

MARKET EQUILIBRIUM FOR BROILER MEAT IN YOGYAKARTA, INDONESIA

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ABSTRACT

Variables affecting supply and demand for broiler meat in Yogyakarta, Indonesia, were estimated to find its market equilibrium. Multiple linear regressions were employed through two-stage least squares (2SLS) simultaneously for demand and supply. Cobweb model was used to derive the market equilibrium. The empirical analysis was carried out using time series data in the 1998-2003 period collected from Badan Pusat Statistik (BPS), Dinas Peternakan DIY and SUSENAS. Two main results were obtained. First, the demand of broiler meat depends significantly on the price of chicken egg, rice, beef and per-capita income. Whereas, the broiler meat price in the past 2 months had effect on the supply significantly. The demand and supply tended to achieve equilibrium.

Keywords : Demand, Supply

INTRODUCTION

One of the important agenda in economic development in Indonesia is providing food for people as it is an indicator of welfare. On the other hand, food crisis or failure to provide food around nation will create a vital problem. Accordingly, government has put priority on providing food with reasonable price.

It is well known that food is one of basic needs for life. Therefore, it is very interesting to study about food and its problems. Demand and supply on food, price and other factors are examples of topic to investigate. Amang (1995) argued that food is a strategic commodity. Therefore, guarantee of providing food, quality of food and reasonable food price are among the criteria and objectives on national food policy in Indonesia. On the contrary, instability of providing food or food price fluctuation can destroy social stability (Handewi, 2002).

Food consumption has become a major problem in economic development in Indonesia. Carbohydrate is not the only food to be consumed, but also protein. Animal and plant protein are very important beside the carbohydrate. According to BPS data in 2003, most people in Indonesia rely on broiler meat for their animal protein (about 71.5%). Supply on broiler meat is, therefore, very crucial.

Following Hirschey and Pappas (2001), supply is the quantity of good that producers are willing to sell at a given price in certain period and conditions. The conditions are (1) the price of its good (2) the price of supplementary and complementary food (3) technology, (4) input price and (5) weather. In market practice, producer's

behavior plays an important role on supply as they are willing to have maximum profit. There are several factors that affect the production of broiler meat. In addition, this production relates to chicken farmer. It is very essential to understand the people behavior on chicken meat consumption and how to provide it.

Meanwhile, demand is the quantity of good that consumers are not only willing to purchase but also have the capacity to buy at the given price in certain period and scope. The relationship between the number of goods and factors that influence is defined as demand function. This function is developed by maximizing the consumer utility function with incomes as a constraint (Henderson and Quandt, 1980). Market demand for a certain commodity is an aggregate to individual demand (Tomek and Robinson, 1981). Theoretically, demand for a certain good is influenced by some factors such as the price of its good, the price of other goods and income level.

Demand and supply interact. This is the reason why demand and supply for a certain commodity is dynamic. This interaction in market can achieve to a condition either equilibrium or not equilibrium. The equilibrium condition is an ideal condition since as there is a maximum efficiency. In other words, consumers can have maximum satisfaction, on the one hand, and on the other hand, producer can have maximum profit.

MATERIALS AND METHODS

Variables affecting demand and supply for broiler meat and its market equilibrium in Yogyakarta, Indonesia, were estimated. Empirical analysis was carried out using the time series data in the 1998-2003 period collected from Badan Pusat Statistik (BPS), Dinas Peternakan Yogyakarta and SUSENAS. The use of multiple regression analysis was employed in which the solution was based on two-stage least square simultaneously between demand and supply. A cobweb model was applied as follows.

$$\text{Log } Q_d = \log a + \alpha_1 \log P_{da} + \alpha_2 \log P_{tabr} + \alpha_3 \log P_{ds} + \alpha_4 \log P_{kb} + \alpha_5 \log I + vt$$

$$\text{Log } Q_s = \log b + \beta_1 \log P_{da} + \beta_2 \log P_{in} + \beta_3 \log P_{da(n-2)} + \beta_4 \log \text{Tek} + vt$$

where $\log Q_d = \log Q_s$

Q_d	= demand of broiler meat
Q_s	= supply of broiler meat
P_{da}	= broiler meat price
P_{tabr}	= chicken egg price
P_{ds}	= beef price
P_{kb}	= rice price
I	= per-capita income
P_{in}	= input price of broiler chicken
$P_{da(n-2)}$	= broiler chicken mea price in the past 2 months
Tek	= technology of broiler chicken
a, b	= constants
α, β	= regression coefficients
vt	= independent variable out of model

RESULTS AND DISCUSSION

Demand

Regression coefficients of the demand of broiler meat is presented in Table 1. There was no indication of multicollinearity by having number of independent variables.

Table 1. Regression coefficients of the demand of broiler meat.

Variables	Coefficients	Significance
R ²	0.8824	***
Chicken egg price (Ptabr)	-0.5426	*
Rice price (Pb)	-0.2914	**
Beef price (Pds)	1,1578	*
Income (I)	0.8531	***

***Significant at 5% level

** Significant at 10% level.

*Significant at 15% level.

The model is appropriate with R² is 0.88, meaning that 88% of dependent variable (chicken meat consumption) is explained by independent variables. F-test also shows significant result.

The price of chicken egg is significant partially at 15% level of error with negative regression coefficient of -0.5426. This value indicates the decrease by 0.5426% of chicken meat consumption as the chicken egg price increases by 1%. This result is very interesting. As people believe that chicken egg is main source of animal protein and has reasonable price, they will keep consuming chicken egg (and not changing to chicken meat) although there is an increase of the egg price. Consequently, people spend more their money on chicken egg instead of chicken meat. Therefore, the demand of chicken meat tends to decrease. In other words, chicken meat can not substitute chicken egg.

Rice price has an effect significantly on demand of chicken meat with coefficient -0.2914, i.e. as the rice price increases by 1% then the demand of chicken meat will decrease by 0.2914%. Most people in Yogyakarta have rice as main food and put it as the first priority when spending their money. An increase of rice price does not stop people to buy rice but less consumption on chicken meat.

Although beef is consumed by people; they believe that it can substitute with chicken meat. The beef price then significantly affect the consumption of chicken meet. Empirical result shows that the increase by 1% of beef price will increase the demand of chicken meat by 1,1578%. People respond positively of the increase of beef price by changing to consume chicken meat. Therefore, the demand of chicken meat will increase.

Moreover, the income level provokes the demand of chicken meat positively. The result in Table 3 (0.8531) gives clear indication that an increase on level of income has significant implication on the consumption of chicken meat.

Supply

The empirical result is given in Table 2.

Table 2. Regression coefficients of the supply of broiler meat

Variables	Coefficients	Significance
R ²	0.6040	***
Input (Pin)	0.1472	ns
Technology (Tek)	0.4736	***
Chicken meat price in the past 2 months	0.9102	***

***Significant at 5% level of error

^{ns}Not significant

The value of determination coefficient R² is 0.604, which means that the independent variables can explain 60% of chicken meat production (dependent variable). The 40% remains in this model may be affected by the external factors.

The input price has no effect on broiler meat production. Generally, the fluctuation on input price is not the main consideration for chicken farmer to keep producing. They are already profit-oriented and keep producing regardless the increase of input price.

The main factor related to broiler production is chicken meat price in the past 2 months. It is shown in the table that the regression coefficient is 0.9102 as the price of chicken meat in the past 2 months increase by 1%. High price of chicken meat and high-predicted profit has influenced chicken farmers to increase their production.

Concerning with technology, an increase of productivity by 0.736% was obtained. In other words, the level of productivity has affected broiler meat production significantly.

Market Equilibrium

Cobweb model was used to analyze market equilibrium of broiler meat. In this model, the demand was determined by chicken meat price (consumer) while the supply was determined by chicken meat price (producer) in the past 2 months as it was needed to have 2-month preparation in producing chicken meat. The model of demand and supply is defined by:

$$\text{Demand of chicken meat : } \log Q_d = \log a - \alpha \log P_{da},$$

$$\text{Supply of chicken meat : } \log Q_s = \log b + \beta \log P_{da},$$

where

Q_d : demand of broiler meat

Q_s : supply of broiler meat

a, b : constants

α, β : coefficients (elasticity)

P_{da} : broiler meat price

From the elasticity of chicken meat demand and supply viewpoint, there will be two possibilities:

- 1) If the curve of demand is more elastic than curve of supply, then curves movement tend to achieve an equilibrium (Figure 1.a)
- 2) If the curve of supply is more elastic than the curve of demand, then curves movement may not achieve an equilibrium (Figure 1.b)

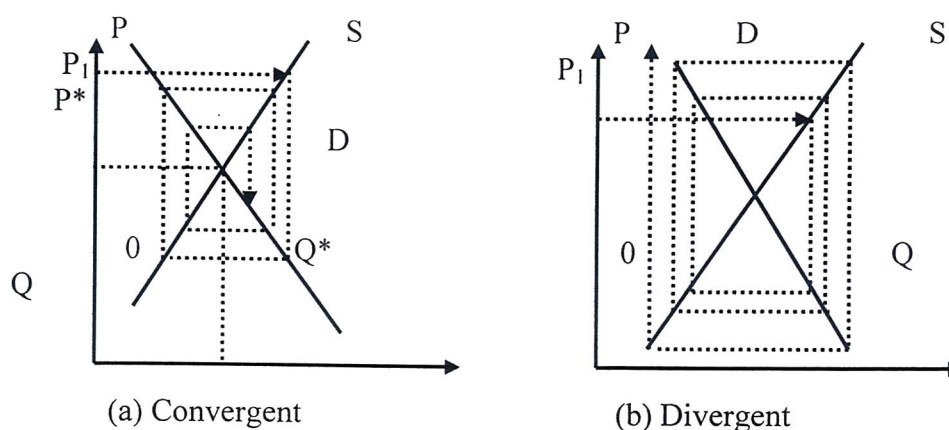


Figure 1. The equilibrium process of Cobweb model

The demand and supply functions are

$$\text{Log } Q_d = 0.759 - 1.472 \log P_{da}$$

$$\text{Log } Q_s = 2.997 + 0.713 \log P_{da}$$

This empirical result has shown that the elasticity of the demand of broiler meat (1,472) and this is higher than the elasticity of the supply of broiler meat (0.713). It is an indication of more elasticity of demand compared to supply of broiler meat. Following the Cobweb model, demand and supply of broiler meat in Yogyakarta will achieve an equilibrium.

REFERENCES

- Amang, B. 1995. *Kebijaksanaan Pangan Nasional*. Penerbit P.T. Darma Karsa Utama. Jakarta.
- Anonim. 2003. *Konsumsi Perkapita Daging Menurut Jenis Daging dan Daging Olah*. Badan Pusat Statistik. Jakarta.
- Handewi, PSS. 2002. *Analisis Permintaan Pangan di Kawasan Timur Indonesia*. Jurnal Agroekonomika (JAE), 20(2).
- Henderson, J.M. and R.E. Quandt, 1980. *Microeconomic Theory, a Mathematical Approach* (3rd ed.). Mc Graw-Hill Book Company.
- Hirschey, M. and J.L. Pappas. 2001. *Fundamental of Managerial Economics* (5th ed.). The Dryden Press, Florida.
- Nicholson, W. 1999. *Teori Ekonomi Mikro: Prinsip Dasar dan Pengembangannya* (translated Deliarnov, 2nd ed.). PT. Raja Grafindo Persada, Jakarta.
- Tomek, W.G. and K.L. Robinson. 1981. *Agricultural Product Prices* (4th ed.). Cornell University Press. Ithaca and London.