

Analysis of broiler meat demand in Central Java Province

Nurdayati,* Sudi Nurtini,† Masyhuri,‡ and Rini Widiati†

*Agriculture Extension College Magelang, Indonesia; †Faculty of Animal Science, Gadjah Mada University, Indonesia; and ‡Faculty of Agriculture, Gadjah Mada University, Indonesia

ABSTRACT: The purpose of this research was to know factors affecting broiler meat demand, and to estimate price, income and cross elasticity of broiler meat demand in Central Java Province. This study using pooled data of time series from 1999 to 2008 and cross section data at 35 districts, in Central Java Province, so there were 350 observations. Data analyzed using double log multiple regression. The results showed that the price of broiler meat, egg, rice, native chicken meat, beef and income, the population of people, lag demand of broiler meat and dummy variable of Avian Influenza epidemic together has significant influences on demand of broiler meat ($R^2 = 0.989$). Partially, income significantly ($P \leq 0.10$) influence the demand of broiler meat, while the price of broiler meat, rice, beef and population of people, lag demand of broiler meat and dummy variable of Avian Influenza epidemic has highly significant effects on broiler meat demand ($P \leq 0.01$). Price elasticity coefficient of broiler meat was 0.241 (in elastic), indicating that broiler meat was essential goods. Cross elasticity coefficient of rice to demand of broiler meat was less than zero (negative), indicating that broiler meat was a complementary goods for rice. However, cross elasticity coefficient of beef was more than zero (positive), indicating that broiler meat was a substitution goods for beef. The coefficient of income elasticity was more than zero (positive) but less than one, indicating that broiler meat was a superior and an essential goods. Dummy variable of Avian Influenza epidemic was highly influenced demand of broiler meat, so if there was no Avian Influenza outbreak in Central Java Province, the demand of broiler meat would be higher than those of Avian Influenza outbreak.

Key words: demand, broiler meat, elasticity

INTRODUCTION

Meat is a source of animal protein food widely available in the market. Some kinds of meat found in the market are meat of broiler, native chicken, beef, goat ect. BPS data in 1999 to 2008 showed that broiler meat in Central Java was the most contribution on consumption of meat (38.59%). In October 2003 in Central Java Province there had been determined outbreak of Avian Influenza and the consumption of broiler meat was declined, but their contribution was the greatest in the meat consumption. This condition was due to the broiler meat was easily obtainable and its price was relatively cheaper than the other meats.

The amount of broiler meat consumption will determine the demand. Therefore, to estimate the demand of broiler meat in the future it is needed analysis. The aim of this study was to evaluate factors affecting demand of broiler meat, and to estimate price, income and cross elasticity of demand of broiler meat in Central Java Province.

MATERIALS AND METHODS

This study used pooled data of time series data from 1999 to 2008 and cross section data at 35 districts, in Central Java Province, so there were 350 observations. Data were collected from secondary data of various sources : (1) BPS, (2) Dinas Peternakan, (3) SUSENAS.

The framework to determine variables affecting the demand of broiler meat was showed on Figure 1. Multiple linier regression model was used to identify several factors affecting demand broiler meat. The demand function can be formulated as follows :

$$Q_d = f(P_{day}, P_b, P_{tl}, P_{daybr}, P_{ds}, I, JP, Q_d-t, Dwfb)$$

Cobb Douglas function can be used to analyze the elasticity observed in any parameters (Gujarati 2003). The function of the broiler meat demand of Cobb Douglas model can be described as:

$$\ln Q_{d_{it}} = A + b_1 \ln P_{day_{1it}} + b_2 \ln P_{b_{2it}} + b_3 \ln P_{tl_{3it}} + b_4 \ln P_{daybr_{4it}} + b_5 \ln P_{ds_{5it}} + b_6 \ln I_{6it} + b_7 \ln J_{7it} + b_8 \ln Q_{d_{8it}} + b_9 D_{wfb_{it}} + V_t$$

where:

- $Q_{d_{it}}$ = broiler demand (kg/year)
- P_{day} = price of broiler demand (Rp/kg)
- P_b = price of rice (Rp/kg)
- P_{tl} = price of chicken egg (Rp/kg)
- P_{daybr} = price of native chicken meat (Rp/kg)
- P_{ds} = price of beef (Rp/kg)
- J_p = population (person)
- I = income percapita (Rp/year/ capita)
- Q_{D-t} = Lag demand of broiler meat (kg/year)
- D_{wfb} = dummy AI (D=1 if there is no AI outbreak and 0= in outbreak)
- $\ln b_0$ = constanta
- $b_1 \dots b_2$ = regression coefficient
- V_t = independent variables out of model
- i = districts at Central Java Province
- t = year

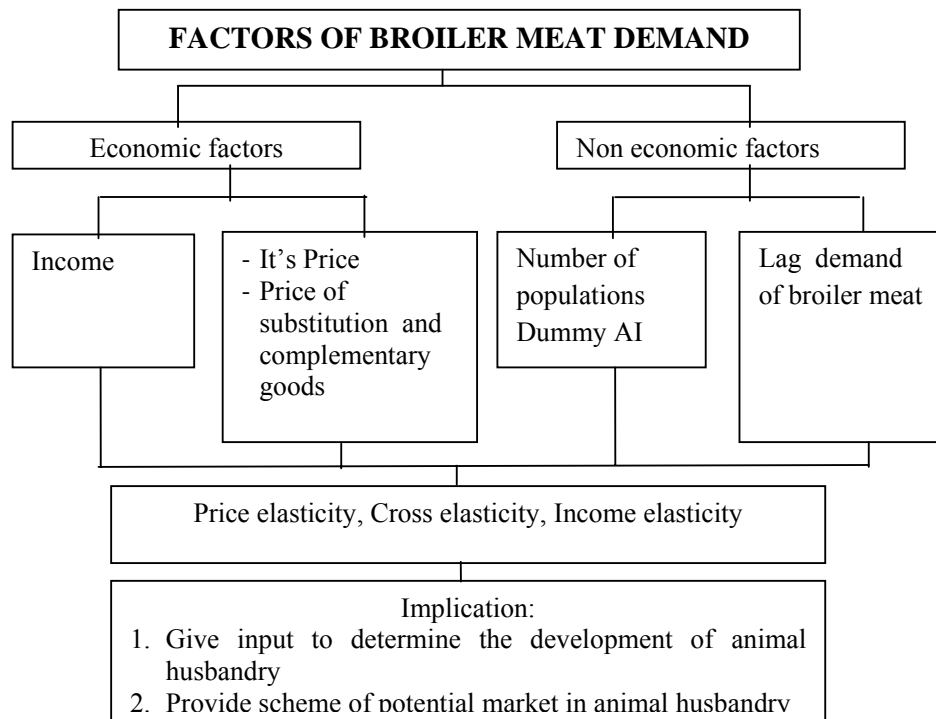


Figure 1. Framework of broiler meat demand factors

Estimating the regression coefficients of broiler meat demand was done by using ordinary least square (OLS).

The criteria used to determine the value of the goods price elasticity were (Samoelson and Noedhous, 1985) :

- $E_p > 1$ = elastic
- $E_p < 1$ = in elastic

The criteria used to determine the relationships amongst broiler meat and the other goods were:

- $E_c > 0$ = substitute relationship
- $E_c = 0$ = independent relationship

$E_c < 0$ = complementary relationship

The criteria used to determine the income elasticity were :

$E_i > 0$ = superior goods

$E_i < 0$ = inferior goods

Where:

E_p = price elasticity of its goods

E_c = cross elasticity

E_i = income elasticity

RESULTS AND DISCUSSION

From Table 1, it can be seen that the value of R^2 was 0.989 (98.9%). It was indicated that 98.9% of the variance of broiler meat demand in Central Java Province was influenced by the independent variable observed, while 1.1% was influenced by variables outside the model. F-test was used to determine simultaneously the influence of independent variables to the dependent variable. Table 1 showed that value of F was 3390.41, which was highly significant. It means that the independent variables jointly have significant effect on the demand of broiler meat in Central Java Province.

To determine the effect of each independent variable on dependent variable, t-test was partially used. Regression coefficient of the price of broiler meat was -0.241, meaning that the increase in broiler price 1% would reduce the total demand of broiler meat for 0.241%.

Variable of rice price was very significantly affecting the demand of broiler meat with regression coefficient -0.350, meaning that the increase of 1% rice price would reduce the number of broiler meat demand for 0.350%. Variable of beef price has significantly affecting broiler meat demand with regression coefficient 0.364, meaning that increasing 1% of meat price would increase 0.364% broiler meat demand.

Variable of income significantly affecting broiler meat demand with regression coefficient 0.009, meaning that increasing 1% income would increase 0.009% broiler meat demand. Positive regression coefficient of income, can be interpreted if the increase in income would increase on demand of broiler meat and decreasing in income would decrease on demand of broiler meat.

Table 1. Regression result on demand broiler in Central Java Province

No	Independent Variable	Coefficient	p-value
1	Price of broiler (Pday)***)	-0.241	0.000
2	Price of chicken egg (Ptl)	0.007	0.721
3	Price of rice (Pb) ***)	-0.350	0.000
4	Price of native chicken (Pdaybr)	0.013	0.717
5	Price of beef (Pds) ***)	0.364	0.000
6	Income (I) *)	0.009	0.092
7	Number of Population (JP) ***)	0.635	0.000
8	Lag demand of broiler meat (Qd-t) ***)	0.359	0.000
9	Dummy AI (Dwfb)***)	0.104	0.000
10	Constanta ***)	1.793	0.000

Source: primary data, analyzed

$R^2 = 0.989$

$F = 3390.41$ (p=0.000)

***) significant at α 1%

**) significant at α 5%

*) significant at α 10%

Variable of population has very significantly effect on broiler meat demand with regression coefficient was 0.635, meaning that increasing 1% population would increase 0.635% broiler meat demand. Regression coefficient of lag demand of broiler meat was 0.359, meaning that increasing 1% lag demand of broiler meat would increase 0.359% broiler meat demand.

Table 1 indicating that dummy variable was very significantly affect the broiler meat demand, so if no Avian Influenza outbreak in Central Java Province, demand of broiler meat would be higher than those of Avian Influenza outbreak.

Elasticity

Price Elasticity. Price elasticity coefficient of broiler meat was 0.241 (in elastic), indicating that broiler meat was an essential goods.

Cross Elasticity. Cross elasticity coefficient of rice to demand of broiler meat was less than zero (negative), indicating that broiler meat was a complementary goods for rice. However, the coefficient of cross elasticity of beef was more than zero (positive), indicating that broiler meat was a substitution goods for beef.

Income Elasticity. The coefficient of income elasticity was more than zero (positive) but less than one indicating that broiler meat was superior goods and essential goods.

CONCLUSION

Income elasticity was positive and less than one so the broiler meat was a superior and an essential goods, meaning that the demand of broiler meat would increase as there was an increasing of income and population.

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