance. If the demand exceeds the supply, prices will rise and on the contrary (Akhmad, 2014 dan Mankiw, 2023).

The same things also happen in Indonesia, where the broiler prices always increase every year. The price of broiler chickens in 2019 was IDR 34,095 per head and increased by IDR 38,210 per head in 2023. The average increase in broiler prices in the last five years is 3.85 %. This increase far exceeds the increase in percentage supply and demand for the broiler in Indonesia. The Broiler demand increases every year with an average increase of 2.96 % in the last five years. Demand for broiler chickens in 2017 was 83.823 tons and will increase to 94.085 tons in 2021. The increase in demand for it in Indonesia still exceeds the supply increase. Supply for broilers in Indonesia were 2,850,000 tons in 2017 and will increase to 3,198,920 tons in 2021 (BPS Indonesia in 2022). The average of it is only 1.03 %. The market in the broiler industry continues to move forward to a balance point. This problem causes the broiler price to move up continuously.

On the producer side, the condition of the national poultry industry is facing obstacles. On the one hand there is an increase in production input cost while on the other hand there is a decrease in the price of live birds as production output. The rise in production cost is due to increased prices for Day Old Chicken (DOC) and feed. It is not

proportional to increase in the broiler price. The average increase in the broiler price in the last five years is 9.10 % and the average increase in feed price is 2.81 while the average increase in broiler prices during the same period was 3.85 %.

The high price fluctuations cause disincentives for the business actors in the poultry sector because of the business uncertainty. The feed price and the DOC price rises have impacts on the production costs of the broiler chickens on the farmer level. This term burdens smallholder breeders to remember the feed and the DOC supply which still appear from large companies if they do not have a bargaining power. While the price of the feed and the DOC are increasing, and sometimes the broiler prices often decrease. This case will have an impact on the business profit. The profit maximization will be obtained from the difference between the earned revenue and the incurred costs. The price is a very important rule of play in determining operating profit. How about the price, to get the maximum profit, producers can minimize the production input prices and increase the output prices. Yet, in the broiler industry, breeders as producers have a weak bargaining position in terms of price. Because more than 93 % of the broiler industries in Indonesia are in partnership forms with the integrator companies and only 7 % are independent breeders (Fitrimawati, 2018). The broiler breeders do not have the power to set output and control input prices.

However, price is an important element for the producers to get the maximum profit and how are consumers for determining the amount of consumption of an item. The price of the broiler chickens also determines the level of losses and profits that can be obtained by entrepreneurs or broiler breeders themselves. Fluctuating prices will certainly make it difficult to predict a business where these fluctuations can occur due to an imbalance between supply and demand. If there is an excess of the supply, the price of the product will fall, and if there is a shortage, the price will rise. The behavior of farmers and traders becomes an important thing in the price fixing process because it is easy to do for sales and determine sales volume according to the consumer needs (Lewerissa et al. 2023). The prices are influenced through economic conditions, demand and supply, demand elasticity, competition, costs, company objectives, and government supervision (Kotler dan Armstrong, 2014). Therefore this study aims to analyze the factors that influence fluctuations in the broiler prices in Indonesia.

2. Materials and Methods

This research was conducted in Indonesia. The used data type is the secondary data about the broiler prices and the factors that influence them, namely the feed prices, the DOC prices, the demand and the supply. The data obtained from the Indonesian Statistics Agency. It was collected in the last five years in every province in Indonesia. There are 34 provinces analyzed in this study. The data analysis used in this study is the panel data regression method with the helps of Microsoft Excel and Eviews 9 software. Panel data regression (Panel Pooled Data) is a combination of cross section and time series data.

Determination of the best model of panel data regression is done through the Chow test, the Hausman test and the Breusch Pagan test. When this test will determine the model with the assumption of the same intercept and slope (Common Effect Model), different intercepts with the same slope (Fixed Effect Model) or disturbance variables may be related to each other between time and between individuals (Random Model Effects). The Common Effect model does not pay attention to the time or individual dimensions, so it is assumed that the behavior of the data is the same as various time periods.

The selected model will then be tested for Classical Assumptions. This test aims to obtain an efficient and unbiased examiner score or BLUE (Best Linear Unbiased Estimator). In the panel data regression, not all classical assumption tests are used, but only the multicollinearity tests and the heteroscedasticity tests (Basuki et al. 2015). Then the goodness of fit test will be carried out using the t test, F test and the coefficient of determination.

3. Result and Discussion

3.1. Result of Panel Data Regration

The initial step of the analysis is carried out on the feasibility of the selected model. The selected model in this study met the criteria for a good model. The panel data regression model in this study has gone through the Chow test and the Hausman test. The results of this test can be seen in **Table 1**.

Table 1. Test Results of Panel Data Regression Model

Testing	Cross-section	Results
Chow test	0.0000 < 0.05	Fixed Effect Model
Hausman test	0.0000 < 0.05	Fixed Effect Model

Based on **Table 1** it can be seen that the results of the Chow test and Hausman test obtained a cross-sectional value of 0.000. This number is smaller than 0.05, which means that this model has a different intercept but the same slope (*Fixed Effect Model*). Lagrange Multiplier testing is not necessary because the Chow test and Hausman test results are the same, namely the *Fixed Effect Model*. In the *Fixed Effect Model*, each individual is a parameter that is estimated using the dummy variable technique. In this study, individuals were represented by 34 provinces in Indonesia. Thus, the regression equation is obtained as follows:

$$Y_{it} = \alpha_0 + \alpha_1 DumSumateraUtara + \dots + \alpha_{33} DumPapuaBarat + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu_{it}$$

Information:

Y_{it}	: Price Variable of broiler chickens (dependent variable)
α	: Constant (Intercept)
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$: Regression coefficient of independent variable
X_1	: Feed Price
X_2	: DOC Price
X_3	: Broiler chicken Supply
X_4	: Broiler chicken Demand
i	: Provincial data in Indonesia
t	: Time data (2017-2021) .

3.2. Results of the Classical Assumption Test

In this study, a multicollinearity test was performed using the Pair Wise Correlation method with a small correlation coefficient of 0.80. This regression model has passed the multicollinearity test because there is no correlation between the independent variables. The following is an explanation of the results of the Multicollinearity test

Table 2.

Table 2. Multicollinearity Test Results

Variable	Feed Price	DOC Price	Supply	Demand
Feed Price	1.000000	0.298089	-0.037838	0.256670
Doc Price	0.298089	1.000000	-0.086759	0.152637
Supply	-0.037838	-0.086759	1.000000	0.042552
Demand	0.256670	0.152637	0.042552	1.000000

Furthermore, to determine whether heteroscedasticity occurs or not, it can be seen from the significance value of the Glejser test. If the significance value is greater than 0.05, there are no symptoms of heteroscedasticity. if the significance value is less than 0.05 then there is a symptom of heteroscedasticity. The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residual of one observation to another. The following is a description of the results of the heteroscedasticity test **Table 3.**

Table 3. Test Results of the Heteroscedasticity *Glejser*

Variable	Significance
Constant (C)	0.4002
DOC price	0.5276
Feed Price	0.8874
Broiler Chicken Supply	0.0851
Broiler Chicken Demand	0.4591

Based on the table above it can be seen that the significance value of each variable on the test results of the Heteroscedasticity Glejser is greater than 0.05. Then, it can be concluded that there are no symptoms of heteroscedasticity where the variance from the residual of one observation to another is the same or it is also called the homoscedasticity.

The autocorrelation test can be seen based on the Durbin Watson value which according to Ghozali (2011) suggests that there is no autocorrelation symptom if the Durbin Watson value is between 2 to (4-du). The du value is obtained from the distribution of values in the Durbin Watson table based on the number of variables (k=4) and the number of respondents (N=170) with a significance of 5%. Based on the

table, the du value is 1.810, so the Durbin Watson value must be greater than the du value but smaller than $4-du$. The value of du (1.7975) < Durbin Watson (1.934883) < $4-du$ (2.2025) can be seen that there is no autocorrelation symptom.

Then, the significance results of the F Statistic are obtained at $0.0000 < 0.05$. That is, the feed price variable, DOC price, demand and supply simultaneously affect the broiler price variable. The result of the Adjusted R^2 value is 0.686094 which means that the independent variable has an effect of 68.6% on the dependent variable. then, it can be concluded that feed prices, DOC prices, broiler supply, and broiler demand have an effect of 69% on broiler prices. While 31% is influenced by other variables not examined.

3.3. Analysis of Broiler Price Fluctuations in Indonesia and Influenced Factors

The broiler chicken is a source of animal protein which dominates the daily food menu for Indonesian people. However, the price of broiler chickens is not stable every year where sometimes there are increased prices and decline prices. The price volatility has an impact on both producers and consumers. The broiler chicken prices from 2017 to 2021 in 34 provinces in Indonesia always fluctuate. this is inseparable from the influence given by input prices, namely the feed prices and DOC prices as well as demand and supply factors for these broiler chickens

Partial testing was carried out using the t test to analyze the factors that influence fluctuations in broiler prices in Indonesia. The results of the t test were obtained as follows **Table 4**.

Table 4. Statistical results from Coefficient and Significant

Variabel	Coefficient	Significant
Constant (C)	6.085433	0.0000
Feed Price	0.134331	0.0000
DOC price	0.046506	0.0397
Supply	0.119553	0.0442
Demand	0.065693	0.2300

Based on **Table 4**, it can be seen that three independent variables have an effect on the price of broiler chickens, while one independent variable has no significant effect. Influential variables include feed prices, DOC prices, and supply. The probability values obtained for feed prices are $p = 0.0000$, DOC prices are $p = 0.0397$ and $p = 0.0442$.

These three values have a small probability value of 0.05. Meanwhile the demand variable has a greater probability value of 0.05 which indicates that it has no effect on the price of broiler chickens.

3.4. Effect of Feed Prices on Broiler Chicken Prices in Indonesia

Based on **Table 4**, the significance value of feed prices is 0.0000 where the value is less than 0.05 which indicates that feed prices have a significant effect on the broiler chicken prices. The feed prices have a positive effect on them in Indonesia, indicating that the higher the price of feed, the higher price of broiler chickens. The price of feed is considered the highest production cost of the broiler chicken business (Juliyanti & Zubaidah, 2022 dan Simanjuntak, 2018). This causes the costs incurred when buying feed will greatly affect the price of broiler chickens as the output of broiler farming businesses.

The highest increase in feed prices will occur in 2021 where one chicken requires a feed cost of approximately IDR 9500. The cause of the increase in the price of chicken feed from year to year is the difficulty in obtaining raw materials for the manufacture of feed. One of the ingredients for making feed that always experiences polemics is corn, where Indonesia still imports the corn to meet the needs of the feed industry. This corn feed import policy has had an impact on rising broiler feed prices in Indonesia. Indonesia has stopped importing corn fodder which has resulted in limited availability of corn. This is what has resulted in an increase in prices for the broiler feed prices and the peak price increase will occur in 2021 (Timorria, 2021). The significant increase in feed prices in 2021 is in line with the increase in the price of broiler chickens which average almost IDR 40,000/head in Indonesia. These results are the same as those obtained by Ratriyanto et al. (2015) in Grobogan district. The results of the study found that the effect of feed prices was significant on the price of broiler chickens. These results were also supported by the results of research by Sunarno et al (2017) conducted in Wonogiri district. The results of his research found that feed variables had a significant effect on broiler chicken production.

In **Table 4**, when viewed from the resulting regression coefficient, feed prices have the highest influences when compared to DOC price variables, broiler supply and

demand. The regression coefficient value is 0.13, which means that if there is a one percent increase in feed prices, there will be a 0.13 percent increase in broiler prices.

3.5. Effect of DOC Prices on Broiler Chicken Prices in Indonesia

The significance value of the DOC price is 0.0397, the value is smaller than 0.05 and is positive. This shows that there is a direct line effect between the DOC prices and the broiler chicken prices in Indonesia. If the price of DOC is higher, the price of broiler chickens will also increase. The DOC is an important element in raising broiler chickens where later the price issued for the purchase of DOC will affect the price of the broiler itself in the market. This happens because the consumption of chicken meat in Indonesia is still relatively low, namely 12 kilograms per capita per year. This resulted in an increase in demand for DOC with the aim of providing sufficient broiler chickens to meet demand and increase public consumption. This decision resulted in an increase in the price of DOC. This increase in DOC prices has a significant effect on the broiler prices (Nurhadiyanti et al. 2022; Solehah, 2016). The DOC prices tend to increase frequently due to the uncontrolled number of DOC and the lack of regulation that regulates the balance between the supply and demand for it. Imbalance of the demand and the supply of available DOC can affect the price level of DOC later.

The price of DOC per head in Indonesia during 2017-2021 fluctuated. Price in 2017 to 2018 was the lowest price and tends to be stable with a price range of approximately IDR 7000/DOC broiler chicken. Whereas from 2018 to 2019 there was a significant increase in the price of broiler chickens compared to 2017. However, in late 2019 to 2020 the price of DOC/head fell again but not as cheap as the price in 2017. In 2020 to 2021 the price of DOC/head will rise again and is the most expensive price for DOC/head compared to previous years. The fluctuation in DOC prices has become a factor in the price of broiler chickens also experiencing instability.

The DOC is one of the main inputs for starting a broiler business. How much or how little the number of broiler chickens produced depends on the successful growth and development of DOC. To ensure that the broiler business output is fulfilled with good quality, the price paid to purchase good quality DOC will also be greater and more expensive per chick, so that it will affect the selling price from the broiler chickens later.

3.6. *Effect of Supply on Broiler Chicken Prices in Indonesia*

The significance value of the broiler chicken offer is 0.0442 smaller than 0.05 with a positive value. It can be interpreted that if the number of broiler chickens offered in the market increases, the price of broiler chickens continues to increase. In **Table 4**, when viewed from the resulting regression coefficient, if there is an increase in broiler offers of one percent, the broiler price will increase by 0.11 percent. These results show that the broiler industry market in Indonesia has not experienced a balance between the demand and the supply. The condition of demand for broiler chickens in Indonesia almost in all provinces in Indonesia still exceeds its supply. Broiler chicken production throughout Indonesia has not met the existing demand. Excess demand for the broiler chickens still occur despite of an increase in supply. In this situation, the market price is below the equilibrium price.

And, when the mechanism works, the price will rise towards its new equilibrium. This causes the price to continue to rise even though the supply increases. These results are supported by research (Nurdayati, 2015). She found that the balance of demand and supply has not been created in the broiler industrial market. The price elasticity of demand for broiler meat (ϵ_d) = 0.643 is smaller than the elasticity of supply for broiler meat (ϵ_s) = 2.218, so $E_d < E_s$.

This is in accordance with the theory of market equilibrium. The market tends to lead to an equilibrium where the quantity demanded equals the quantity supplied. Price changes will occur if the demand and the supply are not in balance. If the demand exceeds the supply, prices will rise and just the opposite. supply exceeds demand price will fall (Sukirno, 2016 dan Mankiw, 2023). This result is supported by Hartono (2012) that even though the feed prices and the DOC prices have increased, the supply has continued to increase. The increase in the feed prices and DOC prices have not reduced the motivation of farmers because demand is still increasing.

3.7. *The Effect of Demand on Broiler Chicken Prices in Indonesia*

The results of the panel data regression analysis showed that the significance of demand for broiler chickens was 0.23 where the value was greater than 0.05. This means that changes in demand for broiler chickens do not affect the price of broiler chickens. Nationally, they are not affected with the demand. This condition indicates

that the existing excess the demand can still be met. An increase in demand is always followed through an increase in supply. So there is no significant shortage of supply so that it does not affect the price of the broiler itself. It can be concluded that national broiler prices are determined with production costs derived from the feed prices and the DOC prices. Meaning that broiler prices are not determined through the market and are still under the control of the producers. Approximately 90 % of the broiler producers are partnership breeders with the integrator companies.

The results of this study were not the same as the results of Leksono. et al (2018) for the effect of demand on broiler prices at the Pakis market in Surabaya. The results show that the demand for broiler chickens has a coefficient of 0.44 and has a positive effect on the price of broiler chickens. In this case, an increase in demand of 1% will cause an increase in the price of broiler chickens by 0.44%. This is also in accordance with Mahendra's research (2021) that the demand for broiler chickens has a significant and positive effect on the price of broiler chickens. The influence of the number of requests on the price of the broiler chickens is in accordance with the theory of the equilibrium price, in which the formation of prices in the market is influenced by supply and demand.

4. Conclusion

Based on the discussion that has been described, it can be concluded that feed prices, DOC prices and broiler supply have a positive and significant effect on broiler prices in Indonesia. The demand for broiler chickens does not affect the price of broiler chickens in Indonesia. National broiler prices are not determined through the market and are still under the control of producers. The broiler prices are determined by production costs that come from changes in the feed prices and the DOC prices.

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