Journal Tikrit Univ. For Agri. Sci. Vol. (18) No.(4) – 2018
ISSN-1813-1646

The Mathematical and Economical Analysis of Poultry Meat Demand in Iraq for the Period (1990-2016) Using Two Stages Least Squares Method

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Key words:
standard number – demand function least squares – income elasticity.
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Received: 26/9/2017
Accepted: 8/3/2018

ABSTRACT

The normal demand function was applied on the available data. the amount allocated for individual consumption was considered as a dependent factor , the standard price , individual income , and standard price of alternative good (red meat) as independent factors . the income elasticity was found higher than (0.0002) . Least squares method with two stages was applied . the income elasticity of this good was (0.0004) , which indicated that individual consumer has reached the saturation level of consumption of this commodity predicting of . required amounts for years (2019 – 2028) was the found and a recommendation on consideration and paying attention to poultry meat industry was given and to work on modern production needs and subsidize the production elements prices to encourage producers to extend their productivity and also to in courch new producers to inter in this field of industry .

التحليل الرياضي والاقتصادي للطلب على لحوم الدواجن في العراق للمدة (1990–2016) باستخدام طريقة المربعات الصغرى ذات المرحلتين

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الخلاصة

تم في هذا البحث تطبيق دالة الطلب الاعتيادية للبيانات المتاحة واعتبر ان الكمية المخصصة للاستهلاك الفردي عامل تابع وارقم القياسي للسعر والدخل الفردي والرقم القياسي لسعر السلعة البديلة (لحوم حمراء) كعوامل مستقلة ، وبلغت المرونة الدخلية اكثر من (0.0002) كذلك تم اجراء طريقة المربعات الصغرى ذات المرحلتين وبلغت المرونة الدخلية لهذه السلعة (0.004) مشيرة الى ان الفرد يصل الى حد الاشباع من استهلاك هذه السلعة ،وتم كذلك التنبؤ بالكميات المتوقعة المطلوبة للسنوات (2019 – 2028)، وتمت التوصية في هذه البحث بضرورة الاهتمام بصناعة الدواجن في العراق من خلال توفير مستلزمات الانتاج الحديثة ودعم اسعار عناصر الانتاج لغرض تشجيع المربين على توسيع طاقتهم الانتاجية وكذلك لدخول منتجين جدد في هذه الصناعة .

الكلمات المفتاحية:
الرقم القياسي – دالة الطلب – المربعات الصغرى – المرونة الدخلية .
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القبول: 8 / 3 / 2018

Introduction:

As for as we know that the indicator of living for any country is based on how much the individuals get of proteins , which they are essential in body growing and protection . To secure these supplied of nutrition food especially animal proteins , the world countries paid attention to the increase of animal production by using modernized production method (safer ,1978) . Poultry meat industry characterized by fast achievement of profit because of short rotation of capital in which it is with (8) weeks . this industry develop med a lot globally and to high extent especially in the U.S. an twenty century (mahrous , 2000) .In Arab countries (Egypt , Saudi , Syria and Lebanon), they achieved the level of fulfillment of their needs (matrons , 2007) . while , Iraq still imports a lot from outside to meet the need of demand due to increasing of population and increasing capita income , in addition of not developing of production in Iraq . The individual share reached around 7 Kg / pens / year compared

to more than 15 Kg . globally ,(planning ministry 2008) . Due to this fact , it is important to reconsider the situation of poultry meat production in Iraq and encourage this important food industry

Research hypothesis :

The most important factor on poultry meat is the price , which inversely affected the demand , the individual in come that positively affect demand , and the alternative goods price which also inversely affect the demand . According to the economy theory , the demand income elasticity value supposed to be with a large value , indicating that the individual does not reach saturation level of consumption in Iraq .

Research problem:

This research problem is the increasing of poultry meat import in Iraq due to the insufficient local production to fulfill the animal increasing of the demand . In addition to lower allocation for individual for this reason it is important to account the income demand of Consumption , in which is of important role in the production policy , in addition to future and predicting of the required quantities to switch the local production to reach self – sufficient of consumption .

Data resources:

Table (1) explain consumptic poultry meat and standard number for price local poultry meat and individual inter and standard number for alterative goods for poultry meat in Iraq for since (1980 – 2016)

St .No.of alterative goods price	Individual increase	St . No . of local price	Consumptic	Years
191.803	100	71.91	263454	1980
562.295	74.44	69.1	256482	1981
1268.852	196.37	80.9	270531	1982
5647.54	533.79	100	234650	1983
14704.92	2697.28	125.84	231628	1984
191.803	100	71.91	263454	1985
562.295	74.44	69.1	256482	1986
1268.852	196.37	80.9	270531	1987
5647.54	533.79	100	234650	1988
14704.92	2697.28	125.84	231628	1989
191.803	100	182.58	192518.9	1990
562.295	74.44	600	11954.69	1991
1268.852	196.37	1248.88	25447.99	1992
5647.54	533.79	3716.85	42066.28	1993
14704.92	2697.28	21011.24	8580.78	1994
22786.89	10509.13	80898.88	3016.91	1995
36590.16	9996.6	102584.3	7030.32	1996
50000	22471.43	102528.1	5824.89	1997
45196.72	24587.66	108876.4	23295.04	1998
38524.59	500011.09	90000	45709	1999
44300	72402.78	82471.91	96248.09	2000
48701.64	55270.8	81292.13	103161.5	2001
55365.57	22026.47	860011.24	155292	2002
74875.41	54176.36	85674.15	58186	2003
66393.44	64215.51	124831.5	74815	2004
141492.2	87553.03	174157.3	59855.6	2005

St .No.of alterative goods price	Individual increase	St . No . of local price	Consumptic	Years
147266.6	109097.8	226966.3	55748.87	2006
89042.62	162754.8	1502247	166446	2007
143442.6	59874.14	255056.2	211382	2008
162475.4	141492.2	280898.9	211921	2009
141492.2	147266.6	263370.8	356055.7	2010
147266.6	162754.8	201292.1	399570.4	2011
77875.41	59874.14	217696.6	239665.3	2012
66393.44	141492.2	186516.9	186031	2013
141492.2	147266.6	1866517	186031	2014
141492.2	141492.2	186517.9	186031	2015
147266.6	147266.6	186517.9	186031	2016

The data were based on publications of planning palmistry for many years , and also Arab Agricultmal development for years (1980 – 2016) .

Research method :

In this research , the functional relation between required amount of poultry meat (Kg / individual / annually) . as factor (Q) , standard number of local price (P) , individual income (dinar /individual /annually) (Y) , and standard number of alternative good price (red meats) (P t) as independent factors ,as shown in table(1) (linear model , double logarithm , semi logarithm , and inverse semi logarithm were applied) . the double logarithm function was fount as the best function based on statistical tests (R^2 , F , T) and also based on their agreement to the economic Logic (Pindyck, 1985) . the double logarithm function gave the following statistical results .

LNQ = 12.75989 – 0.645413 lnp + 1.207550 lny – 0.618351 lnpt

T(9.59) (-3.97) (3.79) (-1.70)

R^2 = 0.70 R^{2-} = 0.69 F = 6.75 D.W = 1.10

Discussion and Resulted:

With viewing of the function values and offer making sure that there was no problem of multi linear regression , it was clear that there was no linear correlation between independent factors (multico linearity based on Klien. test). It is appeared that determent coefficient (R^2) is higher than simple correlation coefficient (r) between independent factors (pt) , y , p (Guajarati , 1985). The problem of linear correlation between randomized errors(auto correlation) , the (D.W) test pointed out to this phenomena based on comparison of tabular due dl . this problem appears normally in time series data . this problem is not considered when the analysis purpose is for future predicting of related variable value , because this problem will continue in future (Salvatore , 1982) . the problem of non-homogeneity a prove (hetroscedatiaty) , did not talk about because it appear in the cross-pection data (Ferguson , 1971) .From the observation of (R^2) , it is appeared that 69% of demand variables on this good due to independent factors of the function and 31% of the factors due to other variables in which they did not include in the measurement in this function , this due to the of the alternative good for consumption (fish) . from the function , the effect of the price was significantly effective as the increase of the price 1% , reduced the demand at 0.64513%. the individual income variable , showed a positive significant effect as the increase of 1% of the individual income increase the demand to 1.20755 % . the standard number variable of the alternative good (red meats) , showed a significant negative effect .The increase of the alternative price of the good by 1% decreased the demeat on the good by 0.61835 % which means the elasticity value at (0.0002) , which indicated that the consumption of this good did not reached saturation stage compared to the other advanced countries in which the elasticity value between (-8 , 0 , -4) % (FAO , 1978) .The F value pointed to the function significance as whole which reached 6.75 , this classic analysis faced opposition by some economists , as they pointed out to the Amount of (Q) depends on price (P) as it independent factor which caceses error correlation between them and insufficient for estimated values , which requires simultaneous – equation

analysis , (salvator , 1982) . the identification problem normally appeared in the analysis of these equations . this problem pointed out to the possibility or impossibility to extract structural equations , from reduced equation which exactly identified . if the numbers of external variables equal to the number of internal variables minus one . it could be over identified if the external variables bigger than internal variables mines one and the identification is under identified . if the external variables smaller than internal variables mines one , the indirect least squares method normally used at two stages at full identification and over identification .The two stages helps to find the standard error of the values , while with the indirect method , cannot find these errors . that is why the least squares method of two stages was used in which it included regression for each interval factor with are.

factors and external variables as the followed steps :

1- The standard number of the price regression was done as a independent factor with individual in come with time and standard number of alternative goods by giving numbers for each year of the time series , the equation as followed :

LPN = 0.259811 + 0.588867 lny + 1.715251 lny

T(0.39) (3.86) (3.51)

R^2 = 0.90 R^{2-} = 0.89 F = 133.11

From this equation , the expected values were calculated for P2 by compensation of Y and T values from time series .

2- The estimated values of P_2 as an independent factor in the demand function was used and got the following results:

LNQ = 18.67 – 1.74 ln p + 0.232 ln y

T(2.69) (-2.18) (2.37)

R^2 = 0.95 R^{2-} = 0.94 F = 4.2 D.W = 1.82

From the observation of statistical results of this function , and after making sure that there were no linear regression problems , the R^2 test pointed out that 94% of the demand variables related to independent variables of the function . The(F) value indicated that the to function is significant . income elasticity was (0.0004) , which means that the consumption this good did not reach saturation limit . for the future prediction of required amount of this good ,The following equation was used :as shown in table (2) and fig (1) .

$Qt = DO\ NO\ (1 + BR^n)\ (1 + X)^N$

QT = total demand of the estimation year.

DO = individual demand on the base year (10 , 38) .

NO = population of the bas year (20 millions).

B = income elasticity (0.0002) .

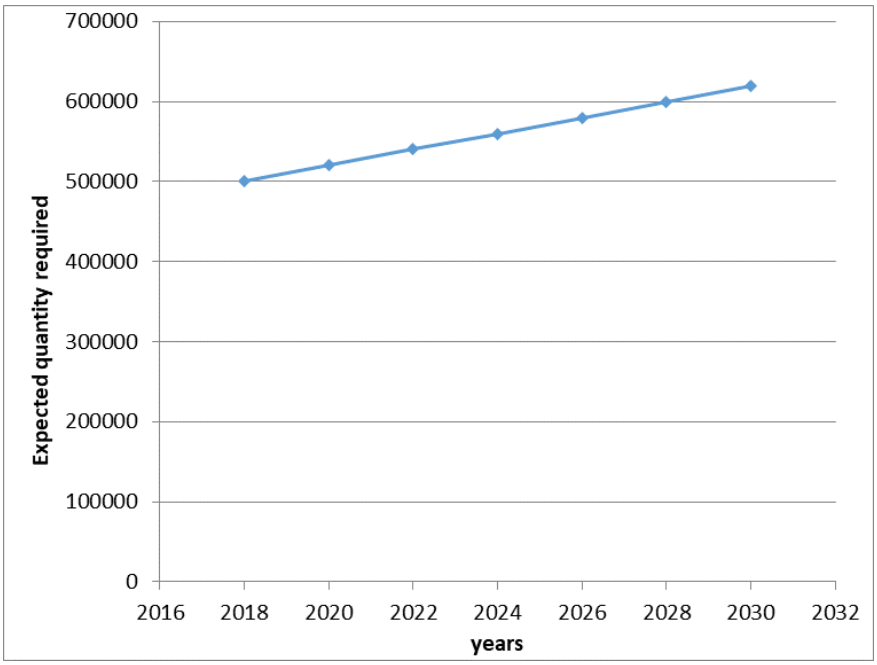
R = average of individual income grow the (0.260984) .

X = population growth rate (13.3) .

N = estimation years (37) .

Table (2): View Expected quantity for years (2019 – 2028)

Required Quantity	Years
507649	2019
520340	2020
533031	2021
545722	2022
558414	2023
571105	2024
583796	2025
596487	2026
609178	2027
621870	2028



Fig(1) view Expected quantity of the required quantity from poultry meat for since (2019 – 2028)

Conclusion :

1- The income elasticity of demand reached (0.0002) , which indicated reaching the saturation limit.

2- The price elasticity of demand reached (0.0003) , and indicated that the demand on poultry meat commedity in Iraq is elastic demand .

Recommendations :

1- supply of production facilities of chicks , forages , veterinary care and support of production facilities .

2- Extend the limit loans for husbenders.

3- explore hybrids with high efficiency of meat production that suitable for local environment.

4- allow investment for Arabic and international companies in Iraq to develop local production and train the Iraqi professionals on modern's ways of the production for this industry.

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