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## An Empirical Estimation of the Factors Affecting Demand and Supply of Poultry Meat

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### ABSTRACT

Poultry sector is one of the most important segments in agriculture sector of Pakistan. Despite growth in poultry sector, many new challenges including bird flu, fluctuating prices and higher cost of production have affected pace of development of this sector. The present study was conducted to evaluate the impact of various variables affecting supply of poultry birds and demand of poultry meat in Faisalabad, Pakistan. Cross sectional data were collected from 40 poultry farmers and 40 consumers selected randomly from Faisalabad city. Simple linear form of regression analysis was employed to estimate effect of major variables. Sale price of poultry birds, average cost of production and experience of the poultry farmers significantly ( $P < 0.05$ ) affected supply of poultry birds, whereas education of farmers and distance from markets had non-significant effect. Income of the consumers, family size and retail price of poultry meat were found significant variables, whereas age and education of consumers were non-significant variables affecting demand. A qualitative variable was used to capture effect of bird flu on supply and demand of poultry meat, which was found significant in both models. This finding establishes the serious implications of bird flu epidemic for poultry industry in Pakistan.

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### INTRODUCTION

Poultry sector is one of the most vibrant segments of agriculture sector in Pakistan. It generates direct or indirect employment for about 1.5 million people. Poultry meat contributes about 19% of the total meat production in the country. The current investment in poultry industry is about Rs. 200 billion. This sector has shown an annual growth of 8-10%. The production of total poultry birds, including domestic and commercial poultry birds, was 518 million, and total meat production remained 601 thousand tons during 2007-08 (Govt. Pakistan, 2008).

Poultry meat is a good source of cheap, palatable and nutritious protein and contributes around 1.1% in the national Gross Domestic Product (GDP), 4.8% in the agricultural GDP (Sabir, 2007). A poultry enterprise produces meat in eight weeks, and eggs in 24 weeks. It has been estimated that chicken appears in the diet of more people throughout the world as a source of meat than the meat from any other animal source. Poultry meat carries an advantage over red meat in terms of low percentage of fat compared to beef and mutton, and is therefore, termed as non-fattening and good dietary source

for the prevention of hardening of arteries (Alam and Shaikh, 2007).

In the recent past, the poultry industry suffered many challenges, which have trickled down to all parts of the country including Faisalabad. This problematic situation arose due to low share of the producer in the profit. Poultry producers complain of low prices of their products and consider it uneconomical to expand further production, while the consumers grumble about high prices of poultry and poultry products (Hussain, 1982). Recently, the bird flu has severely hit pace of development in this industry by shaking the confidence of consumers. In this background, the present study was planned to estimate empirically the factors affecting demand and supply of poultry meat in Faisalabad, Pakistan.

### MATERIALS AND METHODS

This study was undertaken to estimate supply function of poultry birds and demand function of poultry meat in Faisalabad. Forty poultry producers and 40 consumers of poultry meat from surrounding areas of Faisalabad city within a radius of 20 Km were selected

using random sampling technique to collect information on production of birds and consumption of poultry meat. Information on both quantitative and qualitative variables was collected to estimate the demand and supply functions. Different forms of the regression analysis were tried but based upon model fitness criteria, multiple linear form of the regression was found the most suitable (Chattarjee and Price, 2000).

Supply function was estimated as:

$S_m = f(Z_i, D_i)$  Where,  
 $S_m$  = Supply of poultry birds  
 $Z_i$  = Vector of quantitative variables, where  $i=1-5$   
 $D_i$  = Vector of qualitative variable, where  $i=1$

This relationship was further explained as:

$S_m = f(Z_1, Z_2, Z_3, Z_4, Z_5, D_1)$  Where,  
 $Z_1$  = Sale price (rupees/mound)  
 $Z_2$  = Distance from market (Km)  
 $Z_3$  = Average marketing cost (rupees/mound)  
 $Z_4$  = Education of producers (schooling years)  
 $Z_5$  = Experience of producers (years)  
 $D_1$  = Dummy variables, used to capture effect of bird flu  
 Where  $D_1 = 1$ , if affected by bird flu and  $0 =$  otherwise.

Demand function was estimated as:

$D_m = f(X_i, D_i)$  Where,  
 $D_m$  = Demand of poultry meat  
 $X_i$  = Vector of quantitative variables, where  $i = 1-5$   
 $D_i$  = Vector of qualitative variable, where  $i=1$

This relationship was further explained as:

$D_m = f(X_1, X_2, X_3, X_4, X_5, D_2)$  Where,  
 $D_m$  = Demand of poultry meat  
 $X_1$  = Income of consumers (rupees)  
 $X_2$  = Age of consumers (years)  
 $X_3$  = Education of consumers (schooling years)  
 $X_4$  = Family size of consumers (in numbers)  
 $X_5$  = Price paid by consumers (rupees/kg)  
 $D_2$  = Dummy variable, used to capture effect of bird flu  
 Where  $D_2 = 1$ , if affected by bird flu and  $0 =$  otherwise.

## RESULTS AND DISCUSSION

### Supply function

The sale price was found to be the most important variable affecting supply of poultry birds (Table 1). The coefficient of sale price was positive and significant ( $P < 0.01$ ). The value of this coefficient revealed that in response to one unit increase in sale price (Rs/maund), the supply of poultry live birds increased by 0.614 units (mounds).

Average cost was another important variable affecting supply of poultry birds. The coefficient of this variable was -5.89 ( $P < 0.05$ ) which showed that for every one unit increase in average cost i.e. (Rs/maund) there might be 5.89 mounds decrease in supply of live poultry birds (Table 1).

Experience of a person shows the level of technical know how in the business activity. The coefficient of experience was 0.547 ( $P < 0.05$ ), indicating that for every one unit increase in experience, there might be an increase of 0.54 mounds in the supply of live poultry birds (Table 1). Similar results were obtained by Javed *et al.* (2003), Islam (2003) and Adesiyun *et al.* (2007).

Distance from the central market affects farmer's decision to take the produce in the market or sell at the farm. Farmer often decides to sell at farm as the distance from the market increases. The coefficient of distance from market showed a negative sign with the poultry live birds but was non-significant (Table 1).

Education is considered an important variable in the business enterprises as it increases the ability of a person to handle business more efficiently. The coefficient of this variable showed positive sign with the supply of live poultry birds but it was also non-significant (Table 1).

In addition, the effect of bird flu on the supply of live poultry birds was found significant ( $P < 0.05$ ). The value of this variable indicated that there might be 161 mounds decrease in supply of live poultry birds if farmer thought that their business would be affected by bird flu (Table 1).

The value of adjusted  $R^2$  in this analysis was 0.58 (Table 1). This shows that all independent variables explained 58% variation in dependent variable, keeping all other factors constant. The F-value in our analysis, which was highly significant, explained the overall appropriateness of model. It also explained that model was correctly specified.

**Table 1: Summary of supply function**

Variables	Coefficients	Standard error	T-Value
Constant	92.00	41.07	2.24
Sale price	0.614	0.148	4.157**
Distance from market	-0.018	4.690	-0.004 <sup>NS</sup>
Average cost	-5.893	2.755	-2.139*
Education	0.501	0.010	0.079 <sup>NS</sup>
Experience	0.547	0.253	2.160*
Bird flu	-161.182	50.531	-03.190*
Adjusted $R^2$		0.58	
F-value		7.87	

\*\* highly significant ( $P < 0.01$ ), \* significant ( $P < 0.05$ ), NS Non significant.

### Demand function

Income is an important variable of demand for poultry meat. In the estimated demand model, the coefficient of income was 0.001 ( $P < 0.01$ ) which revealed that for one unit increase in income (Rupees) there might be 0.001 Kg increase in the demand of poultry meat (Table 2). This is consistent with economic theory that higher income increases the demand of poultry meat.

The coefficient of family size was 0.653 ( $P < 0.05$ ) which showed that for every one unit increase in family size (one person) there might be 0.653 Kg increase in demand of poultry meat (Table 2). Retail price is one of the most important variables affecting demand of poultry meat. The coefficient of this variable was -0.418 ( $P < 0.01$ ) showing that for every one unit increase in price

(rupees/Kg) there would be 0.418 Kg decrease in poultry meat. Similar findings were recorded by Rasool (1991) and Zahid (1994).

The coefficient of education was 0.139. This variable showed a positive sign with the demand of poultry meat but was non-significant (Table 2). Similarly, the coefficient of age showed a positive sign with the poultry meat but it was also non-significant.

The effect of bird flu on demand of poultry meat was estimated using a dummy variable (Table 2). The value of this variable was -1.583 ( $P < 0.05$ ) which showed that there would be 1.583 times decrease in demand of poultry meat in days of bird flu epidemic.

The value of adjusted  $R^2$  in our analysis was 0.763 which means that independent variables included in the model explained 76% variation in dependent variable. The F-value (16.57) in our analysis was significant, showing correct specification of the model.

**Table 2: Summary of demand function**

Variables	Coefficients	Standard error	T-Value
Constant	2.679	8.252	0.325
Income	0.001	0.066	6.968**
Age	0.009	0.066	0.131 <sup>NS</sup>
Family size	0.653	0.345	1.893*
Price	-0.418	0.111	-0.528*
Education	0.139	0.197	0.704 <sup>NS</sup>
Bird flu	-1.583	1.440	-1.099*
Adjusted $R^2$	0.76		
F-Value	16.57		

\*\* Highly significant ( $P < 0.01$ ), \* Significant ( $p < 0.05$ ), NS Non significant.

### Conclusion

Professional experience of poultry farmers, average production cost, sale price of poultry birds and bird flu are some of the important variables affecting supply of poultry birds whereas income, family size, retail price and

bird flu are the important determinants of demand for poultry meat.

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