

## **An Economic Assessment of the Chicken Meat/Feed Price Interactions in Turkish Broiler Sector**

<sup>1</sup>Yilmaz Aral, <sup>2</sup>Pinar Demir, <sup>1</sup>Yavuz Cevger and <sup>1</sup>Erol Aydin  
<sup>1</sup>Department of Animal Health Economics and Management,  
Faculty of Veterinary Medicine, Ankara University, Ankara, Turkey  
<sup>2</sup>Department of Livestock Economics, Faculty of Veterinary Medicine,  
Kafkas University, Kars, Turkey

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**Abstract:** The purpose of this study was to determine the effects of the factors such as economic crisis, some speculative comments regarding broiler sector (hormone usage, antibiotic residual etc.) and HPAI outbreak upon the prices of chicken meat in Turkey in recent years and to reveal the chicken meat/feed price alterations that occurred in 1994-2006 period. A whole chicken retail prices and broiler feed prices that were obtained from TÜİK (Turkish Statistical Institute) and BESD-BİR (Poultry Meat Producers and Breeders Association) consist of the material of the study. The current prices were converted into real prices by using the index which was constituted in order to eliminate the impact of the inflation on the price data. In addition to this, seasonal price fluctuations which occurred depending on the consumption demand were examined. As a consequence, it was determined that chicken meat production increased average 13.5% during this period yearly but production level decreased by 10.5% in 2001 and increased only by 1.7 and 2.6% in 2005-2006 years, respectively according to the previous years. Furthermore, it was ascertained that the average current prices of the chicken meat and feed increased by approximately 55 and 53 times, respectively. However, real prices decreased by 30.1 and 32.9% between 1994 and 2006, respectively. In conclusion, it has been thought that socio-economic, psychological and seasonal factors have an important role upon the chicken meat prices as well as supply-demand equilibrium in the market. Within this scope, the applications with reference to seasonal demand, input prices, consumer preferences, animal health and efficient production planning directed to the export of the integrated firms which have been in this sector are very important.

**Key words:** Broiler sector, chicken meat, feed, price, hormone usage, antibiotic residual

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### **INTRODUCTION**

The rapid growth of world population requirement of quality and quantity assurance in food supply, need for protein of animal origin, increasing consumer awareness and preferences in terms of healthy and balanced nutrition have brought the broiler sector to the situation of a large industry having a significant place in rural and national economy in Turkey as in many countries.

Despite factors such as the demand reduction and sudden drops in chicken meat prices due to causes economic crises experienced in Turkey, various sensational comments, Highly Pathogenic Avian Influenza (HPAI) outbreaks etc., broiler production has made significant progress in recent years in quality, productivity and capacity (BESD-BİR, 2006). Herein, factors such as using high-yield broiler parent stock, modernization of poultry farms and slaughterhouses,

investment and employment level, production industry integration, increasing consumer demand, advance in sales and marketing organization, export potential have acted. The major problem in broiler sector is dependence on external resources in the supply of parent stock, feed raw materials (especially corn and soybean), vaccines-medicines, feed additives to a certain extent and this situation affects the competition of the sector in foreign markets adversely as a result of increasing production costs (Cicek and Tandogan, 2007).

Many factors affect chicken meat prices such as input costs (feed, chick etc.), income level, purchasing power and consumption choices of the consumer, substitute product prices, economic conjuncture and external trade.

Chicken meat prices in Turkey are influenced rapidly from seasonal and periodic demand variations and instability in markets due to speculations and epidemics. The aim of this study was to determine the effects of

factors such as the economic crisis, some speculative comments related to broiler sector (hormone usage, antibiotic residual, etc.) and HPAI outbreaks on the chicken meat prices and to identify the variations and seasonal price fluctuations between chicken meat and feed prices that occurred in Turkey in 1994-2006 period.

**MATERIALS AND METHODS**

The main material of this research is whole chicken and broiler feed retail prices that formed in the Turkish poultry market in 1994-2006 period. In the study, monthly average chicken meat and feed prices obtained from TÜİK and BESD-BİR were used to examine the interactions and variations according to time in the prices. The current prices were converted to real prices using Consumer Price Index (CPI) in order to eliminate the impact of inflation on the price data in the same period.

On the other hand, the seasonal fluctuations in whole chicken prices were determined by a seasonal index prepared with monthly average prices between 1994 and 2006. The months having values over 100 in the index were assessed as these are higher than the general average on an annual basis. In addition, a correlation analysis was performed to investigate the relationship between chicken meat and feed prices.

**RESULTS AND DISCUSSION**

Broiler sector has shown a rapid development course in Turkey in the last 15 years (excluding 1994 and 2001 economic crisis years) and has experienced a temporary recession period in 2005-2006. Chicken meat production quantity, annual average whole chicken meat and feed prices in Turkey are shown in Table 1. It was observed that annual average growth rate of broiler sector was 13.5% in Turkey in 1994-2006 period but the

development was not linear due to various socio-economic problems experienced by the sector stakeholders. As a matter of fact, the shift in consumer demand to the white meat because of BSE (Bovine Spongiform Encephalopathy) disease emerged in 1996 following the economic crisis of 1994 provided the sector to pick up. Furthermore, it was determined that chicken meat production decreased by 10.5% due to the economic crisis of 2001 according to the previous year.

On the other hand, as a result of some speculative comments related to hormone usage at the end of 2004, HPAI outbreaks and the crisis in the Turkish poultry sector in 2005, a pause in chicken meat production increase and reduction in prices occurred in 2005-2006.

In the research, it was determined that the average current prices of the chicken meat and feed increased by approximately 55.4 and 53.1 times. However, their real prices decreased by 30.1 and 32.9% between 1994 and 2006, respectively. Chicken meat price has increased by 110.7 and 54.5%, respectively compared to the previous year due to the decrease in broiler production in 1998 and 2001. Furthermore, it was found that the speculative comments about hormone and antibiotic residuals in chicken meat in November 2004 dropped the chicken meat price 14.8% in next month. Whole chicken price reached its highest value in 1998 when production trend decelerated due to technical reasons (Fig. 1).

In addition, the HPAI outbreaks occurred in October and December 2005 in Turkey caused panic among people and turned into a virtual crisis. The chicken meat prices in the market was determined to drop 15.5% in the October crisis and 26.4% in the December crisis based on September 2005 price.

When the variation in whole chicken and feed prices are analyzed, the result of realized model estimation is in cubic form and the function and determination coefficient of the equation for the chicken meat has been found as  $Y = 27.71x^3 - 630.25x^2 + 2261.5x + 59023$ ;  $R^2 = 0.7329$

**Table 1: The chicken meat production, whole chicken and broiler feed current prices in Turkey (1994-2006)**

Years	Chicken meat			Average current chicken			Average current broiler		
	production (ton)	Index	%	meat price (TL kg <sup>-1</sup> )	Index	%	feed price (TL kg <sup>-1</sup> )	Index	%
1994	233.510	100.0	-	60.060	100.0	-	9.373	100.0	-
1995	313.154	134.1	34.1	122.296	203.6	103.6	15.725	167.8	67.8
1996	415.155	177.8	32.6	182.717	304.2	49.4	32.029	341.7	103.7
1997	493.271	211.2	18.8	333.550	555.4	82.6	59.325	632.9	85.2
1998	497.720	213.1	0.9	702.702	1170.0	110.7	95.800	1022.1	61.5
1999	557.666	238.8	12.0	925.830	1541.5	31.8	142.396	1519.2	48.6
2000	662.096	283.5	18.7	1210.243	2015.1	30.7	193.067	2059.8	35.6
2001	592.567	253.8	-10.5	1869.813	3113.2	54.5	312.758	3336.8	62.0
2002	620.581	265.8	4.7	2535.240	4221.2	35.6	384.017	4097.1	22.8
2003	768.012	328.9	23.8	2986.340	4972.3	17.8	524.583	5596.7	36.6
2004	940.889	402.9	22.5	3046.647	5072.7	2.0	536.250	5721.2	2.2
2005	957.416	410.0	1.7	3132.500	5215.6	2.8	481.583	5138.0	-10.2
2006	982.507	420.8	2.6	3328.333	5541.7	6.3	498.000	5313.1	3.4

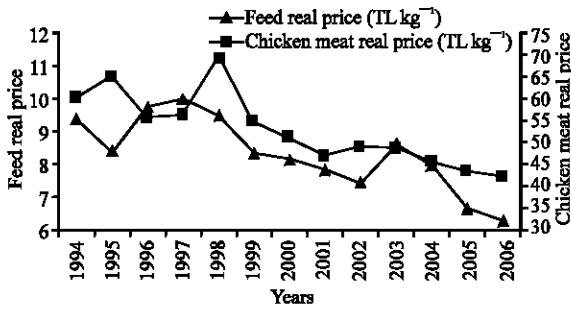


Fig. 1: Variation in chicken meat and feed real prices in Turkey (1994-2006)

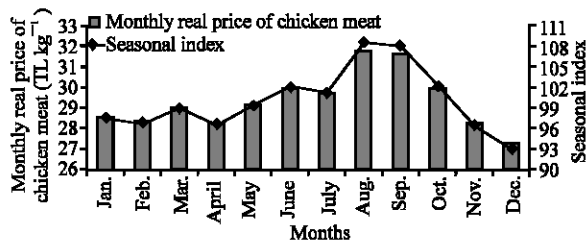


Fig. 2: The seasonal course of monthly average real whole chicken prices (1994-2006)

(73.3%). Moreover, model assumption and determination coefficient of the equation for feed it has been calculated as  $Y = 1.2688x^3 - 46.845x^2 + 202.82x + 9038.3$ ;  $R^2 = 0.7134$  (71.3%).

A correlation analysis was performed with the aim of determining the level of relation between real whole chicken prices and feed prices in 1994-2006 period and the correlation coefficient was computed as ( $r = +0.731$  and  $p < 0.05$ ). This result demonstrates that in the pricing of chicken meat, other factors are effective besides the feed input cost. In this research, monthly averages of real whole chicken prices were taken and alterations in prices and seasonal fluctuations were examined (Fig. 2).

When Fig. 2 is examined, it is observed that also seasonal factors are effective in the chicken meat price formation in Turkish broiler market. Chicken meat prices start to increase from summer months, make a peak in August and September and shows drop tendency from October. Turkish Broiler sector is rapidly affected from crises occurred due to different reasons and speculations in parallel to production increase and employment provision.

Factors such as seasonal and periodic price fluctuations experienced in the market, the number of enterprises and production volume, animal population and productivities, animal epidemic diseases, economic secure environment, feed raw material prices, variations in

substitute product (beef, fish, etc.) prices affect chicken meat supply. A reduction has occurred in chicken meat production as a result of high inflation, rising input costs, etc., during the economic crisis in 2001 in Turkey. The problems (claims of hormone use and HPAI outbreaks) experienced by the sector between the years 2004 and 2006 caused a decline in chicken meat demand and some integrated firms closed in the crisis.

Parallel to rapid drop in chicken meat demand, HPAI crisis has resulted in drop in product prices decrease in broiler production and supply, decrease in capacity utilization, unemployment in commercial poultry farms, temporary stagnation in the poultry sector investments and increase in substitute product prices. In this period, average chicken meat prices declined from 2.85 YTL kg<sup>-1</sup> (2.34 \$ kg<sup>-1</sup>) before the HPAI crises to 1.97 YTL kg<sup>-1</sup> (1.61 \$ kg<sup>-1</sup>) during the outbreak in Turkey (Yalcin, 2006). As in the result of bird flu epidemics, it is indicated that food safety shocks occurring in the market have spread directly to marketing channels and affected price margins at the wholesale and retail levels and damaged the level and share of income in the broiler sector (Saghaian *et al.*, 2008).

In the survey research conducted by Cevger *et al.* (2008), it is found that preference rates of Turkish consumers in brand and packaged products is 51% before AI crisis emerged in 2005-2006 and has reached to 78% after the crisis with increasing awareness level. The HPAI crisis has become effective also on contracted broiler producers. Aral *et al.* (2008), reported that the contracted broiler producers have lost on average 1.38 cycles of production and their management fee reduced by 14.7% in 10 months after the HPAI outbreaks. As a result, the broiler production and the enterprise income have declined by 34.8 and 44.3%, respectively in the crisis period in Turkey. It was declared that feed cost has approximately 56-68% and chick cost 19-22% share within broiler production costs (Cicek and Tandogan, 2007). Economic crises experienced in Turkey in 1994 and 2001 have first increased input costs and this is also reflected to chicken meat prices.

Nowadays, in spite of the progress in Turkish broiler sector observed in subjects such as production, processing, productivity, technology utilization, daily maintenance and feeding conditions, standardization; many of the existing problems are concentrated at the point of minimization of production costs, establishment of supply and demand balance, provision of efficiency in marketing and being competitive position in foreign sales. Increasing enterprise scales, production volume, slaughter and processing capacity in broiler sector should

be assessed under production planning and external trade opportunities should be searched together with consumption demand and self sufficiency level. Information and publicity activities should be applied with the aim of increasing chicken meat consumption.

Demirci (2008) was reported that there were variations in poultry products sales depending on seasons and especially chicken meat sales and general level of prices increase in summer months. In this research, it was determined that August and September months were the most appropriate period for chicken meat supply in terms of seasonal fluctuations and demand level.

For reducing broiler production costs in Turkey, precautions to balance the internal and external market prices of corn which composes a significant element of expense as feed raw material should be taken by the government. In addition, export support should be increased with the aim to provide competitive power of the sector and Value-Added Tax (VAT) rates of the products and customs duty tariffs applied to feed raw materials should be re-arranged to promote production.

### **CONCLUSION**

As a result, it has been thought that also socio-economic, psychological and seasonal factors have an important role upon the chicken meat prices as well as supply-demand equilibrium in the market. Within this scope, the applications with reference to seasonal demand, input prices, consumer preferences, animal health and efficient production planning directed to the exportation of the integrated firms which active in the sector are so important.

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