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Analysis of demand and price of North Sumatera’s layer egg in Aceh

Safrida1*, Indra1, I Zikri1,2, R S Hajar1
1Department of Agribusiness, Faculty of Agriculture, Syiah Kuala University, Banda Aceh, Indonesia
2Pusat Riset Pembangunan Pedesaan dan Pertanian Berkelanjutan Universitas Syiah Kuala (Center for Sustainable Agriculture and Rural Development Syiah Kuala University), Banda Aceh, Indonesia
*Corresponding author’s e-mail: safrida@unsyiah.ac.id

Abstract. The Aceh demand for layer egg supply from Sumatera Utara will affect the total demand and price of Sumatera Utara’s egg in Aceh. This article aims to analyze the factors influencing the demand and price of layer egg from Sumatera Utara in Aceh Province. The analysis method used in this research is simultaneous regression by Two-Stage Least Square data processing and STATA program. The type of data is secondary data in the form of time series from 2013-2017. The result from the research shows that the variable that has a positive influence on the egg demand in Aceh is the egg price in Sumatera Utara and the total population of Aceh. The variation of layer egg demand in Sumatera Utara can be explained by the variation of egg price in Sumatera Utara, egg price in Aceh, the total population of Aceh, and the number of food industries in Aceh by 62.3%. The variable that has a positive influence on the egg price in Sumatera Utara is egg demand in Aceh. The variation of layer egg price in Sumatera Utara can be explained by the variation of Sumatera Utara’s egg demand in Aceh, egg supply in Sumatera Utara, and egg demand in Aceh by 87.8%.

1. Introduction
The demand for layer egg is one of the leading approaches for food needs fulfilment because it aims to provide adequate and equitable food, meet the nutritional need of people, and has an affordable price for the community [1] [2] [3]. It is also increasing the income of stock farmer mainly the layer farmer, increase the foreign exchange of a country, and improve the employment opportunities. The increase of the total population, population income, the tourism sector and the number of food industries will highly determine the level of egg demand. Hence, it is necessary to find out whether the demand for egg in Aceh Province is equal with the supply of egg production or vice versa. This is done as an effort to maintain the balance of consumer needs for egg products with an annual increase of population that will occur in the future.

The egg needs that keep increasing and cannot meet the adequate production will lead to an increase in egg price. An overview of consumption capacity and egg production shows that the number is still far from expectation, which means that egg consumption in Aceh Province many are still supplied from Sumatera Utara. Statistically, Aceh has not been able to fulfill the demand for layer egg in every year. Nearly 90% of Aceh demand for egg comes from Sumatera Utara [4]. Egg production in Aceh Province is still very low. Therefore, Sumatera Utara becomes the supply area for layer egg in Aceh.
The high production of layer egg in Sumatera Utara causes it to be one of the surplus areas of layer eggs with an amount that is able to meet local demand and outside the region [5]. In 2013, the production of layer egg is 140,711 tons. The production occurs a decline in 2014 with the total production of 132,949 tons, and increase again in 2015 until 2017 by 142,119 tons [6]. The egg production in Sumatera Utara from January to April 2018 is 23,686.5 tons, while the egg need is 16,187.54 tons. Therefore, the excess production of eggs is supplied out of Sumatera Utara Province such as Riau, Kepulauan Riau, Aceh, and Sumatera Barat.

This is an important issue, especially for local governments. The Animal Husbandry Department through efforts to increase egg production continuously trying to increase production. An increase in egg consumption is also interpreted as an increase in demand where egg demand is a real and important component of the entire structure of activities in the food sector. The need for eggs continues to increase if not balanced with adequate egg production, will increase the price of eggs. it is known that the amount of consumption and production of layer eggs in Aceh Province is still very far from expectations, so egg consumption in Aceh Province is still widely supplied from North Sumatra [7][8]. This research aims to analyze the factors influencing the demand and price of layer egg from Sumatera Utara in Aceh Province.

2. Methods

The type of data used in this research is secondary data which is a time-series data from 2003 – 2017 and obtained from several sources, which are Statistics Indonesia (BPS) of Aceh Province, Statistics Indonesia of Sumatera Utara, Livestock Service of Aceh, Department of Industry and Commerce of Aceh, and Department of Tourism of Aceh.

This research is using the simultaneous equation with Two-stage Least Square (2SLS) method. Simultaneous equation models can provide a clearer result of the real situation compared to a single equation model, because the variables between one equation and other equations are interconnected and interact with each other [9] consisting of two equations (the same number with endogenous variable), which are: layer egg demand in Sumatera Utara (Dtm) and Sumatera Utara’s layer egg price in Aceh (Ptm). Furthermore, the exogenous variables are Sumatera Utara’s layer egg supply (Stm), layer egg demand in Aceh (Dta), layer egg price in Aceh (Pta), total population (Jpa), and number of food industry (Jla). The analysis method of this equation is by using the order condition method, and the hypothesis test is by using the F test, t-test, and R² test.

The model of simultaneous equation used in this research as follows:

\[ D_{tm} = \alpha_0 + \alpha_1 P_{tm} + \alpha_2 P_{ta} + \alpha_3 J_{pa} + \alpha_4 J_{la} + \alpha_5 D_{tm-1} + e_4 \]  \hspace{1cm} (1)

\[ P_{tm} = \phi_0 + \phi_1 D_{tm} + \phi_2 S_{tm} + \phi_3 D_{ta} + \phi_4 P_{tm-1} + e_5 \]  \hspace{1cm} (2)

Description:

- \( D_{tm} \): Demand for Sumatera Utara’s layer egg in Aceh (Kg/year)
- \( P_{tm} \): Layer egg price in Sumatera Utara (Rp/Kg/year)
- \( P_{ta} \): Layer egg price in Aceh (Rp/Kg/year)
- \( J_{pa} \): Total population in Aceh (people/year)
- \( J_{la} \): Number of the food industry in Aceh (Unit/year)
- \( D_{tm-1} \): Lag of the total demand of Sumatera Utara’s egg in Aceh (Kg/year)
- \( e_4, e_5 \): Interference or residual variables
- The expected value is \( \alpha_1, \alpha_2<0; \alpha_3, \alpha_4>0; 0<\alpha_5<1 \)
- \( S_{tm} \): Total supply of Sumatera Utara’s layer egg (Kg/year)
- \( D_{ta} \): Total demand for layer egg in Aceh (Kg/year)
- \( P_{tm-1} \): Lag of layer egg price in Aceh (Rp/Kg/year)
- The expected value is \( \phi_1, \phi_3>0, \phi_2<0 \) dan \( 0<\phi_4<1 \)
The model of the simultaneous equation can be identified by using the order condition as a sufficient condition \[10\]. A structural equation in the model can be identified if the condition is satisfied \[11\], that is:

\[(K - M) > (G - 1)\]

Remarks:
\(K\) = Total variables in the model
\(M\) = Total endogenous and exogenous variables in the identified equation
\(G\) = Total equation in the model

Based on the equation above, it can be identified that all variables used in the equation have a total of 9 variables with 2 equations. The result of the calculation shown in Table 1.

**Table 1.** The result from the calculation of order condition.

<table>
<thead>
<tr>
<th>Equation</th>
<th>K</th>
<th>M</th>
<th>G</th>
<th>(K-M)&gt;(G-1)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dtm</td>
<td>9</td>
<td>6</td>
<td>2</td>
<td>9-6&gt;2-1</td>
<td>Over identified</td>
</tr>
<tr>
<td>Ptm</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>9-5&gt;2-1</td>
<td>Over identified</td>
</tr>
</tbody>
</table>

An equation that has been identified as “over-identified” can be analyzed by various methods, one of which is 2 SLS (Two-Stage Least Square). The hypothesis test is conducted to find out the influence between the affecting variables (exogenous) with influenced variables (endogenous). The equation from [12] can be used to determine the effect which is:

\[ F_{value} = \frac{R^2 / K}{1 - R^2 / (n - K - 1)} \]  \hspace{1cm} (3)

Remarks:
\(R^2\) : Coefficient of Determination
\(K\) : Independent Variabel
\(n\) : Total Sample

With the criteria of: If the \(F_{value}\) > \(F_{table}\), then \(H_a\) is accepted and \(H_0\) is rejected, which means the independent variable has a significant effect on the dependent variable. If the \(F_{value}\) < \(F_{table}\), then \(H_a\) is rejected and \(H_0\) is accepted, which means the independent variable has no significant effect on the dependent variable.

\[ t_{value} = \frac{b_i}{S_{b_i}} \]  \hspace{1cm} (4)

Remarks:
\(b_i\) : Coefficient of Regression
\(S_{b_i}\) : Error Standard of Coefficient of Regression

With the criteria of: If the \(F_{value}\) > \(F_{table}\), then \(H_a\) is accepted and \(H_0\) is rejected, which means the independent variable has a significant effect on the dependent variable. If the \(F_{value}\) < \(F_{table}\), then \(H_a\) is rejected and \(H_0\) is accepted, which means the independent variable has no significant effect on the dependent variable.
\[ R^2 = \frac{JK(\text{Reg})}{\sum y_i^2} \]  

With the criteria of: If the \( R^2 \) value is closer to zero, it means that the ability of explanatory variables to explain the endogenous variables in conditions is not strong. If the \( R^2 \) value is closer to zero, it means that the ability of explanatory variables to explain the endogenous variables in conditions is very strong. This research is using the significance level (\( \alpha \)) of 10%.

3. Results and Discussion
3.1. The Development of Sumatera Utara’s Layer Egg Demand and Price in Aceh and the factors influencing it
The demand for Sumatera Utara’s Layer Egg in Aceh is the total of egg production in Sumatera Utara which is requested in order to secure the egg needs in Aceh Province. The following graph shows the development of demand for Sumatera Utara’s layer eggs in Aceh Province and the price of layer eggs in Aceh Province during 2003-2017.

![Graph showing development of demand for Sumatera Utara’s layer eggs in Aceh Province and price of layer eggs in Aceh Province during 2003-2017.](image)

**Figure 1.** Development of demand for Sumatera Utara’s layer eggs in Aceh Province and the price of layer eggs in Aceh Province during 2003-2017.

Figure 1 shown the correlation between Sumatera Utara’s egg price with a total of Sumatera Utara’s egg demand in Aceh Province. Based on the graphic above, it can be seen that the egg price in Aceh tends to increase from 2003 to 2017. This condition leads to the decrease of egg demand, where Aceh reduced the demand for egg from Sumatera Utara at the time of the price increase. The increase of the prices causes a decline in consumer purchasing power on Sumatera Utara’s layer egg.

The result from the survey shows that 97.51% of egg traded in Aceh Province come from Sumatera Utara Province, and the remains 2.49% obtained from the local [13]. Aceh province tends to supply the eggs from Sumatera Utara with a relatively equal amount and with a growth rate of 0.80% annually. However, the one time when Aceh supply the egg from Sumatera Utara with a higher amount of supply is in 2012 and 2014. On the contrary, the egg price in Sumatera Utara tends to keep increasing every year. The highest price increase was in 2008 namely 13,846 Rp/Kg/year, which was increasing 8,461 Rp/Kg/year or 63% from the previous year. The highest price of Sumatera Utara’s egg was in 2017 which is about 18,900 Rp/Kg/year.
The price increase of Sumatera Utara’s egg in several years caused by the shift in layer hen in some of the livestock farming due to the decrease of hen productivity. Hence, the farmer replaces the hen to improve their productivity. Generally, normal productivity of layer is when it produces 85 to 100% of eggs. If the productivity is only about 25%, hence the hen cannot lay egg anymore or so it called ayam afkir (hen with decreased production of egg). Therefore, the farmer will replace it. The high price of egg is also influenced by the price progress in outside Sumatera Utara Province [14].

There are several factors influencing the egg demand in Aceh, which are egg price in Sumatera Utara, egg price in Aceh, number of the food industry in Aceh and a total population of Aceh. Based on the graphic, it can be seen that the increase of egg price in Sumatera Utara has impact on egg demand in Aceh. The fluctuation of egg price in Sumatera Utara leads to the shift in Sumatera Utara’s egg demand in Aceh. This condition has a correlation with the Sumatera Utara’s egg supply in Aceh, where the more egg supply in Aceh on Sumatera Utara’s egg, then the demand for Sumatera Utara’s egg will be decreasing. The same goes for the price, where the price will increase with the increase of egg supply in Aceh Province.

The high consumption of egg in Aceh community is supported by the tradition of Prophet’s Birthday celebration, marriage reception and hajj season. It also improves by the emergence of a variety of traditional food industries in several regions in Aceh Province, plus an increasing population with a growth of of 1.9% or an average increase in the population of Aceh Province by 86,416 people/year. This is the reason Aceh's needs for eggs continues to increase every year.

Furthermore, the factors influencing the egg price are the Sumatera Utara’s egg demand in Aceh, egg supply, and egg demand in Aceh. The egg demand tends to keep increasing every year, which followed by the increase in egg price. This is due to the Sumatera Utara layer egg has not been able to meet all the needs of eggs in Aceh.

Due to the lack of supply [15], the price of eggs tends to be uncontrollable, causing an increase in the price of eggs in Sumatera Utara each year and will have an impact on the increase of egg price in Aceh. Sumatera Utara Province supplies layer eggs to Aceh Province from average total production of 28%, where Aceh is one of the destinations for egg suppliers from Sumatera Utara. The other regions that supply eggs from Sumatera Utara are Riau and Sumatera Barat.

The following figure is a graph of the development of Sumatera Utara Layer Egg in Aceh demand, Layer egg demand in Aceh, Layer egg supply in Aceh, and Layer price in Sumatera Utara.

![Figure 2. Development of Sumatera Utara Layer Egg in Aceh demand, Layer egg demand in Aceh, Layer egg supply in Aceh, and Layer egg price in Sumatera Utara.](image-url)
Figure 2 shows that the total production of layer egg in Aceh (Sta) is increasing, but the increase is lower than the percentage of egg demand in Aceh. This condition requires Aceh Province to import the egg from Sumatera Utara (Dtm) in order to meet the Aceh’s needs for egg. Based on the graphic above, the imported egg from Sumatera Utara able to fulfill or even exceed the Aceh needs for an egg from 2003 to 2007. However, since 2009 to 2017, Sumatera Utara has not been able to fulfill the Aceh demand for layer egg due to the increase of egg demand in Aceh. This increase is caused by the increase of total population, income, and number of food industries. This condition has a direct impact on the price increase of egg in Aceh (Pta).

3.2 Analysis of Factors Influencing the Sumatera Utara’s Layer Egg Demand in Aceh Province

The demand of Sumatera Utara’s Layer Egg in Aceh (Dtm) in this research is influenced by the egg price in Sumatera Utara (Ptm), egg price in Aceh (Pta), the total population of Aceh Province (JPa), and number of food industries in Aceh (Jia). The result of the research shows that the $R^2$ value = 0.6232 which indicates that the Sumatera Utara’s egg demand in Aceh (Dtm) can be explained by the factors by 62.32%. Meanwhile, the rest is explained by the other factor outside the equation model.

The result from the simultaneous test of all explanatory variables has a significant effect on the variable of layer egg demand in Aceh with the confidence level of 90% (0.1). Then $H_a$ is accepted and $H_0$ is rejected, which means the egg price in Aceh (Pta), total population of Aceh (JPa), and number of food industries in Aceh (Jia) have a significant effect on the egg demand in Aceh (Dtm).

However, the partial overview shows that the factors influencing the egg demand in Aceh are egg price in Sumatera Utara, total population of Aceh, and the number of food industries in Aceh. The detailed result of analysis of egg demand in Aceh can be seen in the following table.

<table>
<thead>
<tr>
<th>Table 2. The calculation result of Order Condition.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equation</td>
</tr>
<tr>
<td>Dtm</td>
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<tr>
<td>Dtm</td>
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<td>Ptm</td>
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<td>Pta</td>
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<tr>
<td>JPa</td>
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<tr>
<td>Jia</td>
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<tr>
<td>Dtm_L1</td>
</tr>
<tr>
<td>_cons</td>
</tr>
</tbody>
</table>

From the table above, we can conclude the simultaneous equation of 2 SLS regression as follows:

$$Dtm = -1.68e+07 - 1462.49Ptm + 865.12 Pta + 14.90 JPa - 2510.77 Jia - 0.57 Dtm_{-1} + e \quad \ldots \quad (eq1)$$

This result shows the constant value of 1.68e+07 which means that if the layer egg price in Sumatera Utara (Ptm), layer egg price in Aceh (Pta), total population of Aceh Province (JPa), and number of food industries in Aceh (Jia) in certain year is constant, then the demand of layer egg in Aceh (Dtm) will be decreasing by 16,800,000 Rp/Kg/year.
3.3 Layer Egg Price in Sumatera Utara

The coefficient of egg price in Sumatera Utara (Ptm) is -1462.49, which indicates that the price increase of layer egg price in Sumatera Utara by 1Rp/Kg will reduce the layer egg demand in Aceh by 1462.49 Kg. This result is in accordance with the hypothesis that is if the price of layer egg in Sumatera Utara is an increase, then the demand for layer egg in Aceh will be decreasing. From the result of statistical analysis of t-test based on the probability value at the level of $\alpha = 10\%$, it shows that $h_0$ is rejected and $h_a$ is accepted. This finding indicates that the price of layer egg in Sumatera Utara has a significant influence on the egg demand in Aceh.

Based on the theory, if the egg price in Sumatera Utara is increasing, it will be affecting the egg price in Aceh, which leads to the reduction of egg demand in Aceh. The result of the research by [16] stated that the price increase will improve the total demand for a product [17], whether it is from local or other regional production.

3.4 Layer Egg Price in Aceh

The coefficient of egg price in Aceh (Pta) is 865.18, which indicates that the price increase of layer egg price in Aceh by 1Rp/Kg will increase the layer egg demand in Aceh by 865.18 Kg. This result is disagreeing with the hypothesis that is if the price of layer egg in Aceh is an increase, then the demand for Sumatera Utara’s layer egg in Aceh will be decreasing. From the result of statistical analysis of t-test based on the probability value at the level of $\alpha = 10\%$, it shows that $h_0$ is accepted and $h_a$ is rejected. This finding indicates that the price of layer egg in Aceh has no significant influence on the egg demand in Aceh. This condition is caused by the total of Sumatera Utara’s egg Utara has a wider distribution in Aceh than the ones from Aceh. Thus, the response of egg price increase in Aceh on the egg demand is lower than the response of egg from Sumatera Utara.

3.5 Total Population of Aceh

The coefficient of the total population of Aceh (Jpa) is 14.90, which indicates that the increase of total population by 1 person will increase the layer egg demand in Aceh by 14.90 Kg. This result is in accordance with the hypothesis that is if total population of Aceh is an increase, then the demand for Sumatera Utara’s layer egg in Aceh will also be increasing. From the result of statistical analysis of t-test based on the probability value at level of $\alpha = 10\%$, it shows that $h_0$ is rejected and $h_a$ is accepted. This finding indicates that an increase in the total population of Aceh has a significant effect on the egg demand in Aceh. This finding indicates that egg is the main source of animal protein which consumed by the people of Aceh, starting from an early age to adulthood.

The result of the research from [18][19] showed that if the total population is an increase, then the demand for layer egg will also be increasing. In this research, the local production has not been able to meet the egg’s needs for the Aceh people, thus Aceh needs to import it from Sumatera Utara Province. She also stated that the increase of total population is followed by the improvement of employment opportunities that leads to the increase of income and affecting the consumer purchasing power for Layer Egg.

3.6 Number of Food Industries in Aceh

The coefficient of the number of food industries in Aceh (Pnda) is -2510.77, which indicates that the increasing number of food industries by 1 unit will reduce the layer egg demand in Aceh by 2510.77 Kg. This result is disagreeing with the hypothesis that is if the number of food industries in Aceh is an increase, then the demand for Sumatera Utara’s layer egg in Aceh will also be increasing. From the result
of statistical analysis of t-test based on the probability value at level of \( \alpha =10\% \), it shows that \( H_0 \) is rejected and \( H_a \) is accepted.

This finding indicates that increase in number of food industries in Aceh has a significant effect on the Sumatera Utara’s egg demand in Aceh. The increase of food industries in Aceh can be affecting the total demand for layer egg, hence the more eggs are requested to Sumatera Utara. Admittedly, Aceh has a variety of traditions, religious activities, and strong social values, which is a supporting factor in increasing the number of food industries in the Aceh Province. In terms of the significant value (0.014), the population of Aceh provides the biggest role in increasing demand for Sumatera Utara’s eggs in Aceh.

3.7 Analysis of Factors Influencing the Layer Egg Price in Sumatera Utara

The price of Sumatera Utara’s layer egg (Ptm) in this research is influenced by the egg price in Sumatera Utara (Ptm), egg demand in Aceh (Dtm), demand for Sumatera Utara’s layer egg in Aceh (Dtm) and total demand of layer egg in Aceh (Dta). The result of the research shows that the \( R^2 \) value = 0.8781 which indicates that the Sumatera Utara’s egg price (Ptm) can be explained by the factors by 87.81%. Meanwhile, the rest is explained by the other factor outside the equation model.

The result from the simultaneous test of all explanatory variable has a significant effect on the variable of layer egg price with a confidence level of 90% (0.1). Then \( H_0 \) is rejected and \( H_a \) is accepted, which means the Sumatera Utara’s egg demand in Aceh (Dtm), total demand of egg in Aceh (Dta), egg supply in Sumatera Utara (Stm), and lag of egg price in Sumatera Utara (Ptm) have a significant effect on the egg price in Sumatera Utara (Ptm). However, the partial overview shows that the significantly influencing factor egg price in Sumatera Utara is the lag of egg price in Sumatera Utara. This result shows the egg price determination in Sumatera Utara is based on the previous price.

| Table 3. The result from the Calculation of Sumatera Utara’s Layer Egg Price |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Equation**    | Obs |Parms | RMSE | "R-sq" | F-Stat | P            |
| Ptm             | 14  | 4    | 1815.384 | 0.8781 | 16.17 | 0.0000 |
| ---             |     |      |       |       |       |             |
| Coef. | Std. Err. | T | P>|t| | [90% Conf. Interval] |
| Ptm             |     |      |       |       |       |             |
| Dtm             | -0.00068 | 0.00080 | -0.85 | 0.400 | -0.00202 | 0.00066 |
| Stm             | 0.00001 | 0.00003 | 0.54 | 0.592 | -0.00003 | 0.00006 |
| Dta             | 0.00051 | 0.00067 | 0.77 | 0.447 | -0.00061 | 0.00163 |
| Ptm_1           | 0.70157 | 0.40331 | 1.74 | 0.087 | 0.02702 | 1.37612 |
| _cons           | 7474.29 | 8299.732 | 0.90 | 0.372 | -6407.202 | 21355.77 |

Based on the table above, we can form an equation as follows:

\[
Ptm = 7474.29 - 0.00068\ Dtm + 0.00001\ Stm + 0.00051\ Dta + 0.70157\ Ptm_{-1} + \epsilon \quad \text{......(eq 2)}
\]

This result shows the constant value of 7474.29 which means that if the layer egg price in Sumatera Utara (Ptm), the demand for Sumatera Utara’s egg in Aceh (Dtm), and the demand for egg in Aceh (Dta) in a certain year is constant, then the price of layer egg in Sumatera Utara (Ptm) will be increasing by 7474.29 Rp/Kg/year.

3.8 Sumatera Utara’s Layer Egg Demand in Aceh

The coefficient of Sumatera Utara’s layer egg demand (Dtm) in Aceh is -0.00068, which indicates that the increase of demand by 1 Kg will reduce the Sumatera Utara’s layer egg demand in Aceh by 0.00068Kg. This result is not in accordance with the hypothesis that is if Sumatera Utara’s layer egg demand is an increase, then the egg price in Sumatera Utara will also be increasing. From the result of
The statistical analysis of t-test based on the probability value at the level of $\alpha = 10\%$, it shows that $h_0$ is accepted and $h_a$ is rejected. This finding indicates that Sumatera Utara’s layer egg demand has no significant effect on the egg price in Sumatera Utara.

3.9 Sumatera Utara’s Layer Egg Supply

The coefficient of Sumatera Utara’s layer egg supply (Stm) is 0.00001, which indicates that the increase of supply by 1 Kg will increase the Sumatera Utara’s layer egg price by 0.00001 Rp/Kg. This result is not in accordance with the hypothesis that is if Sumatera Utara’s layer egg supply is an increase, then the egg price in Sumatera Utara will be decreasing. From the result of statistical analysis of t-test based on the probability value at the level of $\alpha = 10\%$, it shows that $h_0$ is accepted and $h_a$ is rejected. This finding indicates that Sumatera Utara’s layer egg supply has no significant effect on the egg price in Sumatera Utara.

3.10 Sumatera Utara’s Layer Egg Demand in Aceh

The coefficient of Sumatera Utara’s layer egg demand in Aceh (Dta) is 0.00051, which indicates that the increase of egg demand in Aceh by 1 Kg will increase the Sumatera Utara’s layer egg price by 0.00051 Rp/Kg. This result is in accordance with the hypothesis that is if egg demand in Aceh is an increase, then the egg price in Sumatera Utara will also be increasing. From the result of statistical analysis of t-test based on the probability value at the level of $\alpha = 10\%$, it shows that $h_0$ is accepted and $h_a$ is rejected. This finding indicates that layer egg demand has no significant effect on the egg price in Sumatera Utara.

Based on the theory, the shift in demand curve is caused by the increase of the demand for a product due to changes in other factors outside the price of the products themselves [20]. When demand increases, the higher demand leads to a higher equilibrium price (positively related). The increase of demand also causes the seller to increase prices in order to maximize profits [21] [22]. An overview from the significant value (0.400), shows that the demand for Sumatera Utara’s egg in Aceh provides the biggest role in increasing the price of eggs.

3.11 Lag of Sumatera Utara’s Egg Price

This variable shows that the Sumatera Utara’s egg price is highly determined by the egg price from the previous period. The result from analysis shows that the demand and supply of layer egg from Sumatera Utara have no influence on the egg price in Sumatera Utara. The price is highly determined by the egg price from previous period.

4. Conclusions

Based on the result of the research and discussion, the conclusions are:

1. The equation of Sumatera Utara’s layer egg demand in Aceh (Dtm) shows that the factors influencing the demand for Sumatera Utara’s egg in Aceh are the egg price in Sumatera Utara, the total population in Aceh, and number of food industries in Aceh. This condition has a direct impact on Sumatera Utara’s layer egg demand in Aceh.

2. The equation of Sumatera Utara’s layer egg price (Ptm) shows a significant effect from the variable of the lag of egg price in Sumatera Utara (Ptm$_{t-1}$), The price is highly determined by the egg price from previous period.
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