

Effect of Broiler Prices on Logistics and Supply Chains in Developing the Poultry Industry in Egypt

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ABSTRACT

This study aimed to study the effect of changes of broiler prices on the profitability of broiler logistics under Egyptian conditions. This study was undertaken during the period 2016 – 2020 on random cycles of both broiler and layer farms in three different provinces which were Menofia, Kaliobia and Giza. The data were collected from a cross-sectional survey on the broiler and during the data collection the researcher was contact with the poultry holders and managers. The data were collected from the accurate records which available in the poultry farms of the study areas and from the structured questionnaires methods which established by the researcher and admitted to the farmers during the time of interview, also, the data collected from the Agricultural Directorates of governorates, Livestock development sector and Economic Affairs Sector. The data includes data about logistics costs, returns and net prpfits of broiler production, the data were analyzed statistically and economically. The price of broilers considered as the main variable affecting the profitability of broiler production farms. The price of poultry affected by the costs of production costs that includes variable and fixed costs. The results, concluded that, the higher prices of broiler prices observed during the years 2018, 2019 and 2020 than that of years 2016 and 2017 and in winter seasons than the summer seasons. The increasing of broiler prices causes increasing returns level for broiler sales, the summer seasons achieved a higher net profit than the winter seasons due to increasing the level of production costs in winter seasons than the summer seasons.

Key words: Broiler prices - logistics - supply chains - poultry industry - Egypt

INTRODUCTION

Globally, chicken meat consumption has raised faster rate than any other animal protein source. Modern broiler chickens have become reaching for the marketing weight (2 kg) as early as 5 to 6 weeks. The result of advancement in genetics, feed utilization and management practices during the last couple of decades [Devatkal *et al.*, 2019 and Wu *et al.*, 2019]. The most

commercialized variety and profitable livestock of the avian species are chickens in the world. Chickens turn many forms of feed into protein food more efficiently than other animal species, also broiler chicken production more preferable in comparison to other types of meat like pork, beef and fish. So consumer demand trends reveal a raise in white meat consumption and a decrease in red meat [González-García *et al.*, 2014 and Nkukwana, 2018].

The popularity of chicken by consumers occurred because of low prices. Chicken meat is considered healthier than beef and pork; and processors provide an array of products such as whole chickens, chicken parts, and a plethora of value-added products [Davis *et al.*, 2018]. Within broiler meat, consumers prefer white meat (chicken breast and wings) to dark meat (thighs and legs) by a 2-to-1 margin primarily for health reasons, as white meat includes more protein and less fat than dark meat [Arumugam, 2011]. Consumers benefit from the rapid advances in productivity because broiler production has outpaced beef and pork production and broiler demand, resulting in relatively low broiler prices.

Logistics refers to the overall process of managing how resources are acquired, stored, and transported to their final destination. Logistics management involves identifying prospective distributors and suppliers and determining their effectiveness and accessibility. Logistics managers are referred to as logisticians [Xiang, 2014].

In recent years, the Egyptian poultry production has become an industry, rather than an agricultural activity. Growing consumer demand for affordable animal protein has prompted an increase of broiler chicken meat production in Egypt. At the same time, lack of Government's involvement in outlining the rules for the industry development, or better to say absence of National strategy for poultry industry development, has resulted in numerous issues due to HPAI outbreak, massive live bird market, inefficient production practices, etc [Ahlam El Nagar and Ibrahim, 2021].

Despite its improved self-sufficiency in the broiler meat sector, the country will remain dependent on imports of feed ingredients, as well as primary genetic material (GPS), vet medications, vaccines. The threat of feed grain price increases or decreased import tariffs protection put pressure on local poultry producers to become more competitive. To do so, they will need to invest in the efficiency of primary production and higher food quality and safety standards.

Egyptian poultry industry has evolved into a very significant sector of Egyptian agricultural production. The times when growing poultry in the backyard farms was only a traditional activity that supported the well being of particular household are gone. That does not necessarily mean that backyard poultry production disappeared rather than the role of backyard poultry production for household consumption in the overall national poultry production became minimal. Since middle of the 20th century there have been various vectors and conditions for poultry sector development in Egypt. The socialist era is known for its generous subsidies and support. Today the poultry industry in Egypt is predominantly market driven and has to find its way in the turbulent waters of global market [Ahlam El Nagar and Ibrahim, 2021].

The prices of the kilogram poultry sale considered as one of the most important factor affecting broiler production and profitability, as it affected positively on the returns, costs of production and net profit. As of July 2020, the monthly average price for farm chickens in Egypt was 28.86 Egyptian pounds (1.84 U.S. dollars) per kilogram), which illustrated a slight decline of 1.27 percent from the preceding month. From January 2019 onwards, the average price per kilogram ranged between 25.42 Egyptian pounds (1.62 U.S. dollars) and 34.44 Egyptian pounds (2.20 U.S. dollars). In April and May 2020, the price increased to 30.72 Egyptian pounds (1.96 U.S. dollars) per kilogram and 31.19 Egyptian pounds (1.99 U.S. dollars) per kilogram, respectively, which can be related to an increase in demand due to coronavirus (COVID-19) curfew. Furthermore, throughout the period under review, the mean price of farm chicken more or less followed the same trend as for local chicken prices, with slight differences, as both items are bound by the same market forces [Hafez and Attia, 2020].

The broiler prices affected by the logistics of broiler production that includes variable and fixed costs. Cost of production is the major factor affecting prices of kilogram poultry sale, and so profitability of commercial broiler operation if management would not be a limiting factor, as poor management will call on for increased production costs, as cost of production was reduced in optimally utilized sheds, on concrete type floor and for broilers kept under good hygienic conditions [Asghar *et al.*, 2000]. The cost of production grouped into (i) fixed costs, (ii) variable costs and the sum of (i) and (ii) called total costs of production [Muhammad, 2002].

-Variable costs (VC). It is the costs which changes with change of production and characterized by wide variability from time to time, place to place and management to management and it include the following costs: (i) feed cost (ii) day old chick cost (iii) medication and vaccination cost (iv) labor cost (v) fuel or electricity cost (vi) bedding cost (vii) miscellaneous and transportation cost [Asghar *et al.*, 2000 and Muhammad, 2002].

The second type of the logistics costs includes Fixed cost, which is the costs which not changed with change of production and includes the capital invested on building construction and equipments so; its proper utilization will ensure better returns. It contributes a small percent of the total cost of production in terms of depreciated cost for building and equipments according to number of years in which consumed as 25 years for building houses and 5 years for equipments [Muhammad, 2002].

The Total costs (over all costs) of broiler production defined as the summation of total fixed and total variable costs and its curves take the same shape of variable costs curves but found above it, the total costs differed according to type of the farm sector. The feed cost is one of the major variables that affecting total costs as it constitute about 65-70% of the total cost of production [Bhuiyan, 1998].

The main effects of broiler prices and its effects on profitability of broiler farms attributed to its effects on the total returns and net profit (TR), the total returns from broiler production mainly come from (i) live weight of broiler sales (ii) litter sales as good fertilizers in agriculture fields. The total returns influenced by several factors as kg market price, mortality percent, live body weight at sale, market age, feed wastage and cost of production. The returns and profitability of broilers decreased with increasing of mortality percent from 2.5 to 10 % and increased of market age from 53 to 62 days [Zahir-ud-Din *et al.*, 2001].

The prices of poultry meat depend upon economic changes occurring in the other input prices, mainly feed and the purchasing power of the consumer [Yavuz and Engin, 2006].

The total returns differed significantly according to housing type, breed and management system as the average total returns / 100 kg live weights were 423.95 and 406.18 LE for investment and private sectors for closed farms; respectively, while in open farms the average total returns / 100 kg live body weights were 405.90 and 388.41 LE for investment and cooperative sectors; respectively [Zatter, 1998].

The net profit is the function of cost of production, gross return and prevalent market price and equal to the value which obtained from subtraction of total costs from total returns (TR – TC), so maximizing gross return and minimizing cost of production lead to increase of net profit and higher farm profitability. The age of broilers at marketing and mortality percent were negatively associated with net profit, indicating that an increase in age at marketing and mortality percent will decrease net profit meanwhile, flock size and live weight at market were positively associated with net profit [Asghar *et al.*, 2000 and Zahir-ud-Din *et al.*, 2001].

Research objective

This research aimed to study the effect of changes of broiler prices on the profitability of broiler logistics under Egyptian conditions.

MATERIAL AND METHODS

Study area

This study was undertaken during the years 2016 – 2020 on random cycles of both broiler and layer farms in three different provinces which were Menofia, Kaliobia and Giza.

1. Data collection

The data were collected from a cross-sectional survey on the broiler and during the data collection the researcher was in intimate contact with the poultry holders and managers.

The researcher was collected the data by two ways

- a) From the accurate records which available in the poultry farms of the study areas.
- b) From the structured questionnaires methods which established by the researcher and admitted to the farmers during the time of interview.
- c) Data collected from the Agricultural Directorates of governorates, Livestock development sector and Economic Affairs Sector

2. Types of data collected

The collected data during the years of 2016-2018 were classified according to the types of poultry operations into two sections, data collected about the broiler farms and data collected about the layer farms [Atallah, 2000 and Omar, 2003].

Data collected about the broiler production farms

The data were collected about (4) different broiler strains (Hubbard, Cobb, Ross and Arbore Acre), and this data were sub-classified into:

Production parameters and production resources

It included the breeds types, number of day old chicks brooded, years and the seasons of fattening cycles, the amount of starter, grower and finisher rations consumed, also the mortality percent and its causes, age at marketing, average weight of bird at marketing, housing systems, localities, stocking rate and the flock sizes.

Production costs

It included the fixed costs such as the rent or depreciation of the buildings and equipments. The depreciation rates were calculated for the building on 25 years and for equipments on 5 years, but the value of rent were used directly during the calculation without depreciation rate.

And, the variable costs such as the prices of drugs, vaccines, disinfectants, veterinary supervision, feed cost, day old chick cost, labor cost, electricity and bedding costs and the transportation and miscellaneous costs [Sankhayan, 1983 and Atallah, 2000].

Production returns:

It included the returns from total live body weight sales, litter sales; according to the prices during the years of the study.

3. Statistical analysis

The collected data were introduced on the computer through SPSS/PC⁺ program by the researcher. All the production parameters affecting the broiler production as well as their costs and returns were calculated for each 100 broiler birds at marketing age to overcome the variation in the numbers of broilers of the different farms.

RESULTS AND DISCUSSION

There are factors affecting growth and production of broiler chicken so must be recovered in order to meet growing demands on broiler meat because of broiler chickens industry provides healthy and high quality meat to domestic and international consumers. lately, genetic selection programs, environmental conditions inside housing (barn ventilation and temperature controls) and veterinary management have been improved [Gulli, 2017].

Broiler industry has a recognized potential to generate higher revenue and change living standards If there is proper interventions such as improved genetics, better feeding, housing and management, pricing are advanced and performed [Grimes et al .,2019].

1-Effect of years and seasons on the logistic costs of broiler production

The price of broilers considered as the main variable affecting the profitability of broiler production farms , the price of poultry affected by the costs of production that includes variable and fixed costs [Gholami *et al.*, 2020].

The results observed in table (1) cleared that, there is a significant ($P < 0.01$) of the the costs parameters. Total fixed costs (bulding and equipment depreciation), variable costs (feed, veterinary management, fuel, electrolyte, labour and other costs) among different seasons of different years extended from 2016 to 2020.

The results cleared that, the higher level of total fixed costs, total variable costs and total costs observed in winter seasons than that of summer seasons, especially during years 2019 and 2020.

2-Changes of broiler prices among different years and its effects on broiler production and returns

The results observed in Table (2) and Figure (1) cleared that, the broiler prices differed significantly ($P < 0.01$) among different years and different months of the years from 2016 to 2020. During year 2016 the results cleared that, the higher broiler prices observed in May and June and the lower prices observed in August and January.

While during year 2017, results on the broiler prices during year 2017, the higher broiler prices observed in May, June and March and the lower prices observed in September, October, November and December, and during year 2018 the higher broiler prices observed in April, May and June and the lower prices observed in January,. While during the years 2019, the higher broiler prices observed in May, April and December and the lower prices observed in October and November months.

While during the year 2020, the higher broiler prices observed in April, May and June and the lower prices observed in January.

The higher bird weight observed during the winter months than those of of summer months. Also, the returns per bird during the summer months higher than that of the returns during the winter months (Table, 2).

3-Total returns, total costs and Net profit of broiler farms of different seasons among different years

The results observed in table (3) cleared that, the the total returns, total costs and net profit of broiler production farms differe significantly ($P < 0.01$) among different seasons of different years (2016 to 2020).

The results cleared that, the total costs increased during the winter seasons than the summer seasons and in year 2019 and 2020 than the year of 2016, 2017 and 2018. Also, the total returns increased in winter seasons than the summer seasons due to increasing weight of the birds during the winter seasons and also, due to increasing the price of the broilers during the winter seasons than the summer seasons that is causing increasing the return of poultry sale. The results on the net profit cleared that, the higher net profit observed in summer seasons than than winter seasons due to the increasing level of total costs duing the winter seasons than the summer seasons causes decreasing of net profit in winter seasons than the summer seasons.

The increasing level of broiler price in winter seasons than summer seasons attributed to the increasing costs of feed, veterinary management (Drugs, vaccine, disinfectant anf veterinarian vists costs) also, increasing costs of fuel and electricity. Also, the labour costs, vaccine costs and transportation costs increased in winter months than the summer months.

This results agreed with those of [Tandoğan and Çiçek, 2016] where they reported that, the total variable costs (TVC) which involved the costs of day-old chicks + feed + veterinary

medicine + energy (heating + electricity + fuel-oil) +other (cleaning and disinfection + litter + transport + other costs).

The increasing of treatment costs during winter seasons attributed to the increasing level of diseases as (Avian influenza, Gumboro and Newcastle disease) that required higher level of vaccines, so it will increase the costs and prices of broilers than other months of the year.

Due to previous results of increasing constituents of variable costs (feed, drugs, veterinary management expenses and other costs) this causes increasing level of broiler prices. This results agreed with those of [Hadi *et al.*, 2018] where they documented that fixed cost included the building rent and equipments depreciation used in broiler chickens farms. Equipments depreciation was about 1.16% from total cost of broiler production while the building rent represented about 2.20 % from total production cost, also, [Sultan *et al.*, 2016] investigated that total fixed cost covered about 5.65 % from total cost of production, however total variable cost recorded about 94.35 % and it increased in its amount and level with increasing the production level.

The results indicated that the higher prices of broiler prices observed in years 2018, 2019 and 2020 than that of years 2016 and 2017.

The decreasing of net profits in winter seasons than the summer seasons attributed to the increasing costs in winter seasons that causes decreasing of net returns in winter seasons than the summer seasons.

These results agreed with the results of [Petrikova, 2011] winter is the most required season for warming in poultry housing. Compared to other seasons, chicken producers use the majority of their purchased fuel in the winter time that causes increasing the production costs in winter than summer seasons that reduce the net profit in winter seasons than summer season.

Table (1): Costs parameters among different monthes of the year.

year	Month	N	Total fixed costs/100 bird	Total variable costs/100 bird	Total costs/100 bird
			Mean Std. Error	Mean Std. Error	Mean Std. Error
2016	January	30	14.92±2.50 ab	1642.48±16.22c	1657.40±92.96 c
	February	30	14.55±3.27 ab	1820.46±1822a	1835.01±191.66 a
	March	30	14.43±2.49 ab	1881.89±18.20a	1896.32±145.74 a
	April	30	14.63±1.57 a	1781.61±17.82b	1796.24±75.85 b
	May	30	7.66±1.94 b	1095.10±15.90f	1112.76±104.58 f
	June	30	17.94±2.17 a	1552.69±15.23e	1570.63±82.01 e
	July	30	14.85±2.66 ab	1610.48±16.14c	1625.33±142.88 c
	August	30	13.48±1.47 B	1422.76±14.22e	1436.24±62.13 e
	September	30	14.92±2.50 ab	1642.48±16.44c	1657.40±92.96 c
	October	30	14.55±3.27 ab	1820.46±18.20a	1835.01±191.66 a
	November	30	14.43±2.49 ab	1881.89±19.18a	1896.32±145.74 a
	December	30	14.63±1.57 a	1781.61±16.14b	1796.24±75.85 b
2017	January	30	14.92±2.50 ab	1097.84±17.22f	1112.76±104.58 f
	February	30	14.55±3.27 ab	1556.08±18.16d	1570.63±82.01 d
	March	30	14.43±2.49 ab	1610.90±17.18c	1625.33±142.88 c
	April	30	14.63±1.57 a	1421.61±19.24e	1436.24±62.13 e
	May	30	7.66±1.94 b	1639.74±17.94c	1657.40±92.96 c
	June	30	17.94±2.17 a	1817.07±17.18a	1835.01±191.66 a
	July	30	14.85±2.66 ab	1881.47±16.8a	1896.32±145.74 a
	August	30	13.48±1.47 B	1782.76±17.14b	1796.24±75.85 b
	September	30	14.92±2.50 ab	1097.84±19.22f	1112.76±104.58 f
	October	30	14.55±3.27 ab	1556.08±19.14e	1570.63±82.01 e

	November	30	14.43±2.49 ab	1610.90±16.12c	1625.33±142.88 c
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	May	30	7.66±1.94 b	1095.10±19.20f	1112.76±104.58 f
	June	30	17.94±2.17 a	1552.69±22.10d	1570.63±82.01 d
	July	30	14.85±2.66 ab	1610.48±12.17c	1625.33±142.88 c
	August	30	13.48±1.47 B	1422.76±121.22 d	1436.24±62.13 d
	September	30	14.92±2.50 ab	1642.48±22.23c	1657.40±92.96 c
	October	30	14.55±3.27 ab	1820.46±18.22a	1835.01±191.66 a
	November	30	14.43±2.49 ab	1881.89±19.23a	1896.32±145.74 a
	December	30	14.63±1.57 a	1781.61±23.15b	1796.24±75.85 b
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	February	30	14.55±3.27 ab	1556.08±16.24d	1570.63±82.01 d
	March	30	14.43±2.49 ab	1610.90±16.24c	1625.33±142.88 c
	April	30	14.63±1.57 a	1421.61±14.22e	1436.24±62.13 e
	May	30	7.66±1.94 b	1639.74±12.24 c	1657.40±92.96 c
	June	30	17.94±2.17 a	1817.07±16.24a	1835.01±191.66 a
	July	30	14.85±2.66 ab	1881.47±19.18a	1896.32±145.74 a
	August	30	13.48±1.47 B	1782.76±17.18b	1796.24±75.85 b
	September	30	14.92±2.50 ab	1097.84±17.19f	1112.76±104.58 f
	October	30	14.55±3.27 ab	1556.08±19.18d	1570.63±82.01 d
	November	30	14.43±2.49 ab	1610.90±18.19c	1625.33±142.88 c

	December	30	14.63±1.57 a	1421.61±17.16e	1436.24±62.13 e
2020	January	30	14.92±2.50 ab	1642.48±17.14c	1657.40±92.96 c
	February	30	14.55±3.27 ab	1820.46±20.13a	1835.01±191.66 a
	March	30	14.43±2.49 ab	1881.89±20.14a	1896.32±145.74 a
	April	30	14.63±1.57 a	1781.61±20.22b	1796.24±75.85 b
	May	30	7.66±1.94 b	1095.10±22.14f	1112.76±104.58 f
	June	30	17.94±2.17 a	1552.69±18.19d	1570.63±82.01 d
	July	30	14.85±2.66 ab	1610.48±18.19c	1625.33±142.88 c
	August	30	13.48±1.47 b	1422.76±18.14e	1436.24±62.13 e
	September	30	14.92±2.50 ab	1642.48±20.22c	1657.40±92.96 c
	October	30	14.55±3.27 ab	1820.46±22.24a	1835.01±191.66 a
	November	30	14.43±2.49 ab	1881.89±18.19a	1896.32±145.74 a
	December	30	14.63±1.57 a	1781.61±19.24b	1796.24±75.85 b

For each year: Means of months within the same column of different litters are significantly differ at (P < 0.05)

Source: compiloed and computed from Egyptian stock exchange during the period (2016-2020).

Table (2): Differences in broiler prices among different monthes of the year

year	Month	N	Price of kilogram poultry sale	Average weight	Value of bird sale/bird	Litter sale/bird	Total return/bird
			Mean Std. Error	Mean Std. Error	Mean Std. Error	Mean Std. Error	Mean Std. Error
2016	January	30	14.97±0.81 f	2.11±0.02 a	31.59 ±3.54	5±1.52e	36.59±6.3 6g
	February	30	16.07±0.81 d	2.90±0.02 a	46.60±4.5 0	5±1.52e	51.60±7.3 6e
	March	30	16.33±0.80 d	2.10±0.02 a	34.29±3.5 2	5±1.52e	39.29±9.3 9g
	April	30	17.80±0.66 c	2.10±0.02 a	37.38±3.5 1	5±1.52e	42.38±5.4 4f
	May	30	19.50±1.57 a	1.99±0.01 ab	38.81±3.5 8	5±1.52e	43.81±4.3 6f
	June	30	19.53±1.41 a	1.98±0.01 ab	38.67±3.5 0	5±1.52e	43.67±4.3 7f
	July	30	16.40±1.61 d	1.95±0.01 b	31.98±3.5 9	5±1.52e	36.98±6.3 7g
	August	30	15.90±0.92 e	1.90±0.01 b	30.21±3.5 1	5±1.52e	35.21±5.4 5g
	September	30	16.53±1.46 d	1.89±0.01 b	31.24±3.5 4	5±1.52e	36.24±6.5 4g
	October	30	14.80±1.03 f	1.98±0.01 ab	29.30±3.5 2	5±1.52e	34.30±5.3 5g
	November	30	16.20±0.81 d	2.00±0.02 a	32.40±3.5 4	5±1.52e	37.40±7.3 6g
	December	30	18.47±0.90 b	2.10±0.02 a	38.79±3.5 8	5±1.52e	43.79±4.3 5f
2017	January	30	22.70±1.15 e	2.20±0.02 a	49.94±4.1 2	6±1.54d	55.94±5.3 7e
	February	30	24.61±1.83 c	2.12±0.02 a	52.17±3.5 3d	6±1.54d	58.17±8.3 7e
	March	30	25.00±0.79 b	2.91±0.02 a	72.75±7.4 5b	6±1.54d	78.75±9.3 7c
	April	30	25.27±1.14 b	2.11±0.02 a	53.32±4.5 5d	6±1.54d	59.32±9.3 6e
	May	30	26.93±2.15 a	2.10±0.02 a	56.55±6.5 5d	6±1.54d	62.55±6.3 7d
	June	30	25.93±1.11 b	2.00±0.02 a	51.86±6.8 1d	6±1.54d	57.86±8.3 7e
	July	30	22.03±1.03 e	1.99±0.01 ab	43.84±4.5 5e	6±1.54d	49.84±9.3 8f
	August	30	23.03±1.25 d	1.96±0.01 ab	45.14±3.5 5e	6±1.54d	51.14±8.3 4e
	September	30	19.93±0.78 e	1.92±0.01 b	38.27±3.2 9f	6±1.54d	44.27±8.3 7f

2018	October	30	20.13±0.97 f	1.89±0.01 b	38.05±3.3 8f	6±1.54d	44.05±6.3 6f
	November	30	20.20±0.61 f	1.99±0.01 ab	40.20±4.2 0e	6±1.54d	46.20±8.3 8f
	December	30	20.43±0.50 f	2.10±0.02 a	42.90±4.5 2e	6±1.54d	48.90±7.3 7f
	January	30	21.67±0.61 f	2.11±0.02 a	45.72±4.2 5e	7±1.54c	52.72±6.3 6e
	February	30	23.11±0.74 d	2.90±0.02 a	67.02±6.5 0c	7±1.54c	74.02±7.3 5c
	March	30	23.97±1.27 d	2.10±0.02 a	50.34±5.5 0d	7±1.54c	57.34±6.3 6e
	April	30	26.20±0.89 a	2.10±0.02 a	55.02±3.5 0d	7±1.54c	62.02±7.3 6d
	May	30	26.97±1.45 a	1.99±0.01 ab	53.67±7.4 0d	7±1.54c	60.67±7.3 8d
	June	30	26.83±0.91 a	1.98±0.01 ab	53.12±3.5 0d	7±1.54c	60.12±7.3 9d
	July	30	24.03±1.19 c	1.95±0.01 b	46.86±3.5 1e	7±1.54c	53.86±5.3 6e
	August	30	25.20±0.48 b	1.90±0.01 ab	47.89±3.5 2e	7±1.54c	54.88±6.3 6e
	September	30	23.10±1.35 d	1.89±0.01 b	43.66±3.5 3e	7±1.54c	50.66±5.4 0e
	October	30	24.87±0.97 c	1.98±0.01 ab	49.24±4.4 9e	7±1.54c	56.24±7.3 4e
	November	30	23.90±0.99 d	2.00±0.02 ab	47.80±4.5 1e	7±1.54c	54.80±6.3 6e
	December	30	22.20±0.55 e	2.10±0.02 a	46.62±6.4 6e	7±1.54c	53.62±5.3 4e
2019	January	30	23.23±0.97 f	2.20±0.02 a	51.11±4.2 4d	9±1.55b	60.11±5.3 4d
	February	30	28.32±1.59 b	2.12±0.02 a	60.04±4.5 1c	9±1.55b	69.04±7.3 7d
	March	30	26.47±1.91 d	2.91±0.02 ab	77.03±4.5 2b	9±1.55b	86.03±8.3 4b
	April	30	27.20±1.85 c	2.11±0.02 a	57.39±3.5 0d	9±1.55b	66.39±9.3 4d
	May	30	29.87±0.78 a	2.10±0.02 a	62.73±3.5 0b	9±1.55b	71.73±7.3 6c
	June	30	26.07±2.42 d	2.00±0.02 a	52.14±5.5 2d	9±1.55b	61.14±7.3 4d
	July	30	25.73±1.23 e	1.99±0.01 ab	51.20±5.5 2d	9±1.55b	60.20±6.3 7d
	August	30	21.20±1.24 g	1.96±0.01 a	41.55±5.5 2e	9±1.55b	50.55±6.3 9e
	September	30	20.60±0.93 h	1.92±0.01 b	39.55±4.5 2f	9±1.55b	48.55±8.3 7f
	October	30	20.03±0.61 h	1.89±0.01 b	37.86±4.5 3f	9±1.55b	46.86±7.3 8f

2020	November	30	20.33±0.76 h	1.99±0.01 ab	40.46±4.3 9e	9±1.55b	49.46±6.3 6f
	December	30	23.63±1.77 f	2.10±0.02 a	49.62±9.5 4e	9±1.55b	58.62±6.3 6e
	January	30	25.97±1.22 f	2.20±0.02 a	57.13±3.5 0d	10±1.54 a	67.13±6.3 6d
	February	30	26.89±1.10 e	2.12±0.02 a	57.01±3.5 0d	10±1.54 a	67.01±7.3 5d
	March	30	27.87±1.31 d	2.91±0.01 a	81.10±3.5 0a	10±1.54 a	91.10±7.3 5a
	April	30	28.90±1.67 c	2.11±0.02 a	60.98±6.4 5b	10±1.54 a	70.98±6.3 7c
	May	30	29.17±1.15 a	2.10±0.02 a	61.26±3.5 2b	10±1.54 a	71.26±6.3 6c
	June	30	24.13±1.46 h	2.00±0.01 a	48.26±3.5 4e	10±1.54 a	58.26±7.3 6e
	July	30	23.20±1.03 i	1.99±0.01 ab	46.17±4.5 1e	10±1.54 a	56.17±7.3 5e
	August	30	20.33±1.30 j	1.96±0.01 ab	39.85±3.5 0f	10±1.54 a	49.85±6.3 6f
	September	30	20.73±0.98 j	1.92±0.01 b	39.80±3.5 9f	10±1.54 a	49.80±6.3 7f
	October	30	21.43±0.17 j	1.89±0.01 b	40.50±4.5 2e	10±1.54 a	50.50±6.3 6e
	November	30	20.73±0.11 h	1.99±0.01 ab	41.25±4.5 2e	10±1.54 a	51.25±7.3 7e
	December	30	21.60±0.22 j	2.10±0.02 a	45.36±3.5 0 e	10±1.54 a	55.36±6.3 5e

For each year: Means of months within the same column of different litters are significantly differ at ($P < 0.05$).

Source: compiloed and computed from Egyptian stock exchange during the period (2016-2020).

Table (3): Differences in total returns, total costs and net profit among different years

year	Month	N	Total return/100 bird	Total costs/100 bird	Netprofit/100 bird
			Mean Std. Error	Mean Std. Error	Mean Std. Error
2016	January	30	3658.67±13.58g	1657.40±92.96 c	2001.27±20.10f
	February	30	5160.30±15.51e	1835.01±191.66 a	3325.29±25.10e
	March	30	3929.30±19.55g	1896.32±145.74 a	2032.98±22.24f
	April	30	4238.00±14.28f	1796.24±75.85 b	2441.76±17.48f
	May	30	4380.50±14.59f	1112.76±104.58 f	3267.74±26.24e
	June	30	4366.94±15.38f	1570.63±82.01 e	2796.31±22.24
	July	30	3698.00±16.58g	1625.33±142.88 c	2072.67±20.25
	August	30	3521.00±17.44g	1436.24±62.13 e	2084.76±22.25
	September	30	3624.17±16.58g	1657.40±92.96 c	1966.77±19.25g
	October	30	3430.40±15.48g	1835.01±191.66 a	1595.39±22.15g
	November	30	3740.00±19.44g	1896.32±145.74 a	1843.68±19.25g
	December	30	4378.70±19.58f	1796.24±75.85 b	2582.46±22.45f
2017	January	30	5594.00±19.44e	1112.76±104.58 f	4481.24±25.24d
	February	30	5817.32±16.42e	1570.63±82.01 d	4246.69±22.15d
	March	30	7875.00±17.42c	1625.33±142.88 c	6249.67±22.24b
	April	30	5931.97±18.44e	1436.24±62.13 e	4495.73±22.24d
	May	30	6255.30±19.44d	1657.40±92.96 c	4597.90±22.25d
	June	30	5786.00±13.58e	1835.01±191.66 a	3950.99±25.50e
	July	30	4983.97±16.45f	1896.32±145.74 a	3087.65±22.24e
	August	30	5113.88±16.47e	1796.24±75.85 b	3317.64±22.25e
	September	30	4426.56±16.42f	1112.76±104.58 f	3313.80±24.15e
	October	30	4404.57±15.54f	1570.63±82.01 e	2833.94±17.28f

	November	30	4619.80±14.58f	1625.33±142.88 c	2994.47±22.14f
	December	30	4890.30±16.47f	1436.24±62.13 e	3454.06±16.18e
2018	January	30	5272.37±15.42e	1657.40±92.96 c	3614.97±17.15e
	February	30	7401.90±14.58c	1835.01±191.66 a	5566.89±16.55c
	March	30	5733.70±14.52e	1896.32±145.74 a	3837.38±18.25e
	April	30	6202.00±14.43d	1796.24±75.85 b	4405.76±14.25 d
	May	30	6067.03±16.58d	1112.76±104.58 f	4954.27±19.25 d
	June	30	6012.34±17.34d	1570.63±82.01 d	4441.71±14.15d
	July	30	5385.85±18.44e	1625.33±142.88 c	3760.52±17.45
	August	30	5488.00±19.58e	1436.24±62.13 d	4051.76±15.27d
	September	30	5065.90±13.58e	1657.40±92.96 c	3408.50±16.17e
	October	30	5624.26±14.58e	1835.01±191.66 a	3789.25±17.15e
	November	30	5480.00±16.47e	1896.32±145.74 a	3583.68±15.25e
	December	30	5362.00±13.58e	1796.24±75.85 b	3565.76±16.25e
2019	January	30	6010.60±15.59d	1112.76±104.58 f	4897.84±17.18d
	February	30	6903.84±14.30d	1570.63±82.01 d	5333.21±15.33c
	March	30	8602.77±13.58b	1625.33±142.88 c	6977.44±19.25b
	April	30	6639.20±14.42d	1436.24±62.13 e	5202.96±17.45c
	May	30	7172.70±13.58c	1657.40±92.96 c	5515.30±15.45c
	June	30	6114.00±15.47d	1835.01±191.66 a	4278.99±14.22d
	July	30	6020.27±15.57d	1896.32±145.74 a	4123.95±14.22d
	August	30	5055.20±13.58e	1796.24±75.85 b	3258.96±22.15
	September	30	4855.20±15.44f	1112.76±104.58 f	3742.44±14.25e
	October	30	4685.67±13.58f	1570.63±82.01 d	3115.04±13.25e
	November	30	4945.67±13.58f	1625.33±142.88 c	3320.34±32.15e

	December	30	5862.30±18.44e	1436.24±62.13 e	4426.06±14.25d
2020	January	30	6713.40±13.58d	1657.40±92.96 c	5056.00±16.25c
	February	30	6700.68±13.58d	1835.01±191.66 a	4865.67±17.45d
	March	30	9110.17±18.44a	1896.32±145.74 a	7213.85±18.25a
	April	30	7097.90±13.58c	1796.24±75.85 b	5301.66±15.27c
	May	30	7125.70±13.58c	1112.76±104.58 f	6012.94±16.15b
	June	30	5826.00±16.48e	1570.63±82.01 d	4255.37±14.25d
	July	30	5616.80±13.58e	1625.33±142.88 c	3991.47±13.91e
	August	30	4984.68±15.59f	1436.24±62.13 e	3548.44±17.45e
	September	30	4980.16±13.58f	1657.40±92.96 c	3322.76±22.75e
	October	30	5050.27±13.58e	1835.01±191.66 a	3215.26±16.17e
	November	30	5125.27±15.48e	1896.32±145.74 a	3228.95±13.14e
	December	30	5536.00±13.58e	1796.24±75.85 b	3739.76±17.15e

For each year: Means of months within the same column of different litters are significantly differ at (P < 0.05).

Source: compiloed and computed from Egyptian stock exchange during the period (2016-2020).

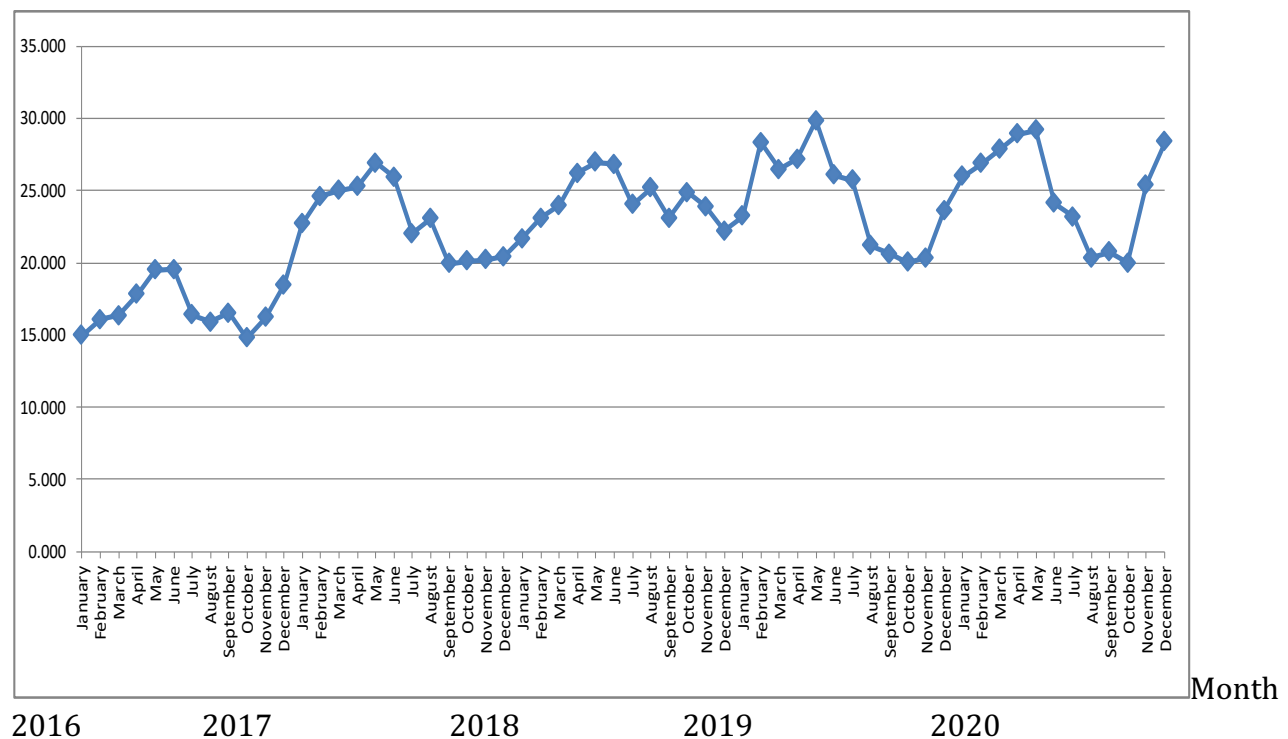


Figure (6): Differences in broiler prices among different monthes of the year

CONCLUSION

The broiler prices affected by the logistics of broiler production that includes variable and fixed costs. Cost of production is the major factor affecting prices of kilogram poultry sale, and so profitability of commercial broiler operation if management would not be a limiting factor, as poor management will call on for increased production costs, as cost of production was reduced in optimally utilized sheds, on concrete type floor and for broilers kept under good hygienic conditions. The cost of production grouped into (i) fixed costs, (ii) variable costs and the sum of (i) and (ii) called total costs of production.

The results concluded that the higher prices of broiler observed in years 2018, 2019 and 2020 than that of years 2016 and 2017 and in winter seasons than the summer seasons. The increasing of broiler prices causes increasing returns level from broiler sales, the summer seasons achieved a higher net profit than the winter seasons due to increasing the level of production costs in winter seasons than the summer seasons.

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