AN ECONOMIC RESEARCH OF BROILER PROJECTS FOR SOME PROVINCES IN THE MIDDLE OF IRAQ IN 2019*

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ABSTRACT

This research was aimed to estimate the long-run cost and supply functions and to calculate the optimum profit-maximizing level of production, optimum capacity for broiler projects. The preliminary data were obtained by questionnaires that were distributed to project owners in Qadisiyah, Babil and Wasit governorates. A total of 80 projects amounted for 15% of the total projects in these governorates were included. The results indicated that the optimal profit-maximizing and actual production were 25,337, 34,737, and 21.25 tons respectively. The optimum production capacity was 9.9 thousand birds, while the actual capacity was 8.3 thousand chicken The cost elasticities were 0.936, 1.0 and 1.23 at the actual, optimal and profit maximizing production, respectively. The supply function had low elasticity indicating that the producers face great difficulty in controlling production in case of price changes. From these results, it can be concluded that government support is required for productive inputs, facilitating loans, preventing poultry importing, and adoption of strategic policy for the agricultural sector in general and poultry production in particular.

Keywords: Poultry, supply function, cost elasticity, optimum production capacity.

***Part of M. SC. thesis of the first author.**

دراسة اقتصادية لمشاريع لحم الدجاج لبعض المحافظات وسط العراق للعام 2019*

حيدر جاسم العبد العالي زهرة هادي محمود
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المستخلص

هدفت هذه الدراسة الى تقدير دالة التكاليف، طويلة الاجل ودالة العرض وحساب الحجم الامثل والمعظم للربح والسعة المثلى لمشاريع انتاج لحم الدجاج. اعتمدت الدراسة على البيانات الاولية التي تم الحصول عليها باستخدام استمارة الاستبيان التي وزعت على اصحاب المشاريع في القادسية وبابل وواسط والتي بلغ عددها (80) مشروعا شكلت نسبة (15 %) من اجمالي المشاريع في المحافظات (القادسية، واسط ، بابل) للعام 2019. اشارت النتائج الدراسة الى أن الحجم الأمثل والمعظم للربح والإنتاج الفعلي قد بلغ (25.337، 34.737، 21.25) طن على التوالي. بلغت السعة الإنتاجية المثلى (عدد الطيور المثلى) والبالغة (9.9) ألف طير بينما السعة الإنتاجية الفعلية فقد بلغ (8.3) ألف طير. أظهرت الدراسة ان مرونة التكاليف هي (0.936 ، 1.00،1.23) عند معدل الإنتاج الفعلي والامثل والمعظم للربح على التوالي، في حين اتسمت دالة العرض بانخفاض مرونتها مما يدل على أن منتجي لحم الدجاج يواجهون صعوبة كبيرة في التحكم في الانتاج في حالة تغير الأسعار. من خلال هذه النتائج يمكن الاستنتاج بضرورة تقديم الدعم الحكومي للمدخلات الإنتاجية وتقديم القروض ومنع استيراد لحم الدجاج ووضع سياسة استراتيجية تنموية للقطاع الزراعي عامة وانتاج الدواجن خاصة.

الكلمات المفتاحية:- الدواجن ، دالة التكاليف ، دالة العرض ، السعة الإنتاجية المثلى .

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INTRODUCTION

Poultry farming is an important and influential industry in the national economy and plays a fundamental role in securing animal protein from meat and eggs of high nutritional value at reasonable prices if compared to the prices of meat and other animal products (4). The importance of broiler evident in its ease of digestion, and it contains calories, proteins in good proportions, vitamins, fats and carbohydrates (5). broiler waste is used as fertilizer for agricultural crops, as it is rich in organic materials that increase soil fertility and improve soil properties. broiler projects are characterized by their short capital and quick recovery period, as the production cycle does not exceed (6-8) weeks and achieves profits (24). The first signs of intensive broiler production in Iraq began in the beginning of the twentieth century, specifically in 1905. Then this industry developed with the number of productive projects for the production of broiler, which reached 5172 projects in 2018 (28), and the total production amounted to (109) thousand tons. The contribution of Qadisiyah and Babil and Wasit in a total production was estimated at (14.5%, 10.2%, 11.5%, respectively), while the number of projects during the current year reached (198, 217 and 109 projects, respectively). Despite the availability of the necessary capabilities and resources for poultry breeding projects, there is a shortage of production and lack of self-sufficiency in this product, which may be due to many reasons that overshadowed the reluctance of the projects set for the advancement of this sector, and the most important of these reasons may be the nature of the policies set By the state in the low level of support for broiler production projects and not creating a safe investment environment for breeders in imparting a qualitative leap in broiler production and achieving the necessary economic efficiency and optimal utilization of resources.(23)

The importance of research lies in the optimal use of inputs and drawing the correct productive path for the owners of broiler waste is used as fertilizer for agricultural crops, as it is rich in organic materials that increase soil fertility and improve soil properties breeding projects in the future to reach self-sufficiency and the possibility of exporting the surplus. Local, Arab and international studies focused on studying the costs of broiler waste is used as fertilizer for agricultural crops, as it is rich in organic materials that increase soil fertility and improve soil properties projects (1, 2, 3, 6, 8, 12, 14, 16, 17, 19, 20, 21, 25 ,26 ,27 .30,31). Therefore, the current research aimed to calculate the optimal level, maximum profit level, optimum capacity and supply function for broiler production projects by estimating the long-run cost function for the 2019 in the governorates of Qadisiyah, Babil and Wasit. The research is based on the assumption that the owners of broiler projects of the research sample have the ability and efficiency in using the available resources (chicks, fodder, medicines, vaccines, rented work) and that the reason for not achieving self-sufficiency is due to the nature of the policies set by the state in the low level of support for production projects Meat.

MATERIALS AND METHODS

Cross-sectional data were obtained through a random sample of broiler projects in the governorates of Qadisiyah, Babil, and Wasit, for the 2019, according to a questionnaire prepared for this purposes. A random sample of (80) projects was collected from the total broiler projects in those governorates, which amounted to 524, i.e. 15% of the total projects. For quantitative analysis, Ordinary Least Squares (OLS) method was used to estimate cost function parameters using Eviews.10 software.

First: Total costs

Table (1) shows the relative importance of each of fixed cost items, and variable costs to total costs. Variable costs represented 89.55% while only 10.45% of the total cost is attributed to fixed costs. Thus, variable costs are far more important that fixed costs, and any attempt to minimize the costs should aim to minimize one or all items of the variable costs. The high rate of variable costs encouraged breeders to invest their money in the production of broiler, for the possibility of recovering the invested capital, and there is a good possibility to control the total cost through variable costs, through the process of replacement or the variable production elements.

Table 1. Relative importance of fixed and variable costs from total costs of meat Chicken meat sample study.

Total costs items	Value (Million dinars)	% Relative importance
Variable cost	3304.825	89.55
Fixed cost	385.655	10.46
Total cost	3690.480	%100

Source: calculated based on the questionnaire form

Second: Total variable costs

As for the variable cost items (Table 2), the relative importance of feed costs came first accounting for 76.27% of the total variable costs. This indicates the high price of feed for broiler production. That is partially because breeders depend on the imported feed from the private sector (in dollars) as a result of halted local feed projects, and absence governmental support. Chicks costs came next with 16.862% of the relative importance of the variable costs, which emphasizes the high interest of the breeders of the research sample in importing chicks of high quality, disease resistance and productivity. The relative importance of each of the items of medicines, vaccines, leased work, electricity, water, fuel, bed, maintenance expenses, and transportation, was 3.215%, 1.670%, 0.921%, 0.321%, 0.215%, 0.436%, and 0.09% of the total variable costs, respectively.

Table 2. The relative importance of the variable costs of the total costs for the research sample

Costs	the amount of costs (Million dinars)	the relative importance%
Feed	2520.590	76.270
Chicks	557.260	16.862
Medicines and vaccines	106.250	3.215
Leased work	55.191	1.670
Electricity and water	30.437	0.921
Fuel	10.608	0.321
Bed	7.105	0.215
Maintenance expenses	14.409	0.436
Transportation	2.794	0.09
Total	3304.825	%100

Source: Prepared by the researchers, based on the questionnaire

Third: Total fixed costs

As regard for the fixed costs items, the interest costs on capital came first by 48.16%. It was relatively high due to low financial capacity of most breeders who resort to get loans (which involve interests), and the minimum requirement insurance to get loans. The costs of land and hall renting came next by 38.39%, and this can be attributed to the increase hall rent in the research area. The permanent work occupied the last rank with 13.45% of the total fixed cost due to the dependence of the poultry breeders on the permanent leased workers in view of the experience gained by these workers from working in poultry projects.

Table 3. The relative importance of fixed costs from the total costs per ton for the research sample fields

Costs	Amount of costs, (Million dinars)	The relative importance%
Interest on invested capital	185.731	48.16
Hall rent	148.053	38.39
permanent workers	51.870	13.45
Total	385.655	100

Source: Prepared by the researchers, based on the questionnaire

RESULTS AND DISCUSSION

Estimating the long-run cost function

According to the economic theory, the total costs are a function of total production in the short run, that is, one or more production factors are constant in this period. In the present analysis, the long-run production costs function for broiler production projects was estimated from the data of the research community, using three forms of cost functions which are (linear, quadratic and cubic). It was found that the cubic form is appropriate for the relationship adopted in the research because of its compatibility with statistical, econometrics and economic tests. The general form of the model can be written as follows (7):

$$\mathbf{Tc = b_1\, Q - b_2 Q^2 + b_3 Q^3 - b_4 LQ + b_5 L^2 + U_i \ldots (1)}$$

whereas:

TC: Total costs (thousand dinars).

Q: Total production, which represents (number of chicks - mortality) × broiler weight (kg).

.L: Field capacity

bi: b_0‘b_1‘b_2‘b_3: Parameters for the fixed model are.

Ui: The random variable reflecting the influence of other related variables that are not directly modeled and difficult to be measured and quantified.

Table 4. The estimated parameters of the short-run total cost function of broiler projects, the research sample

Variable	Coefficient	Std. Error	t- Statistic	Prob.
Q	2173.440	250.8775	8.663351	0.0000
Q^2	-29.42319	10.55859	-2.786658	0.0068
Q^3	0.246398	0.114605	2.149968	0.0349
LQ	-28.74276	9.667969	-2.972988	0.0040
L^2	44.26884	3.162995	13.99586	0.0000
R-squared	0.761365	Mean dependent var	38448.67	
Adjusted R-squared	0.748289	S.D. dependent var	19089.87	
S.E of regression	9577.534	Akaike info criterion	21.23418	
Sum of regression	6.70E+09	Schwarz criterion	21.38525	
F-statistic	-823.1332	Hannan-Quinn criter.	21.29466	
Durbin-Watson stat.	1.502328			

Source: Estimate using Eviews.10

Statistical analysis

Based on the t-test, it was found that most of the estimated parameters were significant at 1%, and the modified coefficient of determination showed that (74.8%) of the changes in total costs were caused by changes in the total output of broiler production projects and field capacity, while 25.2% of those changes are due to other factors not included in the model and the impact of which was absorbed by stochastic factor

econometrical analysis

In order for the model to be acceptable and reliable in the interpretation of the studied phenomenon, it is necessary to conduct the essential econometrics tests related to the econometrics problems. The results indicated that the model is free from the problem of autocorrelation using two tests, namely the Breush-Godfery (LM test) (table 5) and the Durbin-Watson test, as they are suitable for testing the presence first degree autocorrelation (18). The model showed the absence of the autocorrelation problem by using the (LM) test with a probability value of 0.882 for two lags period. Accordingly, we can accept the null hypothesis that the model does not suffer from the autocorrelation problem. In addition, the Durbin - Watson test showed that there was no autocorrelation problem in the estimated model as the value of (D) lies in the acceptance region of the null hypothesis, meaning that (D) is equal to (1.50). From the DW table for a level of significance (5%) and degrees of freedom (80), we find that D lies between du <D <4 - du i.e. That: 1.440 <1.50<1.541.

Table 5. Diagnostic tests

Breusch – Godfrey Correlation LM Test:			
F-statistic	6.517571	Prob. F(2,73)	0.9862
Obs *R-squared	12.12076	Prob. Chi-Square(2)	0.8823
Heteroscedasticity Test Breusch – Pagan -Godfrey			
F-statistic	3.521119	Prob. F(5,74)	0.0065
Obs *R-squared	15.37513.	Prob. Chi-Square(5)	0.0089
Scaled explained SS	31.10905	Prob. Chi-Square(5)	0.0000
Heteroscedasticity Test White			
F-statistic	22.96498	Prob. F(13,66)	0.0000
Obs *R-squared	65.51618	Prob. Chi-Square(13)	0.0000
Scaled explained SS	132.5613	Prob. Chi-Square(13)	0.0000

Source: Calculated using Eviews.1

Likewise, the product square (Q^2) and the product cube (Q^3) are functionally associated with resulting variable Qi because the relationship is not linear. Therefore, such a model satisfies the assumption that there is no multiple linear relationship between the independent variables (Multicollinearity). As the research based on cross-sectional data, it is necessary to detect the presence of heteroscedasticity. Both, Breusch- Pagan-Godfrey and White tests demonstrated the presence of heteroscedasticity at probability (<0.01) which warrants treatment. Robust Least Square was used to treat Whites Heteroscedasticity – Correct Stander Errors (11) which occur due to the presences of odd data. Estimation of this model with traditional methods, such as Ordinary Least Square, will lead to lose merits of the model parameters as Shown in Table (6):

Table 6. Short-run cost function using Robust least square

Dependent Variable: TC
Method: Robust Least Squares
Date :09/24/18 Time: 11:00
Sample: 1-80
Included observation :80 after adjustments.

Variable	Coefficient	Std. Error	t- Statistic	Prob.
Q	2136.659	82.95644	25.75640	0.0000
Q^2	-20.57835	3.251769	-6.328355	0.0000
Q^3	0.636693	0.026762	23.79096	0.0000
LQ	-60.16560	3.049473	-19.72983	0.0000
L^2	77.34339	0.166609	464.2221	0.0000
Robust Statistics				
R-squared	0.642278	Adjusted R-squared		0.623199
Scale	5823.144	Deviance		33909010
Rn-squared	606255.9	Prob. (Rn-squared stat)		0.000000
Non-robust Statistics				
Mean dependent var.	40318.85	S.D. dependent var		22018.32
S.E. of regression	380645.9	Sum squared resid		1.09E+13

Source: Estimate using Eviews.10

The results showed that all the estimated parameters of the cost function are significant at the level of (1%) according to the (Z) test. The value of the coefficient of determination reached (0.64), which means that the total production explains about (64%) of the changes that occurred in the production costs of broiler, while the other 36% of change are due to other factors not included in the model. The function has also passed all econometrics tests and the estimated function can be adopted in deriving the cost function in the short run. (Table 6).

Economic analysis

The optimum behavior of producer in the long run for broiler production projects:

First: Determining the optimal level and cost-minimizing production level

In order to calculate the optimal volume that reduces costs (economies of scale) in broiler production projects, firstly, it is necessary to find the long-run average of the total cost equation (LRATC) (15). As all production costs vary in the long run, the average cost equation was derived from the total cost equation per volume of output (Q). Thus, the short-run cost equation will be as follows:

$$TC = 2136.659Q - 20.578Q^2 + 0.637Q^3 - 60.165LQ + 77.343L^2 \dots (2)$$

Writing the estimated function in its implicit form, we get:

$$V = TC - 2136.659Q + 20.578Q^2 - 0.637Q^3 + 60.165LQ - 77.343L^2 \dots (3)$$

Taking the first derivative of the implicit function in terms of area (L) and setting it equal to zero will results in:

$$\frac{\partial V}{\partial L} = 60.165Q - 154.686L = 0$$

$$L = 0.389Q \dots\dots (4)$$

Substituting the value of (L) in equation (2), we obtain the long-run cost function in terms of production:

$$LRATC = 2136.659 - 32.279Q + 0.637Q^2 \dots\dots (5)$$

In order to research economies of scale, the long-run average total cost equation LRATC must be known, which is derived from the total cost equation divided it by Q:
To determine the optimal volume of production that minimizes costs, the first necessary condition must be applied to minimize the cost function. This involve taking the first derivative of the average total cost function in terms of product and equaling it to zero, and then solve the equation in terms of (Q), so we get:

$$\frac{\partial(LRATC)}{\partial Q} = -32.279 + 1.274Q \dots\dots (6)$$

$$Q = -32.279 + 1.274Q = 0$$

$$Q = \frac{32.279}{1.274} = 25.337 \text{ ..... Optimum level}$$

The graph of the long-run average total cost was drawn by compensating the different quantities of production. Accordingly, the function took the form of U letter because the average costs function is a function of the second degree. The optimum quantity of production was located, which is the quantity at which the lowest long-run average cost is achieved and at the same time the best possible net income (normal profit) is achieved. (Table 7).

Table 7. total average long-run cost of broiler projects for the research sample

Production (tons)	Average costs long run (Million / Tons)
5	1991.19
10	1877.57
15	1795.80
20	1745.88
25.337	1727.74
30	1741.59
35	1787.22
40	1864.70
45	1974.03
50	2115.21
55	2288.24
60	2493.12
65	2729.85
70	2998.43
75	3298.86
80	3631.14
85	3995.27
90	4391.25
95	4819.08
100	5278.76

Source: Prepared by the researchers, based on the estimated LAC function.

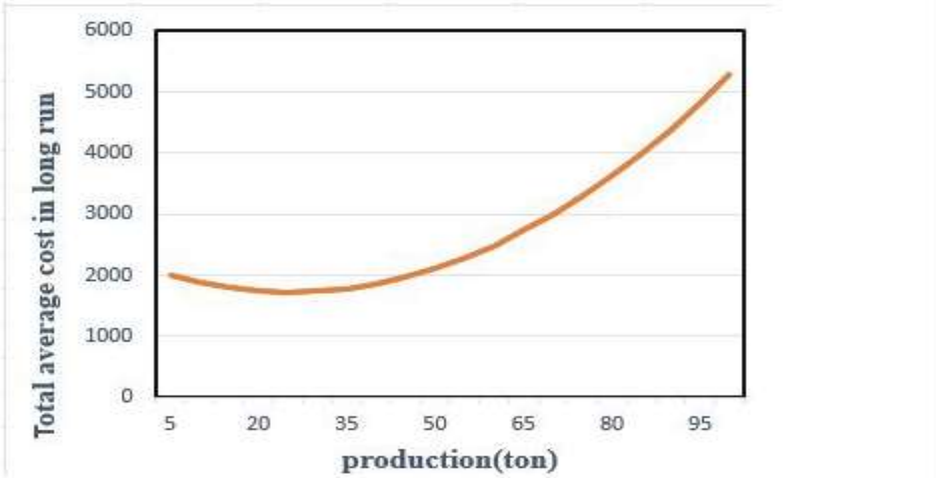

Figure 1. Long-run total average cost curve broiler projects for the research sample

Source: prepared by the researcher based on the data of Table (7)

To calculate the optimum capacity for broiler production projects, we substitute the value of Q in equation (3) as follows:

$$L = 0.389Q = 0.389(25.337) = 9.9 \text{ thousand chicks}$$

It is the optimum capacity that can be used by the breeder of broiler production projects for the optimum production level that minimizes average cost in the long term and achieves the best net income (normal profit). The average actual capacity was about (8.4) thousand birds.

Table 8. The optimum and actual capacities and production level for broiler production projects

Indicators	Actual production level (1)	The optimal cost-minimizing (2)	The Production efficiency 1/2
Capacity (thousand birds)	8.4	9.9	%84.8
Production (tons)	21.25	25.337	%83.9

Source: Prepared by the researchers, based on the questionnaire

these results with the optimal levels of capacity and production, we find that the actual production rate of the research sample was (21.25) tons which is less than the optimal production level by about (4.087) tons. It is also clear from the above table that the average actual capacity of the research sample has reached (8.4) thousand birds, while the optimum capacity was about (9.9) thousand birds, which is almost more than the average actual capacity by (1.5) thousand birds, while the efficiency of the projects in terms of production and capacity was (84.8, 83.9%). In turn, this means that in order to obtain the optimum level of production, field capacities must be expanded to take advantage of economies of scale (advantages of large production), which is the case in which average costs decrease when expanding the level of production.

Second: estimating the profit-maximizing production level for broiler projects The estimation of the profit-maximizing level of production for broiler projects was performed by equating the marginal costs with the marginal revenue, which is equal to the unit price of the product in light of the perfect competition as follows (13):

$$LMC = Py$$

$$LMC = \frac{\partial LTC}{\partial Q} = 1.911Q^2 - 64.558Q + 2136.659$$

Note that the average price per kilogram of broiler for the research sample amounted to (2,200) thousand dinars, according to the questionnaire form.

$$\mathbf{1.911Q^2 - 64.558Q + 2136.659 = 2,200 \ldots\ldots..(7)}$$

By solving equation number (7), we obtain the following quadratic equation:

$$\mathbf{1.911Q^2 - 64.558Q - 63.341 = 0}$$

The quadratic equation was then solved by according to the following constitution law:

$$Q = \frac{-b \mp \sqrt{b^2 - 4ac}}{2a}$$

$$Q = \frac{-(-64.558) \mp \sqrt{(-64.558)^2 - 4(1.911)(-63.341)}}{2(1.911)}$$

$$Q = \frac{64.558 + \sqrt{4651.914}}{3.822}, \qquad Q = \frac{64.558 - \sqrt{4651.914}}{3.822}$$

Decimal: Q=34.737 or Q=-0.954

Negative value is neglected, meaning that the most profitable production is (34.737) tons. When comparing these results with the actual and optimal levels, we find that the profit-maximizing production level for the research sample exceeds the actual production and the optimum cost-minimizing level was 13,487 and 9.4 tons, respectively.

Cost elasticity

Cost elasticity can be found by dividing the marginal costs by the average total costs of broilers in the long term of actual production level which was 21.25 ton according to the following formula:

$$EC = \frac{LRMC}{LRATC}$$

When compensating the actual production level of (21.25) tons in the above formula, the cost elasticity will be as follows:

$$EC = \frac{1.911(21.25)^2 - 64.558(21.25) + 2136.659}{0.637(21.25)^2 - 32.279 * 21.25 + 2136.659}$$

$$EC = \frac{1627.737}{1738.376} = 0.936$$

This implies that the cost elasticity reached (0.936), which is less than the correct one at the actual production rate. Thus, there is a relative increase in production that is greater than the relative increase in costs, which means that the production of these projects is subjected to the stage of increasing returns as shown in Table (9).

Table 9. Cost elasticity for the actual production, cost-minimizing and profit maximizing levels for Chicken meat projects for the research sample.

Indicators	Production level	Marginal costs	average costs	Elasticity cost
Actual production level	21.25	1627.737	1738.376	0.936

Source: Prepared by the researchers, based on the questionnaire

Supply function for broiler projects

To find out the reaction of broiler breeders to the changes in production price, the supply function must be derived by equating marginal costs with the price of the output, i.e. the supply function can be derived from the necessary condition for the profit function, as follows: (22)

$$\pi = TR - TC$$

$$\frac{\partial \pi}{\partial Q} = P - \frac{\partial LRTC}{\partial Q} = 0$$

$$P = LRMC$$

Substitution of the above marginal cost equation derived from the total cost function in the long-run estimated results in:

$$\mathbf{1.911Q^2 - 64.558Q + 2136.659 = P \ldots\ldots\ldots.(8)}$$

$$\mathbf{1.911Q^2 - 64.558Q + (2136.659 - P) = 0}$$

Solving this equation by constitution method gives the function of supply, as follows:

$$a = 1.911 \quad ، b = -64.558 \quad ، c = (2136.659 - P)$$

$$Q = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$S = \frac{-(-64.558) \pm \sqrt{(-64.558)^2 - 4(1.911)(2136.659 - P)}}{2(1.911)}$$

$$S = \frac{64.558 \pm \sqrt{7.644P - 12164.886}}{3.822} \ldots\ldots\ldots.(9)$$

This function represents the long-run supply of broiler (9), To find out the breeders' response to the different price levels according to the estimated supply function, different price levels have been assumed as shown in the table (10), from which the supply curve can be drawn for the research sample of breeders in the long term as shown in Figure (2).

Price elasticity of supply

The price elasticity of supply broiler projects, which is one of the most important indicators that can be estimated from the supply function, was calculated from the first differentiation of supplied quantity in relative to the price (7) as follows:

$$\frac{dQs}{dP} = \frac{1}{3.822}\left(\frac{d}{dP}(64.558) + \frac{d}{dP}\sqrt{(7.644\text{P} - 12164.886\ )}\right)$$

$$\frac{dQs}{dP} = \frac{1}{3.822}\left(0 + \frac{3.822}{\sqrt{(7.644\text{P} - 12164.886\ )}}\right)$$

$$\frac{dQs}{dP} = \frac{1}{\sqrt{(7.644\text{P} - 12164.886\ )}}$$

By applying the law of price elasticity, we have:

$$Es = \left(\frac{\partial Qs}{\partial P}\right)\left(\frac{P}{Qs}\right)$$

It is possible to obtain the various quantities supplied from it based on estimated supply function. When different values are given for the output prices, the supplied quantity can be obtained, which is directly proportional to the output price.

Table 10. quantities offered from broiler projects in the long run and elasticity of supply

Product price (Thousand dinars/kg)	Supplied quantity (kg)	Elasticity of supply
1,500	57.11	0.17
1,600	57.76	0.18
1,700	58.39	0.18
1,800	59.02	0.19
1,900	59.63	0.20
2,000	60.24	0.20
2,100	60.84	0.21
2,200	61.43	0.21
2,300	62.01	0.22
2,400	62.59	0.22
2,500	63.16	0.22

Source: Prepared by the researchers, based on the estimated supply function.

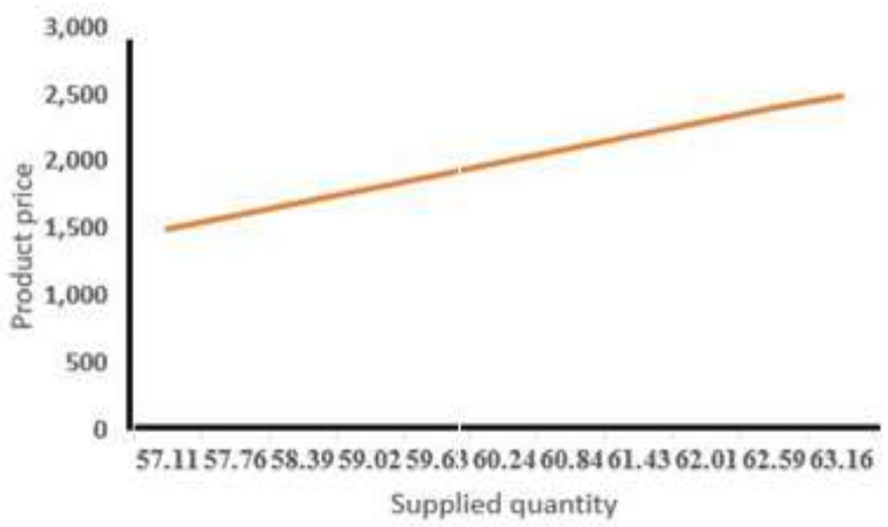

Figure 2. Curve of broiler projects

Source: From the work of the researcher using data on the table(10)

From reviewing the data in Table 10, we note the direct relationship between the quantity of production and the price of broilers for the research sample, and the low elasticity of supply, which indicates that broiler producers face a great difficulty in controlling production in the event of price changes. The rational cause of that is to the predominance of imported products over the local product, and the high risk of broiler projects due to its exposure to diseases such as bird flu as well as the state of insecurity. All these factors all restricted the ability of producers to respond to price changes. The output function represented by the supply curve of broiler projects can be illustrated in Figure (2), which is the rising portion of the long-run marginal cost function (LMC) curve, starting from the lowest point on the long-run average total cost curve (LATC). From the results of this research it can be concluded that the variable costs contributed to the largest proportion of the total costs, and therefore any attempt to reduce the costs should aim to reduce one or more elements of the variable costs. As evidenced by the long-term cost the actual levels of production capacity are less than the optimum levels, which means that to obtain the optimum volume of production, the field capacity must be expanded to take advantage of economies of scale. It has been evident from the low price elasticity of supply that the supply of productive resources is low which is attributed to the fact that the imported products are prevalent over the local product, and there is a high risk of broiler breeding, as a result of its exposure to diseases such as bird flu and instability. The research recommends the necessity of working to raise economic efficiency by providing government support for productive inputs, extending loans, preventing the import of broilers, and setting a strategic policy for the agricultural sector in general and poultry production in particular.

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