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THE IMPACT PRICES AND SOME FACTORS ON MAIZE PRODUCTION IN WASIT GOVERNORATE –AN ECONOMETRICS STUDY

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ABSTRACT

Classifies the maize crop from among strategic crops in Iraq, which have a great impact in contributing to farm income on the one hand, and the cultivated area from the other.As it constitutes acreage large proportion within the Governorate of Wasit**,** The problem of Research Determined by asking the following: Is that the current pricing policy of the maize crop in Iraq generally and Wasit Governorate is particularly favorable**,** The research objectives to Estimate the multiple regression model consist 3 variables like as: The prices of maize and cultivated area and the time, the result show the prices have high effected on maize production in first degree and the cultivated area come second degree.

KEYWORDS: Agricultural, Economics, Econometrics

INTRODUCTION

The word maize derives from the Spanish form of the indigenous Taíno word for the plant, maize. It is known by other names around the world. Corn outside North America, Australia, and New Zealand means any cereal crop, its meaning understood to vary geographically to refer to the local staple. In the United States, Canada, Australia and New Zealand, [citation needed] corn primarily means maize; this usage started as a shortening of "Indian corn". "Indian corn" primarily means maize (the staple grain of indigenous Americans), but can refer more specifically to multicolored "flint corn" used for decoration. In places outside North America, Australia and New Zealand, corn often refers to maize in culinary contexts. The narrower meaning is usually indicated by some additional word, as in sweet corn, corn on the cob, popcorn, corn flakes, baby corn. In Southern Africa, maize is commonly called mielie (Afrikaans) or mealie (English) [6].

Maize is preferred in formal, scientific, and international usage because it refers specifically to this one grain, unlike corn, which has a complex variety of meanings that vary by context and geographic region. Maize is used by agricultural bodies and research institutes such as the FAO and CSIRO. National agricultural and industry associations often include the word maize in their name even in English-speaking countries where the local, informal word is something other than maize; for example, the Maize Association of Australia, the Indian Maize Development Association, the Kenya Maize Consortium and Maize Breeders Network, the National Maize Association of Nigeria, the Zimbabwe Seed Maize Association. However, in commodities trading, corn consistently refers to maize and not other grains. Classifies the maize crop from among strategic crops in Iraq, which have a great impact in contributing to farm income on the one hand, and the cultivated area from the other.As it constitutes acreage large proportion within the governorate of Wassit, so for the climate

and natural conditions appropriate in production, making the governorate enjoys a comparative advantage in the crop, it is a key element in industrial uses (Oil, Food &) and enters to a great extent in the production of a animal feed, so the state is constantly increasing its production in order to increase the period of insufficient production to meet the local need and note it is evident through the prices of agricultural and by the same way for expansion in the cultivation of this crops.

Research Problem

The problem of Research Determined by asking the following:

Is that the current pricing policy of the maize crop in Iraq generally and Wasit Governorate is particularly favorable, appropriate and represent a motive for the cultivation and production of this crop?

The research objectives

The research objectives as following

- Use the Johnson transformation to correct the data.
- Estimate the regression model by use two types data one from that real data and the other data correct data by use Johnson transformation for impact the price of maize production, cultivated area and time variables on maize production marketed.
- Relationship analysis with tests the model by use all statistical and Econometrics tests.
- Analysis of economic relations and their conformity with the assumptions of economic theory and the impact of the variables on the production of maize.

THE DATA

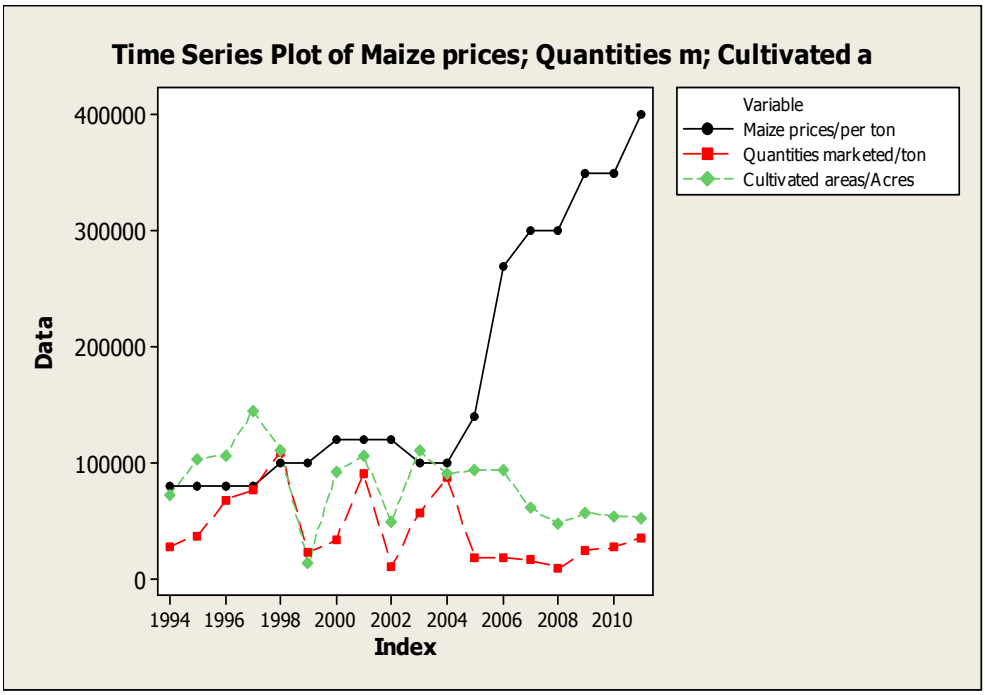
We are collect the data Records of Directorate of Agriculture in Wasit Governorate for the period 1994-2012 and organized the data in the following table:

Table 1: Show Maize Crop Data in Governorate of Wasit (Price: Iraqi Dinar)

Years	Quantities Marketed/Ton	Cultivated Areas/Acres	Maize Prices/Ton (ID)
1995	27446	72265	80000
1996	37423	103100	80000
1997	67197	106800	80000
1998	77154	144495	80000
1999	109645	111425	100000
2000	22452	13513	100000
2001	33622	92694	120000
2002	90562	106000	120000
2003	10655	48642	120000
2004	57279	110507	100000
2005	87635	90444	100000
2006	19060	93799	140000
2007	18173	93270	270000
2008	16183	60990	300000
2009	9487	47764	300000
2010	24000	56800	350000
2011	27222	53835	350000
2012	36035	53000	400000

Source: The data from Directorate of Agriculture in Wasit Governorate

These Data are Represent by Following Figure



Source: The data from Table 1 by use Minitab.14 Demo

Figure 1: Show the Curves for Quantities Marketed, Maize Prices and Cultivated Area (Quantity: Ton, Prices: ID)

From the figure the prices curve it rise to the top while the quantity of maize curve condescendingly to the bottom while the cultivated area curve increase than quantity curve, the reason for that case return to the farmer don't use any improve technology to improve his production from maize.

LITERATURE REVIEW

(Duncan Bought on and John M. Staatz, 1993)[4] publishing paper entitled" Using tke commodity subsector approach to design agricultural research: the case of maize in Mall" This paper applies a subsector perspective to analyzing the design of agricultural production and processing technologies. The framework stresses how conditions at one level of a subsector influence constraints and opportunities for technical and institutional innovations at other levels. The paper also stresses the need to combine insights from the subsector and farming systems perspectives when developing an agricultural research agenda. These points are illustrated by drawing on results from a recent maize subsector study in Mall. (Maré, F.A.; Nell, W.T.; & Willemse, B. J. 2010)[5] publishing paper entitled "Maize prices in South Africa: Can the producer increase his revenue by marketing grain through cattle" show Since the decline in the price of maize from the beginning of 2010, meat has become the new buzzword under maize producers as they are desperately looking for alternatives to increase the value of their crops. It seems as if the price of maize may stay low at levels equal to export parity prices for the next year or two due to very large yields and an increasing level of ending stocks each year. (Betchani H. Tchereni and Timothy H. Tchereni 2013)[3] publishing paper entitled "Supply Response of Maize to price and Non-price Incentives in Malawi" this paper analyzed the impact of price and non- price incentives on supply of Malawi's main food crop, maize. The study fills a farmers response gap identified in several studies on farmers responses to price at hectare allocation decision level. to achieve this, the study applies the unrestricted Nerlovean supply response model to maize. Results of the study show that farmers are responsive to crops own price and non-price incentives.

(Adetola I. Adeoti, Olufemi Popoola and Adeyinka B. Aremu, 2013) [2] publishing paper entitled "The effect of market Liberatization on Maize price Distributions in Nigeria" the paper show the market liberalization a major provision of the structural adjustment programme. it examined the nature oh maize price fluctuations. Data on monthly prices were deflated by consumer price index of food items to construct real prices series for maize. The Econometrics model, Autoregressive conditional Heteroskedastic in mean (ARCH-M) was employed to determine the effect of the policy reform on the mean and volatility of maize prices.

(A. B. Mohammed, A. F. Ayanlere, U. Ibrahim and Muhammad Lawal, 2013) [1] publishing paper was entitled "Economic analysis of maize production in Ogori/Magongo Local Government Area of Kogi stat, Nigeria" The study assessed the economics of maize production in Ogori/Magongo Local Government Area of Kogi state. To this end, effort was made to examine the socio economic characteristics of determine the resource use efficiency, problems as well as profitability of maize production in the area to achieve the objective of this study, 48 maize farmers where randomly selected from wards from the local government area, gross margin and multiple regression models, results showed that most farmers (68.75%) use hired labour personal savings (93.75%).

METHODOLOGY

We are estimate the linear regression model by using four independent variables as following:

Qm: represent the production quantity of maize estimated in money unit/ ton (Iraqi Dinar).

Cu: represent the Cultivated Areas measurement in Acres.

Ap: Agriculture prices/per ton (ID).

Y: represent the time.

We are use Linear model the formulation of it as following:

Linear model

$$Q_i = b_0 + b_1 P_q + b_2 C_u + b_3 A_p + b_4 Y_i + U_i$$

Where: (i=1,2,3…….n)

$\boldsymbol{b_0}$**:** constant (intercept).

bi: parameters represents slop.

Ui: random variable

The result of Estimate as following:

Linear

ESTIMATION AND INTERPRETATION

Regression Analysis: Quantities m versus Agriculture; Cultivated a

The regression equation is

Quantities marketed/ton = - 1742085 - 0.086 Agriculture prices/per ton

+ 0.562 Cultivated areas/Acres + 876 Years

Predictor	Coef	SE Coef	T	P
Constant	-1742085	4873585	-0.36	0.726
Agriculture prices/per ton	-0.0855	0.1178	-0.73	0.480
Cultivated areas/Acres	0.5615	0.2144	2.62	0.020
Years	876	2441	0.36	0.725

S = 24433.4 R-Sq = 48.3% R-Sq(adj) = 37.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	3	7813204893	2604401631	4.36	0.023
Residual Error	14	8357861049	596990075		
Total	**17**	**16171065942**			

Source	DF	Seq SS
Agriculture prices/per ton	1	3661014938
Cultivated areas/Acres	1	76821046
Years	1	76821046

Unusual Observations

Agriculture Prices/per	Quantities					
Obs	Ton	Marketed/Ton	Fit	SE Fit	Residual	St Resid
5	100000	109645	62553	8711	47092	2.06R
R denotes an observation with a large standardized residual.						

Durbin-Watson statistic = 2.10662

JOHNSON TRANSFORMATION FOR DATA

We note the result in both equations it bad result because the relationship not legal like the price of quantity variable have the negative singe and also the Agriculture prices/per ton have similar singe and these singes reflects the theories assumption must be positive singes, we don't confirm this result and we believed The bad result it's from data and we must correct the data by use the Johnson transformation as following:

- **Log** Agriculture prices/per ton

The real data and the correct data by use the Johnson transformation are organized in following table

Table 2: Shows the Real and Correct Data of the Log Agriculture Prices/per Ton Variable by Use the Johnson Transformation

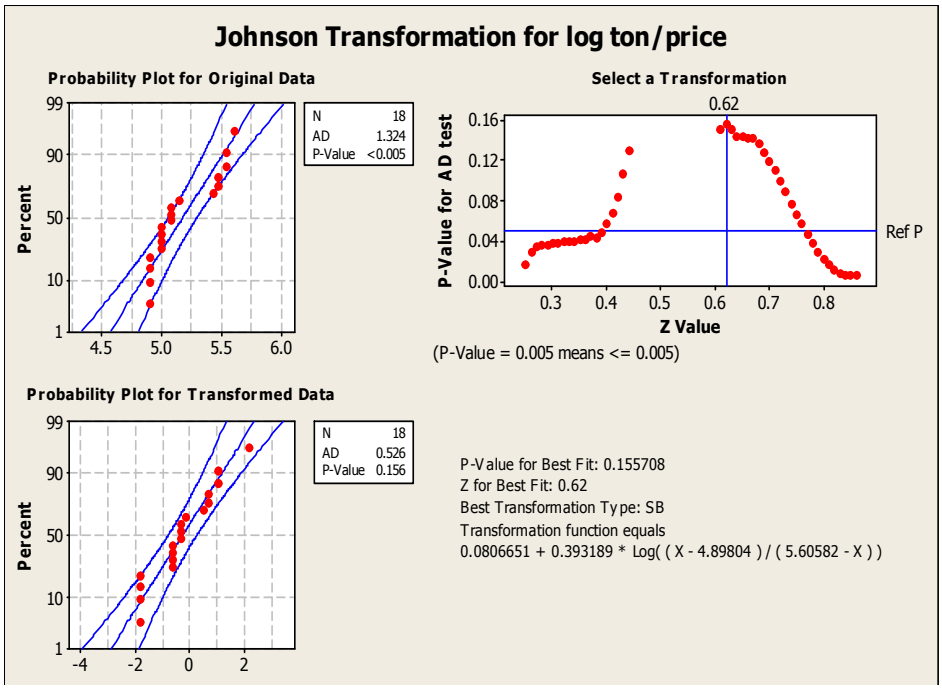
Real Data	Correct Data by Use the Johnson Transformation
80000	-1.86000
80000	-1.86000
80000	-1.86000
80000	-1.86000
100000	-0.62000
100000	-0.62000
120000	-0.33896

Table 2: Contd.,

120000	-0.33896
120000	-0.33896
100000	-0.62000
100000	-0.62000
140000	-0.16184
270000	0.52004
300000	0.67202
300000	0.67202
350000	1.00378
350000	1.00378
400000	2.13822

Source: The Correct Data by use Minitab Program

We are note the correct data are different from the real data because we are use one from three function the Johnson use it in transformations and the figure of it as following:



Source: The Figure from Result by use Minitab Program

Figure 2: Show the Johnson Transformation for Log Ton/ Price

From the Figure, the result from Johnson transformation

P-Value (Significant Level) for Best Fit: 0.155708

Z for Best Fit: 0.62

Best Transformation Type: Bounded distribution function SB

The Function Equal: 0.0806651+0.393189*log ((X-4.89804)/(5.60582-X))

N: 18

AD (Anderson-Darling Test): 0.526

- **Log Cultivated Area Variable**

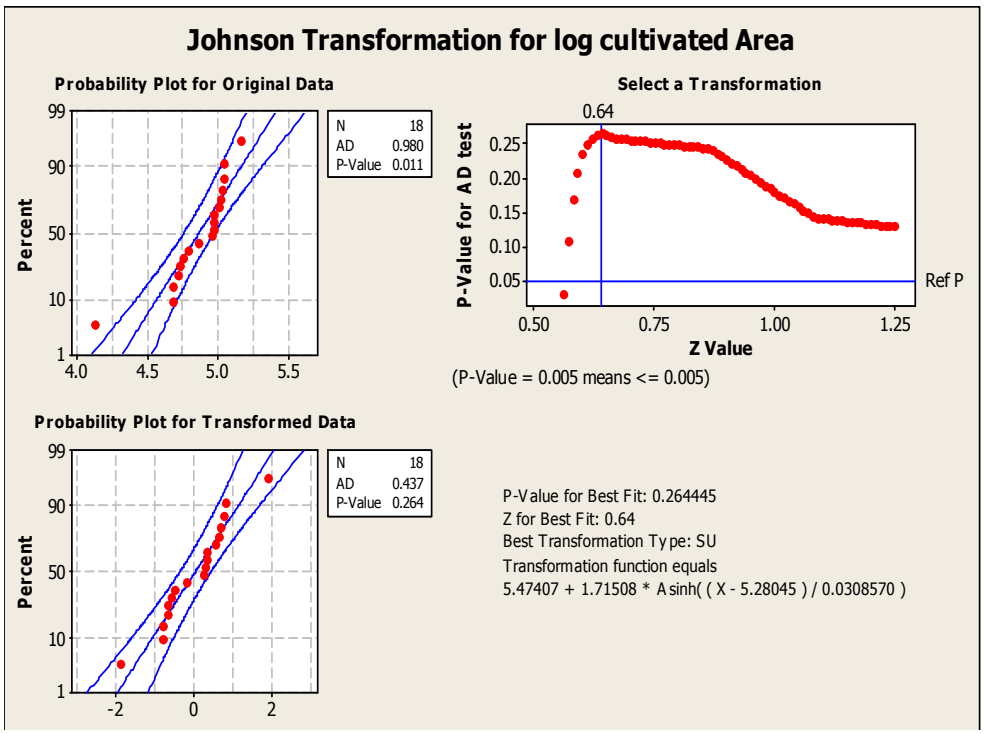
The real data and the correct data by use the Johnson transformation are organized in following table:

Table 3: Shows the Real and Correct Data of the Log Cultivated Area Variable by Use the Johnson Transformation

Real Data	Correct Data by Use the Johnson Transformation
27446	-0.20112
37423	0.57739
67197	0.67790
77154	1.92000
109645	0.80704
22452	-1.92000
33622	0.30537
90562	0.65597
10655	-0.78664
57279	0.78107
87635	0.24821
19060	0.33363
18173	0.32009
16183	-0.47674
9487	-0.80932
24000	-0.58039
27222	-0.65454
36035	-0.67557

Source: The Correct Data by use Minitab Program

We are note the correct data are different than the real data and the result of it in the figure following



Source: The Figure from Result by use Minitab Program

Figure 3: Show the Johnson Transformation for Log Cultivated Area Variable

The Result as following

P- Value (Significant Level) for Best Fit: 0.264445

Z for Best Fit: 0.64

Best Transformation Type: Bounded distribution function SU

The Function Equal: 5.47407+1.71508*Asinh ((X-5.28045)/(0.0308570))

N: 18

AD (Anderson-Darling Test): 0.437

The log Quantities/ton variable it still without change by use Johnson transformation and after these transformation.

ESTIMATION AND RESULTS

We will be estimate the regression model for it again by use the same program as following

Regression Analysis: Log Q/Ton versus Jo. Log Ton/p; Jo. Log Cult; Years

The regression equation is

log Q/ton = 153 + 0.323 Jo.Log ton/price + 0.262 Jo. log Cultivated areas

- 0.0739 Years

17 cases used, 1 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	152.53	67.33	2.27	0.041
Jo.Log ton/price	0.3227	0.1657	1.95	0.073
Jo. log Cultivated areas	0.26180	0.07132	3.67	0.003
Years	**-0.07385**	**0.03359**	**-2.20**	**0.047**

S = 0.213092 R-Sq = 62.3% R-Sq(adj) = 53.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	3	0.97507	0.32502	7.16	0.004
Total	**16**	**1.56538**			

Source	DF	Seq S
Jo.Log ton/price	1	0.27619
Jo. log Cultivated areas	1	0.47937
Years	**1**	**0.21952**

Durbin-Watson statistic = 2.21074

We are organized the result by use Johnson transformation and the result by real data in the following table

Table 4: Show the Regression Model Estimate for Both Data Types

Models Parameters and Coefficients	The Estimate Model by Use Real Data	The Estimate Model by Use Johnson Transformation
Constant t	-1742085 $(-0.36)^{non}$	152.53 $(2.27)^{5\%}$
Log ton/price t	-0.0855 $(-0.73)^{non}$	0.3227 $(1.95)^{5\%}$
log Cultivated areas t	0.5615 $(2.62)^{1\%}$	o.26180 $(3.67)^{1\%}$
Years t	-876 $(-0.36)^{non}$	-0.07385 $(-2.20)^{5\%}$
R^2	48.3%	62.3%
$\bar{R}^2$	37.2%	53.6%
r	69.5%	79%
F(4,18)	$(4.36)^{5\%}$	$(7.16)^{1\%}$
D.W	$(2.10662)^{5\%\ in}$	$(2.2107)^{5\%\ in}$

Source: By use the Real and Transformation Data and Minitab.14 Demo
t- table (1%) = 2.624, t-table (5%) = 1.761
F- table (1%) = 4.58, F-table (5%) = 2.93
D.W= (dl=0.933 du=1.696 4-du = 2.404)

We note both estimated in above table 4 the best estimate are in Johnson transformation data, Will this estimate prove the significant all parameters of constant, Log ton/price variable and Years variable at 5% except the parameter of log Cultivated areas variable it is at 1% by use t-test and the model also significant at 1% by use F-test, and we are test all Econometrics problem like Multicollinearity, Autocorrelation and Hetroscedasticity problems as following

- **Multicollinearity Problem**

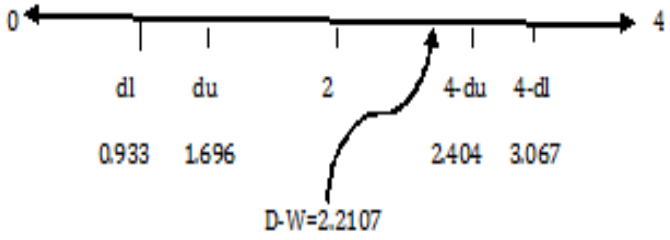
We Comparison between the partial correlation coefficients and total correlation coefficient by use Klein test as following

	Years	Jo.Log Ton/p
Jo.Log ton/p	0.645 0.000	
Jo. log Cult	-0.431 0.074	-0.522 0.000
And the total correlation coefficient = 79%		

The Total correlation coefficient greater than all coefficients in Matrix and we say for this cause: the model empty from multicollinearity problem.

- **Autocorrelation Problem**

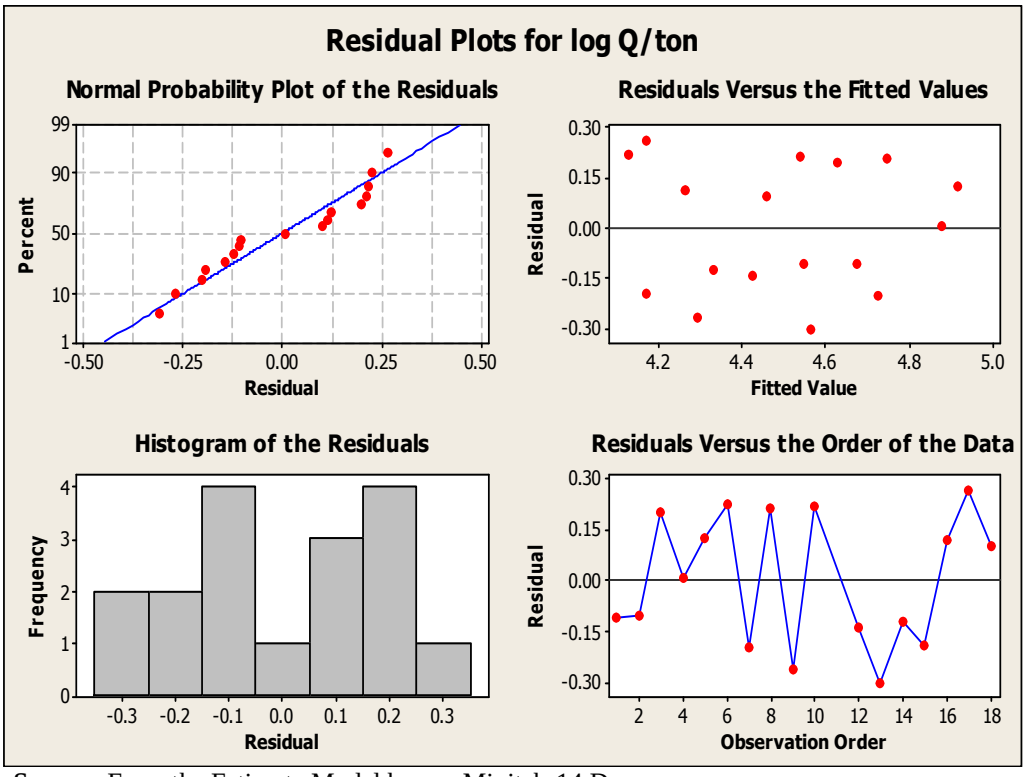
We are test this problem by use D-W test as following



Than we are say also no problem in estimate of model because of the occurrence of the value of D-W at except area.

- **Heroscedasticity Problem**

We can note that the figure follows: the first at the top right, which is the form of the spread of residuals as shows that there is a homogeneous distribution of residuals, and shape the bottom of it proves that there is no problem of autocorrelation, The other two forms on the left shows that the random variable is compatible with the assumption of random variable.



Source: From the Estimate Model by use Minitab-14 Demo

Figure 4: Show the Residuals for the Estimate Model

CONCLUSIONS

From the estimate model the relationship between the maize quantity and price of ton and cultivated area variables are positive relation, This corresponds with the assumptions of economic theory while the time variable is negative and this is contrary to the same hypothesis, the researchers believe that the reason for negative time due to the events that have passed from the wars and crises in Iraq.

If we want increase the price of ton and cultivated area variables by one unite this increase reflex on the quantity of maize will be increase about 32% and 27% respectively, than we can increase the output every time by increase these variables. The parameter price show it more powerful than other variables and so must follow the pricing policy claim to increase production because the price increase leads to increased use of technological methods and not increasing the cultivated areas, which is due to the increased productivity of the crop and then the total production in the governorate of Waist.

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