

## RESEARCH ARTICLE

# An Economic Analysis to Estimate Supply Function for Red Meat in Iraq

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### ABSTRACT

Meat is an important source of protein for human body. Research aims to study the effect of prices and costs on production and local supply of red meat in Iraq. The estimated supply function for period (1985-2019) using standard analytical method. Problem statement is lack of interest in local livestock projects due to the conditions that the country has experienced. Most of the local projects have stopped and the local supply is insufficient to meet the increasing demand for that commodity, forcing it to import from abroad and the high prices and costs of red meat. Results for estimated supply function of red meat for independents that were well represented. An increase in the price causes a direct increase in the quantity supplied, but the increase in price is greater than the increase in quantity. For costs, the relationship was inverse, that is, the higher costs, lower the amount of supply. When prices of requirements for red meat production increase, this leads to an increase costs, so producers reduce amount of supply of commodity, but in small, or they raise the prices of the product to cover additional costs. Recommends need to use modern technologies in production and continuous support and provision of production requirements in order to increase local production and reduce dependence on importing foreign meat. Also, developing legal procedures to reduce smuggling and finally pay attention to the research aspect that contributes to development of livestock.

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### Introduction

Agricultural production is one of the most important economic activities that aim to use economic resources to satisfy the community's needs for agricultural goods and services. Also it has a significant and effective role in the progress of societies and the improvement of their living conditions. It is one of the indicators of progress and economic development of countries. This is through its contribution to the production of the necessary food commodities and their continuous provision in the markets for self-sufficiency. Also, the provision of raw materials for the industrial sector, the employment of manpower and moving the wheel of economic development.

Iraq is considered a developing country, as it suffers from a growing gap between the rate of demand for food commodities and their production levels due to high population growth rates and an increase in purchasing power, which forces it to import in large quantities of various food commodities, especially meat, in order to bridge the food gap (Maher, 2017).

Livestock is one of the most important sources of supplementary food for plant products that are important for building the human body. Iraq is one of the countries that have sufficient natural resources to breed and develop the livestock industry, for example, these natural resources are fields, pastures, natural herbs and fresh water represented by the Tigris and Euphrates rivers that extend along the geographical area of Iraq from north to south, in addition to its moderate climate in terms of temperatures and humidity. Compared with other countries. And if these resources and conditions are properly and economically exploited through economic policies planned according to scientific programs that encourage the growth of production of this important commodity in the life of society and the

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population and achieve self-sufficiency from many animal products, such as meat, eggs, milk and industrial products such as wool and leather, and meet the community's need for them. Red meat is one of the commodities that have nutritional and healthy importance for human life through its components of proteins, fibers and vitamins, as it is of high nutritional value. In addition, the consumption of meat in any society reflects the degree of standard of living and the level of well-being of the individual in that society (Ali, 2005). Despite that, livestock in Iraq suffers from planning problems and wrong policies that have negatively affected the level of local production, which has led to a significant decrease due to the conditions that the country went through from wars during the eighties and the economic blockade that led to great damage in all sectors of the Iraqi economy, including the Livestock, which led to the suspension of projects due to the lack of feed materials and veterinary vaccines that the country had previously imported from other countries of the world. In addition to the events of the war in 2003, which greatly damaged livestock projects and stopped them from working (Al-Aqidi 2008).

The problem statement is the presence of neglect and lack of interest in local livestock projects due to the conditions that passed through the country during the study period, such as wars and an economic siege that led to the damage and the suspension of most of these local projects and the low level of local supply that was insufficient to meet the increasing demand for that commodity. These problems resulted in the high local prices of meat Red red tape and the inability of those with little income to buy it, as well as the high production costs that the producer cannot afford in the absence of government support. Also, the country's adoption of importing red meat products from other countries at prices lower than their local prices, consumers were forced to buy them instead of Iraqi red meat, which affected the levels of local production of red meat.

Objective of study to determine local production of red meat by studying the influence of factors on the amount of local supply represented by local prices, production costs and the time change of production, by building a standard model to show that standard relationship represented by the supply function of red meat during the study period (1985-2019).

There are many local and international studies that dealt with the subject of supplying various goods and services due to the economic importance of the subject beside the product and production of goods. Examples are those studies (Hussain, 2019) in the field of poultry meat supply, where they reached a conclusion that the effect of input prices on output prices exceeded in increasing the amount of supply, and therefore the policy of supporting input prices had a better effect on the amount of supply than supporting the final price of the output. Several other studies dealt with the subject of the presentation, such as (Al-Nayef, 1995), (Rahji, and Adewumi, 2008), (Sheikh and Kashif, 2007), (Yani. 2005), and (Mutlaq and Al-Hayali, 2010). All these studies clarified the importance of the price

factor and the abundance of irrigation water, as well as the increase in cultivated areas in affecting rice production.

### Research Methods

Importance of animal products in general and meat in particular in human life, previously, explained. After the increasing demand for them, we should work to provide them by following policies and means that increase the production and local supply of red meat and its availability in local markets. Supply is an expression of the willingness and willingness of producers to supply the market with different quantities of goods in response to the prevailing price levels in the market when the rest of the factors affecting the supply remain stable, as it shows the producer's behavior towards his commodity when prices change. In other words, the producers must have the desire and ability to supply the market with quantities of goods Certain (Mosa and Amer, 1998) When the prices of goods and services increase, producers offer additional quantities of more of their goods in order to increase their profits. Also, supply is often affected by natural factors such as the amount of rain, soil fertility, availability of natural pastures, etc. As for the factors adopted to estimate the supply function of red meat in Iraq, the independent variables that will be taken when estimating the estimated supply function are shown in the following:

$$Q_s = f(P, C, T)$$

Whan

$Q_s$  = Quantity supplied of red meat

$P$  = Domestic price

$C$  = Production costs

$T$  = time factor

As all the above independent factors are of great importance in their impact on the local supply and consequently on the local production of red meat in Iraq. The study relied on time series data that extends from (1985-2019) to the variables of the presentation function above. Table (1) shows these data that were obtained from government agencies represented in the Ministry of Planning. The reality of red meat production in Iraq, where in the past decades a production base was formed, represented by the private sector, which included the fields of breeding and fattening for cows, calves and sheep, and slaughterhouse projects, leather and wool, which led to approaching self-sufficiency, which was the dispensation of importing from those products and thus contributed to providing supportive financial returns For the country's economy in addition to exporting the surplus of national production because of its qualitative efficiency in other countries. In addition, the period of the seventies and eighties of the last century witnessed Iraq buying the best breeds of beef producing cows and raising them through cooperation between the private sector and the government in that period in order to cover the local market and then export and sell to neighboring countries. There are also a number of production plants that have reached thousands of them for milk production, forage production or for fattening calves (Sabri, 2013). While the economic blockade that continued until the end of the nineties led to the deterioration of animal production in general and meat in

particular, as factories and projects stopped production and the number of production units decreased due to poor funding and lack of feed materials and veterinary vaccinations, which led to a significant drop in local production in addition to the rise in prices, as This situation continued even after the events of the Iraq war after 2003. After that, merchants began to import red meat from different countries, where the local markets were dumped, as it was characterized by its cheap price, but it was of poor quality, but it began to be consumed by some groups of people with limited income Where in addition to the lack of import of medicines and feed, excessive slaughter and smuggling of animals led to a weak local production (Hussain, 2013).

The local production of red meat in Iraq is characterized by the fluctuation of quantities between the rise during certain years and the decrease during other years. The reason for this fluctuation in the level of production is due to the conditions that the country is going through during those years in addition to many reasons, including the conditions of the economic blockade, poor financing and the lack of availability of raw materials and other reasons mentioned earlier. In 1985, production amounted (90) thousand tons, but it declined significantly during 1988, reaching (69) thousand tons. During the wars of the eighties that the country witnessed at the end of the 1989 war, production increased and the economic situation of the country improved, so production reached (95) thousand tons. During the nineties, production continued to decline, reaching its lowest level during 1998, reaching only (50) thousand tons. The reason for this was that there was an economic blockade on Iraq, and the country was interested in producing vital crops such as wheat, rice and poultry to meet the country's need of those important commodities in daily consumption. After that, the domestic production of red meat began to increase continuously, reaching its highest level during the period in 2019 to reach (182.2) thousand tons. The reasons for this increase are due to the expansion of the scope of work and support for red meat production projects, in addition to the role of private sector production represented by small and multiple projects in regions country.

About local production costs, whether monetary or non-cash costs are affected by the quantities of production factors and their prices, and the amount of production per unit of production factors, and that each resource has many and alternative uses for which projects compete for the purpose of obtaining them, so the resources must be used efficiently for the project to continue. Costs are defined as the set of sums borne by the producer or firm in exchange for using a particular economic resource to obtain a product (Sigb, 2005), and production costs are also among the main factors that affect the local supply of the commodity. The costs are divided into two parts, fixed and variable, as is known in the economic view, and that the determination of the optimal level of production, i.e., the level of supply, depends on the variable costs. The nature of project costs is affected by the length of time so that the project can fit with the prevailing market conditions. Its production (supply control) will face the problem of flexibility in that, i.e. the

extent of freedom of the project or industry in matching between the volume of its production and the prevailing market conditions. (Hussein, 2019). Also, the data in Table (1) indicates a continuous increase in the sums of total costs spent on red meat production at the country level continuously until the end of the study period. Its lowest level was during 1985, amounting to (0.97) thousand dinars, and it reached its highest amount (2789.98) in 2006. The increase in production costs is due to the increase in the prices of production elements such as feed, veterinary medicines and vaccines, most of which are imported by the country from abroad, as well as the high prices of fuel and electricity.

About local prices of red meat shown in Table (1), it was characterized by a continuous increase, similar to the costs during the study period for economic, social and political reasons going through the country. The most important of these reasons were inflation, depreciation of the local currency and the economic blockade during the nineties as well as the low level of local production, which did not reflect The increasing costs as well as prices led to a significant increase in local production and an increase in imported red meat with relatively cheap prices, which led to a decrease in the supply of the commodity and thus an increase in the local prices of red meat so that it became unsuitable for the level of low-income owners.

**Table 1.** Annual amounts of local production, prices and costs of red meat in Iraq for the period (1985-2019)

Years	Production(Q)000	Price(p) 000	Cost (c) 000
1985	90	2.9	0.97
1986	96	3.03	0.98
1987	87	3.69	1.07
1988	69	4.1	1.42
1989	95	5	1.51
1990	87	6.3	2.22
1991	55	11.7	6.67
1992	74.3	27.4	17.60
1993	89	77.37	56.80
1994	84	337	112.88
1995	73.1	1196	390.87
1996	60	1250	478.76
1997	52	1909.3	750.54
1998	50	2550	1243.90
1999	55	2414.2	1324.68
2000	70	2252	1329.38
2001	65.5	2835	1390.39
2002	130.5	2549.2	1566.80
2003	131.9	2545.3	1743.21
2004	132	3046.7	2236.36
2005	134.1	3646.9	2698.17
2006	136.3	4365.3	2789.98
2007	138.6	5225.3	2516.83
2008	149.7	6254.7	2339.38
2009	152.3	9100	1769.52
2010	154.9	12559	1802.50
2011	157.7	13485	2263.55
2012	160.5	13931	2044.66
2013	163.3	14126	2063.20
2014	166.3	14118	2123.80
2015	169.3	14367	2077.22
2016	172.4	14500	2088.08
2017	175.6	14813	2096.37
2018	178.8	15250	2087.22
2019	182.2	13833	2090.56

**Source:** Ministry of Planning - Central Statistical Organization - Agricultural Statistics Department.

## Results and Discussion

### Estimation of Supply Function for Red Meat

In order to estimate the supply function of red meat in Iraq through the data shown above during the study period (1985-2019), local production or supply quantities were adopted as a dependent variable. While the variables represented by the variable local production prices and production costs as well as the use of the time variable are all independent factors. For the purpose of detecting the effects of these variables on the production of the local commodity. When estimating the width function, the double logarithmic model will be adopted, which is one of the best models of the red meat width function in expressing the relationship between the dependent variable and the independent variables, and is superior to other models, for example, the normal linear model, half logarithmic and inverse logarithmic. Excellence because of the results obtained in terms of transaction values, indications, morale, and morale of the model as a whole, as well as passing these first and second degree tests or not being dangerous in some of them if they appear. The preference for the logarithmic form is due to the fact that it leads us to logical values for the estimated parameters of the independent variables, and thus we can rely on it as it gives us acceptable results. As well as the logarithmic model reduces the chances of emergence of the problem of instability of homogeneity of variance and other standard problems. The previous variables will be expressed by the following symbols:

lnQs: natural logarithm of locally produced quantities of red meat that represents the amount of local supply

lnp: natural logarithm of local price of red meat

lnc: natural logarithm of amount of production costs

T: time variable

The results of analysis for supply function were according to the following tables:

**Table 2. Model Coefficients(a)**

Dependent Variable	Independent Variables	Unstandardized Coefficients		t-test for B	Sig. Std. Error
		B	Std. Error		
lnQs	(Constant)	3.911	.249	15.737	.000
	lnp	.247	.137	1.799	.083
	lnc	-.312	.126	-2.485	.019
	T	.062	.019	3.217	.003

**Table 3. Model Summary**

R	88.9%
R <sup>2</sup>	79.1%
F	34.022
Sig	0.000 <sup>a</sup>
D.W	1.038

Statistical analysis of the data in the previous table No. (1) in order to obtain the estimated model of the function of the local supply of red meat in Iraq during the study period and using the SPSS program. The best estimated models. The results were good from the economic and statistical aspects. From the economic point of view, the value of the constant indicates that the amount of supply is (3.911) when the values of the independent

variables are zero. Also, the interpretation of the signs and values of the independent variables, the sign of the estimated parameters was compatible with the economic logic, as the sign of the price parameter (lnp) was positive and amounted to (0.247), as the increase in the price by only one unit leads to an increase in supply by (0.247) a direct increase and explains This is a significant increase in the local prices of red meat in Iraq because the increase in price is greater than the increase in quantity. As for the parameter of the second variable, which is production costs (lnc), which is considered one of the most important determinants of supply after the price, the parameter signal was negative and its value is (- 0.312), i.e. If costs decreased by only one, it led to an increase in the amount of supply by a value of (- 0.312), i.e. a reverse increase, that is, the higher the amount of costs, the lower the amount of supply. The third independent variable in the model is time (T), which is considered one of the important influences on the display due to the emergence of differences in presentation methods as well as modern developments and means during the time period, especially that the study uses time series data for many years, the amount of the time parameter was (0.062), which effect was positive But at low levels, that is, with the progression of time, there is an increase in the amount (0.062), i.e. a direct increase, and this indicates a decrease in the level of technical development and modern means for developing red meat production in Iraq during the progress of the years, which affects the supply of this commodity.

Interpretation of the model from the statistical and standard point of view in Table (3) that the value of the correlation coefficient was high and direct, amounting to (88.9%), and the amount of the coefficient of determination R<sup>2</sup> reached (79.1%), where the percentage of change was good, meaning that it is (79.1%) of the change in the amount of supply. It is caused by the independent variables included in the estimated model, which are price, costs and time. The rest (20.9%) of the change is subject to other factors that were not included in the estimated model of the supply function, explained by the random error element. Also, the value of the F-test (34.022) indicates the significant quality of the estimated model as a whole. As for the values of the t-test for the estimated parameters, it indicates the significance of all the values of the estimated parameters, except for the price parameter, which was not significant at the 5% level of significance. As for the second-order tests, i.e. the standard tests, the value of Durban Watson (D.W) indicates that the model has overcome these problems and also that the estimated model depends on time series data for the independent variables and the dependent variable.

### Conclusions and Recommendations

Livestock in general and red meat in particular, were found to suffer from planning problems and wrong policies that affected the level of local meat production and made it insufficient to meet the demand for it, due to the conditions that the country went through from wars during the eighties and the economic blockade that led to great damage in the sector Livestock and poor funding in addition to the lack of

imported feed materials and veterinary vaccines. Also, the high production costs that the producer cannot bear in the absence of government support, with neglect and lack of interest in local livestock projects due to the conditions that have passed in the country and the suspension of most of these local projects and the low level of local supply of meat. All this is the reason for the high local prices of red meat and the inability of those with low incomes from buying it. Also, the country's adoption of importing red meat products from other countries at prices lower than their local prices, consumers were forced to buy them instead of local red meat, which affected the levels of local production.

Also from the results of the estimated supply function for red meat for independent factors whose percentage of representation in the model was very high, the increase in price made there is a direct increase with the quantity supplied, and that the increase in price is greater than the increase in quantity, and this explains the high local prices of red meat significantly in Iraq. The results also showed that production costs, which are one of the most important determinants of supply after price, were inversely related, that is, the higher the amount of costs, the lower the amount of supply. They raise their product prices to cover the extra costs. As for the time variable, it has made a direct increase in the level of supply of red meat, and this indicates the low level of technical development and modern means for developing the production of the commodity in Iraq during the progress of the years, which affects the supply of this commodity.

Finally, the research recommends the need to use modern means and techniques in the production of red meat by paying attention to livestock and its development requirements through continuous support, investments and provision of requirements through good and concentrated feed and veterinary vaccines, establishing and developing production stations and providing loans, especially for small producers in order to develop their production and improve the level of their livelihood. It also encourages and gives a major role to investments for the private sector in addition to the role of government projects through joint cooperation among them in order to increase local production and reduce dependence on importing foreign meat. Also, work on developing legal procedures to reduce smuggling of local meat, and the local consumer of meat should be supported and provided in local markets at prices commensurate with his income due to the importance of food. Paying attention to the research aspect through conducting practical studies and providing statistics that contribute to the development and development of livestock and meat in particular.

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