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IASET

USE THE REDUCE FORM EQUATION TO ESTIMATE THE IMPACT OF RICE PRICES ON INDIAN MARKET FOR PERIOD 1990-2015 (AN ECONOMETRICS STUDY)

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ABSTRACT

In such models the emphasis was on estimating and/or predicting the average value of Y conditional upon the fixed values of the X variables. But in many situations, such a one-way or unidirectional cause-and-effect relationship is not meaningful. This occurs if Y is determined by the X's, and some of the X's are, in turn, determined by Y. From that caused will be occurs problem in the estimation by use the OLS and the result not good to present the relationships between them, and we can't depend upon it and we are estimation the model by use another method, will in short we are use the simultaneous equations which makes the distinction between dependent and explanatory variables of dubious value. It is better to lump together a set of variables that can be determined simultaneously by the remaining set of variables-precisely what is done in simultaneous-equation models. In such models there is more than one equation-one for each of the mutually, or jointly, dependent or endogenous variables And unlike the single-equation models, in the simultaneous-equation models one may not estimate the parameters of a single equation without taking into account information provided by other equations in the system.

KEYWORDS: Econometrics, Simultaneous Equations, Market System

1. INTRODUCTION

Every time the prices effected on many commodities in any market especially free market and it controlled of the supply and demand in it. We were concerned exclusively with single equation models, i.e., models in which there was a single dependent variable Y and one or more explanatory variables, the X's. In such models the emphasis was on estimating and/or predicting the average value of Y conditional upon the fixed values of the X variables. But in many situations, such a one-way or unidirectional cause-and-effect relationship is not meaningful. This occurs if Y is determined by the X's, and some of the X's are, in turn, determined by Y. From that caused will be occurs problem in the estimation by use the OLS and the result not good to present the relationships between them, and we cannot depend upon it and we are estimation the model by use another method, will in short we are use the simultaneous equations which makes the distinction between dependent and explanatory variables of dubious value. It is better to lump together a set of variables that can be determined simultaneously by the remaining set of variables—precisely what is done in simultaneous-equation models. In such models there is more than one equation—one for each of the mutually, or jointly, dependent or endogenous variables And unlike the single-equation models, in the simultaneous-equation models one may not estimate the parameters of a single equation without taking into account information provided by other equations in the system.

What happened in estimation the OLS to this system?, we can describe as following:

- The result from estimation for parameters not good.

- Fielded all statistical tests like t and F for it.
- Big value for parameters variance.
- Reject one from assumptions of random variable (COV$(X_i U_j) \neq 0$)
- Finally field the OLS to estimation this system.

In the field of published simultaneous-equation models and Reduce form many researchers published many papers, (Guido W. Imbens, Whitney K. Newey, 2002)[1] publish paper entitled "Identification and Estimation of Triangular Simultaneous Equations Models Without Additivity" This paper investigates identification and inference in a nonparametric structural model with instrumental variables and non-additive errors The first step consists of estimating the conditional distribution of the endogenous repressors given the instrument. (Ehizuelen Michael MO, 2016)[2] publish paper entitled" The Dynamics of Infrastructure and Economic Growth in Nigeria" He donate to use the Reduce form equations to estimate the dynamics of infrastructure.

2. THETHEORY

The market model can't solve by use the ordinary least squares method because the estimation have many econometrics problem like Mulitycolleniearty, Heteroscedasticity and Autocorrelation these problems result from reject the one of characters of that method is based character, this character is very important for the best fit of model and we are dependent of the result from it, if available in that estimation and we can prof that as following:

From the market model following:

$$Q_d = \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1$$

$$Q_s = b_0 + b_1 P_x + b_2 W + u_2$$

$$Q_d = Q_s$$

Where:

Q_d: Demand Quantity.

Q_s: Supply Quantity.

P_x: X price(X: commodity).

Y: Individual income.

W: The water.

$\alpha_0, \alpha_1, \alpha_{2,} b_0, b_1, b_2$: Parameters.

u_1, u_2: Random variables.

$$\square Q_d = Q_s$$

$$\therefore \ \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1 = b_0 + b_1 P_x + b_2 W + u_2$$

$$\alpha_1 P_x = b_0 + b_1 P_x + b_2 W + u_1 - (\alpha_0 + \alpha_2 Y + u_2)$$

$$\alpha_1 P_x = b_0 + b_1 P_x + b_2 W + u_1 - \alpha_0 - \alpha_2 Y - u_2$$

$$\alpha_1 P_x - b_1 P_x = b_0 + b_2 W + u_1 - \alpha_0 - \alpha_2 Y - u_2$$

$$P_x(\alpha_1 - b_1) = b_0 - \alpha_0 + b_2 W - \alpha_2 Y + u_1 - u_2$$

$$\therefore P_x = \frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}$$

$$\square\ var - cov\ of\ (bs) = [P_x - E(P_x)]$$

$$\square\ var - cov\ of\ (bs) = \left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}\right] - E\left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}\right]$$

$$= \left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}\right] - \left[\left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + E[\frac{u_1-u_2}{(\alpha_1-b_1)}]\right]\right]$$

$$\square E(u_i) = 0$$

$$\therefore var - cov\ of\ (bs) = [P_x - E(P_x)]\ Z = \left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}\right] - \left[\left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y\right]\right] = \left[\frac{b_0-\alpha_0}{(\alpha_1-b_1)} + \frac{b_2}{(\alpha_1-b_1)} W + \frac{-\alpha_2}{(\alpha_1-b_1)} Y + \frac{u_1-u_2}{(\alpha_1-b_1)}\right] - \frac{b_0-\alpha_0}{(\alpha_1-b_1)} - \frac{b_2}{(\alpha_1-b_1)} W - \frac{-\alpha_2}{(\alpha_1-b_1)} Y = [\frac{u_1-u_2}{(\alpha_1-b_1)}] < or > 0$$

That’s mean reject the one from the Random variable assumptions as following:

$$COV(P_x U_i) \neq 0$$

∴ That’s mean the model have problem (Heteroscedasticity problem) and result from estimation it's not good and we are don’t dependent that result,We are solve and estimate that’s model by use another method, and the best methods we can use simultaneous model and the best from them Reduce Form model to get the best fit from estimation.

3. THEMODEL

To get the Reduce form model we are get the structural equations from market model and solve it by use the regression model to get the estimation of parameters $\alpha_0, \alpha_1, \alpha_{2,} b_0, b_1, b_2$ to the demand and supply equations and we are use the Reduce form to get the new parameters estimate and we are dependent of it to explain the relationships between them.

- **Structural Equations**

  The Price and quantity equilibrium

- The equilibrium of quantity

$$Q_d = \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1$$

$$Q_s = b_0 + b_1 P_x + b_2 W + u_2$$

$$Q_s = Q_d$$

From supply equation:

$$Q_s = b_0 + b_1 P_x + b_2 W + u_2$$

$$b_1 P_x = Q_s - b_0 - b_2 W - u_2$$

$$\therefore\ P_x = \frac{Q_s - b_0 - b_2 W - u_2}{b_1}$$

We are change the P_x from supply equation in demand equation as following:

$$Q_d = \alpha_0 + \alpha_1 \frac{Q_s - b_0 - b_2 W - u_2}{b_1} + \alpha_2 Y + u_1$$

$$Q_d = \frac{\alpha_0 + \alpha_1 (Q_s - b_0 - b_2 W - u_2) + \alpha_2 Y + u_1}{b_1}$$

$$Q_d b_1 = \alpha_0 + \alpha_1 (Q_s - b_0 - b_2 W - u_2) + \alpha_2 Y + u_1$$

$$Q_d b_1 = \alpha_0 + \alpha_1 Q_s - \alpha_1 b_0 - \alpha_1 b_2 W - \alpha_1 u_2 + \alpha_2 Y + u_1$$

$$Q_d b_1 - \alpha_1 Q_s = \alpha_0 + \alpha_1 Q_s - \alpha_1 b_0 - \alpha_1 b_2 W - \alpha_1 u_2 + \alpha_2 Y + u_1$$

□ $Q_s = Q_d$

And rearranged above equation as following:

$$Q(b_1 - \alpha_1) = \alpha_0 - \alpha_1 b_0 + \alpha_2 Y - \alpha_1 b_2 W + u_1 - \alpha_1 u_2$$

The equilibrium of quantity equation:

$$\therefore \bar{Q} = \frac{\alpha_0 - \alpha_1 b_0}{(b_1 - \alpha_1)} + \frac{\alpha_2}{(b_1 - \alpha_1)} Y + \frac{-\alpha_1 b_2}{(b_1 - \alpha_1)} W + \frac{u_1 - \alpha_1 u_2}{(b_1 - \alpha_1)}$$

- The equilibrium of price

□ $Q_s = Q_d$

We are replacing the equivalent in the equations of supply and demand as following:

$$\therefore b_0 + b_1 P_x + b_2 W + u_2 = \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1$$

$$b_1 P_x = \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1 - (b_0 + b_2 W + u_2)$$

$$b_1 P_x = \alpha_0 + \alpha_1 P_x + \alpha_2 Y + u_1 - b_0 - b_2 W - u_2$$

$$b_1 P_x - \alpha_1 P_x = \alpha_0 + \alpha_2 Y + u_1 - b_0 - b_2 W - u_2$$

And rearranged above equation as following:

$$P_x(b_1 - \alpha_1) = \alpha_0 - b_0 + \alpha_2 Y - b_2 W + u_1 - u_2$$

The equilibrium of price:

$$\therefore \overline{P_x} = \frac{\alpha_0 - b_0}{(b_1 - \alpha_1)} + \frac{\alpha_2}{(b_1 - \alpha_1)} Y + \frac{-b_2}{(b_1 - \alpha_1)} W + \frac{u_1 - u_2}{(b_1 - \alpha_1)}$$

B. the Reduce form:

From the equilibrium of price and quantity equations:

$$\overline{P_x} = \frac{\alpha_0 - b_0}{(b_1 - \alpha_1)} + \frac{\alpha_2}{(b_1 - \alpha_1)} Y + \frac{-b_2}{(b_1 - \alpha_1)} W + \frac{u_1 - u_2}{(b_1 - \alpha_1)}$$

$$\bar{Q} = \frac{\alpha_0 - \alpha_1 b_0}{(b_1 - \alpha_1)} + \frac{\alpha_2}{(b_1 - \alpha_1)} Y + \frac{-\alpha_1 b_2}{(b_1 - \alpha_1)} W + \frac{u_1 - \alpha_1 u_2}{(b_1 - \alpha_1)}$$

We are derivative the Reduce form as following:

$$\pi_0 = \frac{\alpha_0 - b_0}{(b_1 - \alpha_1)}, \pi_1 = \frac{\alpha_2}{(b_1 - \alpha_1)}, \pi_2 = \frac{-b_2}{(b_1 - \alpha_1)}, V_1 = \frac{u_1 - u_2}{(b_1 - \alpha_1)}$$

$$\pi_3 = \frac{\alpha_0 - \alpha_1 b_0}{(b_1 - \alpha_1)}, \pi_4 = \frac{\alpha_2}{(b_1 - \alpha_1)}, \pi_5 = \frac{-\alpha_1 b_2}{(b_1 - \alpha_1)}, V_2 = \frac{u_1 - \alpha_1 u_2}{(b_1 - \alpha_1)}$$

$$\overline{P_x} = \pi_0 + \pi_1 Y + \pi_2 W + V_1$$

$$\bar{Q} = \pi_3 + \pi_4 Y + \pi_5 W + V_2$$

We estimate The Reduce form parameters by use the multiple Regression models for supply and demand equations.

$$\alpha_0^* = [\pi_0 * (b_1 - \alpha_1)] + b_0$$

$$\alpha_1^* = [\pi_5 * (b_1 - \alpha_1)] - b_2$$

$$\alpha_2^* = \pi_1 * (b_1 - \alpha_1)$$

$$b_0^* = [\pi_0 * (b_1 - \alpha_1)] - \alpha_0$$

$$b_1^* = \left[\pi_1 * \frac{1}{\alpha_2}\right] + \alpha_1$$

$$b_2^* = [\pi_2 * (b_1 - \alpha_1)] * -1$$

$$U_1^* = [V_1 * (b_1 - \alpha_1)] + u_2$$

$$U_2^* = [V_2 * (b_1 - \alpha_1)] - u_{1*}[\frac{1}{-\alpha_1}]$$

$$\therefore \overline{P_x} = \alpha_0^* + \alpha_1^* Y + \alpha_2^* W + U_1^*$$

$$\bar{Q} = b_0^* + b_1^* Y + b_2^* W + U_2^*$$

4. THE DATA

The researchers collect data from many resources such as, world bank, Fao and Indian agricultural ministry for Rice crop such as, Production(supply) consumption (Demand) and the Income per capita and the prices of Rice, and we are recognize the data as the following tables :

Table 1: The Production, Consumption, Prices, Rice Arable Land and Income Per Capita for Rice Crop in India Country for Period 1990-2015(Q: 1000Mt, Area: 1000Ha, Icome: Us$)

Years	Total Supply 1000Mt	G.R for Total Supply*	Total Demand 1000Mt	G.R for Total Demand*	Prices-US $ for Ton	G.R for Prices*	Rice Arable Land (000H)	G.R for Rice Arable Land*	Income Per Capita	G.R for Income Per Capita*
1990	88291	*	73091	*	159.32	*	163459	*	473.18	*
1991	89195	1.03	74595	2.06	160.41	0.68	163459	0	466.37	-1.44
1992	86923	-2.55	75273	0.91	152.87	-4.7	163182	-0.17	485.23	4.44
1993	91300	5.06	76050	1.03	141.38	-7.52	162706	-0.29	505.22	4.12

Table 1: Contd.,

1994	96310	5.49	77660	2.12	140.56	-0.58	162586	-0.07	536.73	6.24
1995	91480	-5.02	76280	-1.78	150.8	7.29	162525	-0.04	559.88	4.31
1996	93230	1.91	81630	7.01	154.49	2.45	161911	-0.38	587.01	4.85
1997	92052	-1.26	77552	-5	119.41	-22.71	161025	-0.55	611.14	4.11
1998	96584	4.92	81234	4.75	119.73	0.27	161601	0.36	646.22	5.74
1999	101766	5.37	82650	1.74	144.56	20.74	161409	-0.12	684.41	5.88
2000	102696	0.91	75960	-8.094	132.62	-8.26	160975	-0.27	687.48	0.45
2001	118391	15.28	87611	15.34	124.55	-6.09	160930	-0.03	706.37	2.75
2002	96300	-18.66	79860	-8.85	124.12	-0.35	160325	-0.38	713.41	1
2003	99530	3.35	85630	7.23	134.21	8.13	160432	0.07	762.91	6.94
2004	93930	-5.63	80861	-5.57	207.7	54.76	159799	-0.4	803.42	5.37
2005	100296	6.78	85088	5.23	203.69	-1.93	159681	-0.07	863.86	7.47
2006	103870	3.56	86700	1.9	259.01	27.12	159444	-0.15	923.45	6.9
5007	108120	4.09	90466	4.34	345.4	33.35	158662	-0.49	988.21	7.02
2008	112180	3.76	91090	0.69	385.71	11.67	158022	-0.4	1000.37	1.23
2009	108090	-3.65	85508	-6.13	289	-25.07	157995	0.44	1098.41	9.8
2010	116480	7.76	90206	5.49	268	-7.27	157924	0	1176.61	7.12
2011	128810	10.59	93334	3.467	409	52.61	157009	-0.17	1246.81	5.97
2012	130340	1.19	94031	0.75	391	-4.4	156979	-0.29	1294.45	3.82
2013	132086	1.34	98710	4.98	402	2.81	156546	-0.07	1352.05	4.45
2014	128237	-2.91	98233	-0.48	377	-6.22	157000	-0.04	1430.46	5.8
2015	122066	-4.81	94266	-4.04	337	-10.61	157657	-0.38	1450.51	1.4

Source: World Rice Statistics

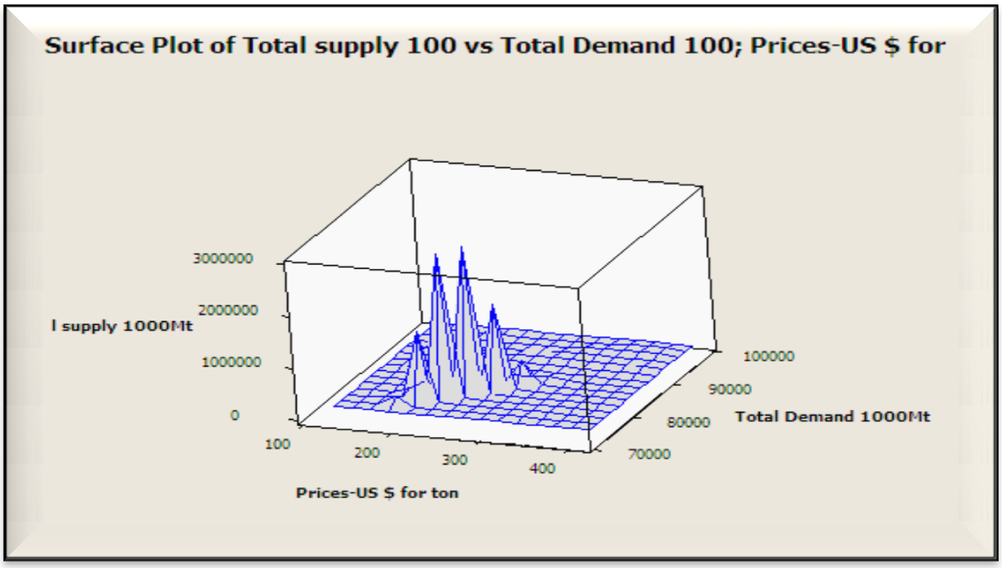
http://ricestat.irri.org:8080/wrs

http://www.worldbank.org.databank /data/

http://irri.org

- We are calculated the growth Rate value According to the following equation : $[(\frac{t_2}{t_1} - 1) * 100], t = year$

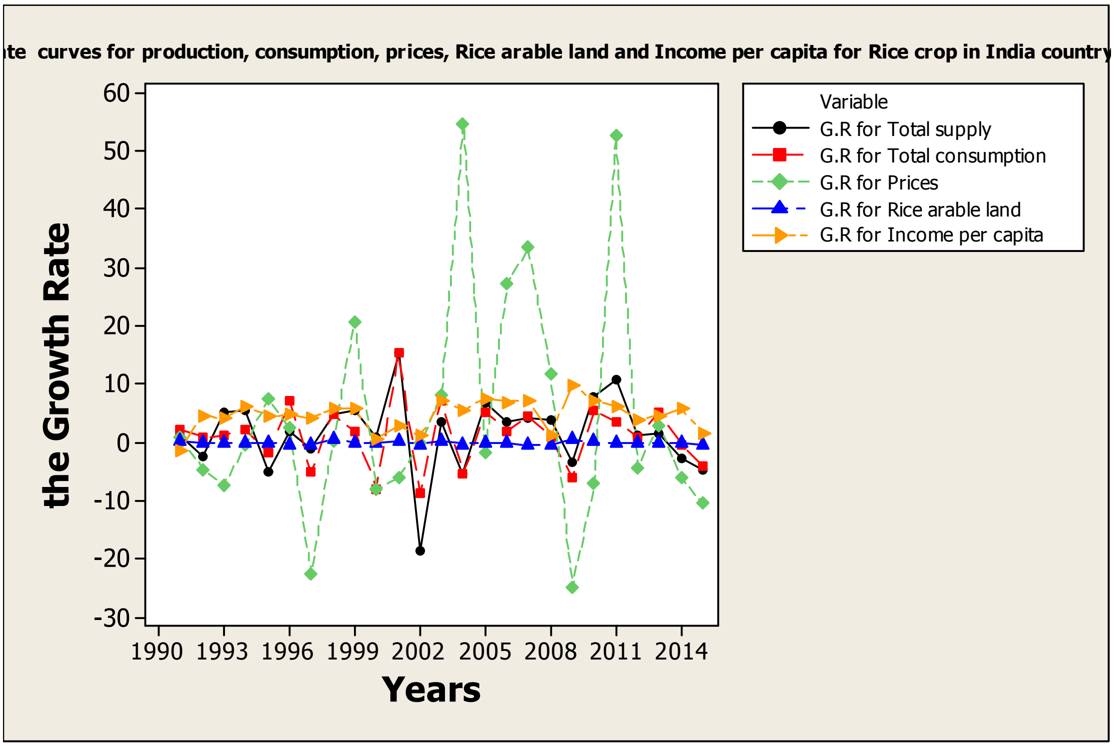
We are note that's table 1 the supply and demand and all variable changed all time for the period and we can understand very clearly by present in following figure for the growth rate only because give us good concepts for it :\



Source: From the date in table 1 and use the Minitab, 16 programs.

Figure 1: The Growth Rate Curves for Production, Consumption, Prices, Rice Arable Land and Income Per Capita for Rice Crop in India Country for Period 1990-2015

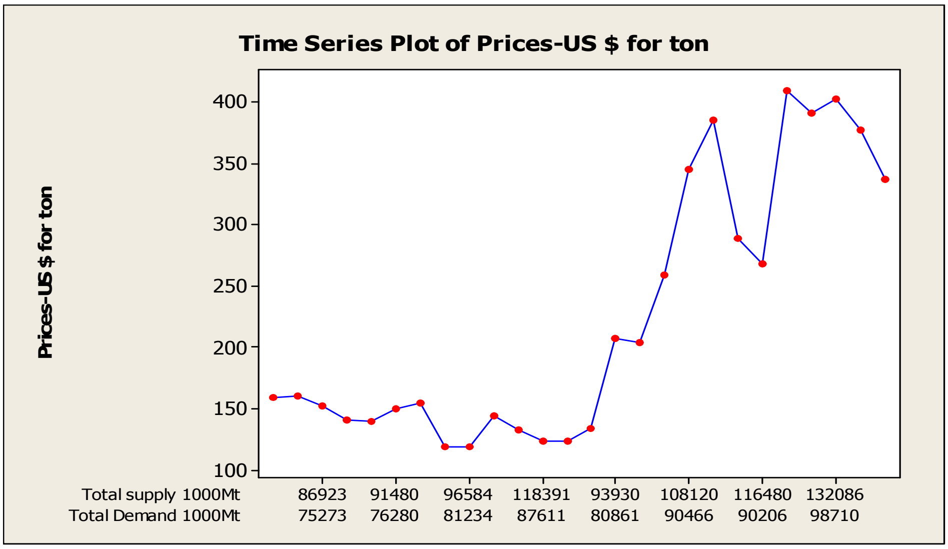
From the above figure 1 we are note the impact prices on both supply and demand values.



Source: From the date in table 1 and use the Minitab, 16 program.

Figure 2: The Growth Rates for All Variables in Both Supply and Demand Equation

We are note the prices growth rate curve its fluctuating the values for the period 1990-2015 affecting the supply and demand quantities, while the other variables are fluctuating very few except the supply curve its response to the prices mor than the demand curve and we are drawing a curve price in single figure as following :



Source: From the date in table 1 and use the Minitab, 16 Program

Figure 3: The Price Growth Rate Curve

5. THE ANALYSIS

Now we are estimation the regression models to supply and Demand equations by use the Minitab programming.16 and recognize the estimation in the following table:

Table 2: The Supply and Demand Estimation by Use the OLS

The Equations / Variables and tests	Demand Equation	Supply Equation
Constant t	65447 $(40.69)^{1\%}$	831010 $(4.06)^{1\%}$
Price t	8.04 $(0.70)^{25\%}$	26.80 $(1.02)^{15\%}$
Income t	20.180 $(5.28)^{1\%}$	
Rice arable t		-4.572 $(-3.67)^{1\%}$
R^2	88%	80%
$\bar{R}^2$	87%	78%
r	94%	89%
$F_{(3,26)}$	$(83.86)^{1\%}$	$(45.34)^{1\%}$
D.W	$(2.57853)^{1\%} in$	$(1.24176)^{1\%}\ in$

Source: From the date in table 1 and use the Minitab, 16 programs.

Table 3: The Statistical and Econometrics Test

$t_{0.01}$	2.508
$t_{0.05}$	1.717
$t_{0.10}$	1.321
$t_{0.15}$	1.022
$t_{0.25}$	0.685
$F(4,26)_{0.01}$	4.31
$D.W_{0.01}$	dl = 0.928 du = 1.411

Source: Damodar N. Gujarati-Basic Econometrics- fourth edition-The McGraw−Hill Companies, 2004pp:972-973

We are recognizing the equations as structural equations and we get the equilibrium of quantity and prices from it as following:

Total Demand 1000Mt = 65447 + 8.0 Prices-US $ for ton + 20.2 Income per capita

Total supply 1000Mt = 831010 + 26.8 Prices-US $ for to

- 4.57 Rice arable land (000H)

- **The Equilibrium of Quantity**

26.8 Prices =Total supply – 831010+4.57 Rice arable

$$\therefore Prices = \frac{Total\ supply - 831010 + 4.57\ Rice\ arable}{26.8}$$

Total Demand =65447+8.0$\frac{Total\ supply - 831010+4.57\ Rice\ arable}{26.8}$+20.2 Income

$$Total\ Demand = \frac{65447 + 8.0 Total\ supply - 8.0(\ 831010) + 8.0(4.57) Rice\ arable + 20.2\ Income}{26.8}$$

$$26.8Qd = 65447 + 8.0Qs - 8.0(\ 831010) + 8.0(4.57)R\ a + 20.2\ In$$

$$26.8Qd - 8.0Qs = 65447 - 8.0(831010) + 8.0(4.57)\,R\,a + 20.2\,In$$

$$\cdot\; Q(26.8 - 8.0) = 65447 - 8.0(831010) + 8.0(4.57)\,R\,a + 20.2\,In$$

$$\therefore \bar{Q} = \frac{65447-8.0(831010)}{(26.8-8.0)} + \frac{8.0(4.57)}{(26.8-8.0)} R\,a + \frac{20.2}{(26.8-8.0)} In + V_1$$

Above equation is the equilibrium of quantity.

- **The Equilibrium of PRICES**

$$Qs = Qd$$

∴ 831010 + 26.8Pr - 4.57 Ra=65447 + 8.0 Pr + 20.2In

26.8Pr=65447 + 8.0 Pr + 20.2In-(831010 - 4.57 Ra)

26.8Pr=65447 + 8.0 Pr + 20.2In - 831010 + 4.57 Ra

∴ 26.8Pr − 8.0 Pr =65447 – 831010 +20.2In + 4.57 Ra

$$\therefore \mathrm{Pr}(26.8 - 8.0) = 65447 - 831010 + 20.2\mathrm{In} + 4.57\,\mathrm{Ra}$$

$$\therefore \overline{\mathrm{Pr}} = \frac{65447 - 831010}{(26.8-8.0)} + \frac{4.57}{(26.8-8.0)}\mathrm{Ra} + \frac{20.2}{(26.8-8.0)}\mathrm{In} + \mathrm{V}_2$$

Above equation is the equilibrium of Prices.

Now we are estimating the Reduce Form for the structural equations as following:

The Prices

$$\widehat{\pi}_0 = \frac{65447 - 831010}{(26.8-8.0)}, \widehat{\pi}_1 = \frac{4.57}{(26.8-8.0)}, \widehat{\pi}_2 = \frac{20.2}{(26.8-8.0)}$$

$$\therefore \overline{\mathrm{Pr}} = \widehat{\pi}_0 + \widehat{\pi}_1\mathrm{Ra} + \widehat{\pi}_2\mathrm{In}$$

$$\therefore \widehat{\mathrm{P}}_r = -40721.44 + 0.243\mathrm{Ra} + 1.08\ \mathrm{In}$$

- **The Quantity**

$$\hat{\pi}_3 = \frac{65447-8.0(831010)}{(26.8-8.0)}, \hat{\pi}_4 = \frac{8.0(4.57)}{(26.8-8.0)}, \hat{\pi}_5 = \frac{20.2}{(26.8-8.0)}$$

$$\therefore \bar{Q} = \hat{\pi}_3 + \hat{\pi}_4 Ra + \hat{\pi}_5 In$$

$$\therefore \bar{Q} = -350140.06 + 1.95Ra + 1.08\ In$$

The Estimation of the Reduce Form equation as following:

$$\hat{P}_r = -40721.44 + 0.243Ra + 1.08\ In$$

$$\bar{Q} = -350140.06 + 1.95Ra + 1.08\ In$$

Will we are determined the new estimate parameters as following:

$$\tilde{\hat{\alpha}}_0 = -40721.44, \tilde{\hat{\alpha}}_1 = 0.243, \tilde{\hat{\alpha}}_2 = 1.08$$

$\widetilde{b}_0 = -350140.06, \widetilde{b}_1 = 1.95, \widetilde{b}_2 = 1.08$

6. THE CONCLUSIONS

From the results we are get the new parameters for Market system after cleaning the model from the two problems like Identification and bise and these parameters are different then the first result to supply and demand equations it was have big value for the parameters and this technique improve the estimation because the OLS don’t give us the good fit for the market system.

7. REFERENCES

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