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AN ECONOMETRIC ANALYSIS OF CONSUMPTION EXPENDITURE IN DESERTS GOVERNORATES IN EGYPT

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ABSTRACT

A Linear Approximated Almost Ideal Demand System (LA/AIDS),used to estimate the demand relationship for major food groups (cereals, beans ,meats ,fish, egg, milk, oil and sugar) in desert governorates in Egypt from 1990 – 2010. Own-price, cross-price and expenditure elasticities were estimated . The results of the analysis of food expenditure elasticities of demand for different food groups showed that expenditure elasticities for all food groups were positive and less than one except for meats and milk groups which imply that it is a luxury good rather than other necessary good in the system. The results showed that the Marshallian own-price elasticities was the highest for meat group ,then sugar group, followed by oil, cereals , beans respectively then fish and milk ,and finally egg group . On the other hand, the cross-price elasticities of oil showed a complementary relationship with the other food groups. There is a high substitutive relationship between beans and meats group, and between meats and fish groups. Compensated own-price elasticity estimates show similar trends but smaller values than uncompensated ones, which is theoretically consistent.

INTRODUCTION

Consumption expenditure and its distribution found an international echo in the issue of an international World Bank in 2005 in his report on the world development, considering that consumer expenditure per capita reflects the state of well-being in developing countries, while income reflects the state of well-being in developed countries.

Consumption is considered an essential component in the national income on one hand and a component of final demand on the other hand . The study of the consumption pattern of the members of the community is considered important task of governments, whether communist or capitalist in making decisions on export and import prices and inventory ,.... ..... etc

The economic studies of the relationship between consumer spending for different commodities varied according many variables like income (Engel curve) - the commodity s quality (luxury - essential - normal) and region of residence (rural – urban regions,developing-developed countries, and lower-middle- upper –frontier governorates)

In reviewing studies of consumption expenditure in Egypt ,it is found that most studies analyzed the demand system for food groups by using data in all Egyptian regions(34 regions) at one survey year as observations to estimate the whole demand in Egypt (e.g. El-Eraky,1991,Dawoud,2005,Fayyad,*et al.,* 1995),without any differentiation between regions but Fabiosa *et al.* (2008)estimated the demand system for all governorates separating observations into urban and rural .Also there are some studies estimated the demand system for one commodity (e.g. El-Seify,

*et al.,*2010) or some similar commodities(Albghdady, *et al.,* 2010) using time series data.

This study tried to benefit from the previous studies to focus only on desert (frontier) governorates by using Linear Approximated Almost Ideal Demand System (LA/AIDS) methodology to estimate the demand for major food groups .

Data

This study is mainly based on cross section data of the Egyptian Household Income, Expenditure, and Consumption Survey(HIECS), which was conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS) in years 1990/1991,1995/1996,1999/2000,2004/2005,2009/2010 for Frontier governorates (they defined as regions located on the eastern and western boundaries of Egypt and they include Red Sea, New Valley, Matrouh, North Sinai, and South Sinai),note that the study dropped South Sinai because of lack data , and the study used desert governorates and frontier governorates synonymously. The study concentrates on eight food commodity groups, which include: cereals, beans, meats, fish, eggs, milk products, oils & fats, and sugar products . It is also based on annual data of the consumer price commodities issued by CAPMAS.

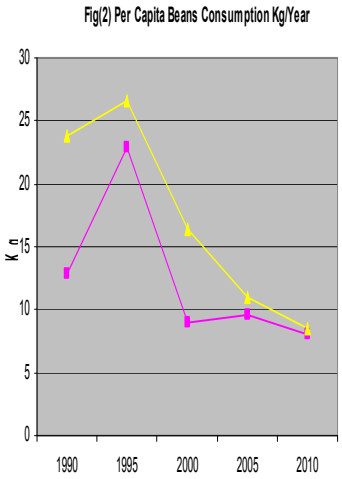
Food Consumption and Expenditure Patterns in Frontier Governorates

Cereals Group:

Fig(1) shows that the annual per capita consumption of cereals increased from 203.04 kg in 1990 to 325 kg in 1995for urban and from 283 kg to 317.9 kg for rural, with an increase around 60%,12% for urban and rural respectively. There was a noticeable decrease between years 2005 and 2010 from 241.5 to131.2 kg/capita/year for urban and from 162.7 to 72.7 kg/capita/year for rural, with a decrease around 45.7%,55.3%for urban and rural respectively. Table (1,2)show that the expenditure shares for cereals in urban and rural during the period (1990-2010)was 25%, 23% respectively .And North Sinai was the highest expenditure share with 29%,28% for both urban and rural respectively.

Beans Group:

Fig.(2) shows that the annual per capita consumption of beans increased from 12.8 kg in 1990 to 23 kg in 1995for urban and from 23.8 kg to 26.6 kg for rural, with an increase around 79.7%,11.8% for urban and rural respectively. There was a noticeable decrease between years 2005 and 2010 from 9.6 kg to 7.9kg/capita/year for urban and from 11 to 8.5 kg/capita/year for rural, with a decrease around 18%,23%for urban and rural respectively. Table (1,2)show that the expenditure shares for beans in urban and rural during the period (1990-2010)was 5%, 6% respectively .And North Sinai and Matrouh were the lowest expenditure share with 4% for urban, and Red Sea and North Sinai were the lowest expenditure share with 6% for rural.



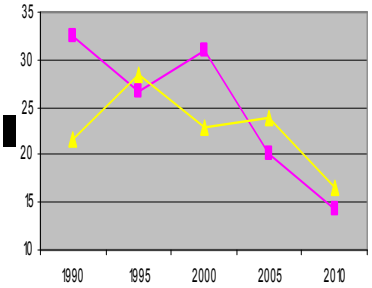
Meats Group:

Fig (3) shows that the Consumption of meats in urban frontier governorates decreased with some fluctuations from 32.3 kg/capita/year in 1990 to26.6 kg/capita/year in 1995,with a decrease rate amounted about 18%,and from 31.1 kg in 2005 to20.2 kg in 2010 ,with a decrease rate amounted about 35%.Inversely,the consumption of meats in rural frontier governorates increased with some fluctuations from 21.7kg/capita/year in 1990 to 28.4 kg/capita/year in 1995,with an increase rate amounted about 31%,and from22.9 kg/capita/year in 2000 to 23.9 kg/capita/year in 2005 ,with an increase rate amounted about 4%,finally decreased in 2010 to 16.5 kg/capita/year. Table (1,2)show that the expenditure shares for meats group was the highest between all groups, it was 32%, 37% for urban and rural respectively .And New Valley was the highest expenditure share for urban with 34%,while Matrouh was the highest expenditure share for rural with 42.3%.

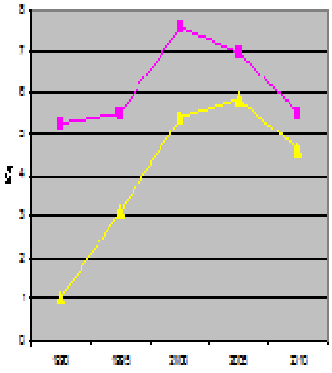
Fish group:

Fig(4)shows that the consumption per capita of fish increased from 5.3 kg in 1990 to 5.5kg in 1995 for urban and from 1.04kg to 3.1 kg for rural, with an increase around 3.8%,198%for urban and rural respectively. Inversely, there was a noticeable decrease in years 2000, 2005 and2010 from 7.6 kg to7 kg to5.5 kg ,with a decrease amounted about 8%,21% respectively. Also, there was a decrease between years 2005, 2010 for rural frontier governorates from 5.8 kg to4.6 kg, with a decrease rate amounted about 20.7%. Table (1,2)show that the expenditure shares for fish group was 8%, 7% for urban and rural respectively .And Red Sea was the highest expenditure share with 13% for urban, while North Sinai was the highest expenditure share with10% rural .

Fig (3)Per Capita Meats Consumption Kg/Year



Fig(4)Per Capita Fish Consumption Kg/Year



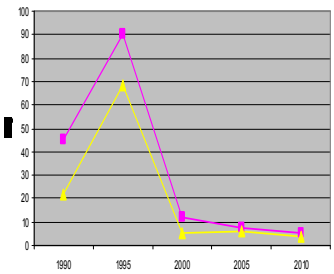
Egg group:

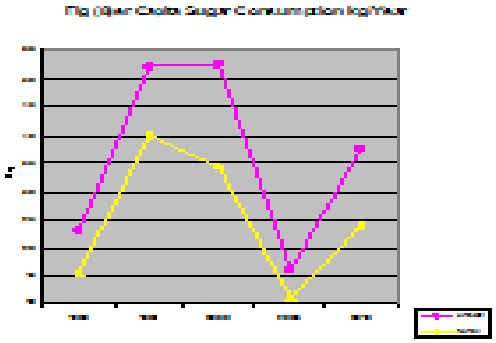
Fig(5) shows that the per consumption of egg increased between 1990 ,1995 from 3.8 to 9 kg for urban and from 1.6 to 8.7 kg for rural. Inversely, the consumption of egg decreased between years2005,2010 from 4.3 to 2.7 kg,4.7 to 3.2 kg for urban and rural frontier governorates respectively. Table (1,2)show that the expenditure shares for egg group was the lowest between all groups, it was 4% for both urban and rural .And New Valley was the highest expenditure share with 5% for both urban and rural .

Milk group:

Fig(6)shows that the per capita milk consumption increased between 1990 to 1995 from 44.8kg to90.1 kg for urban and from 22.1 kg to 68.2 kg for rural, this mean it increased above 100% for urban and 200% for rural. Inversely it decreased sharply in 2000 ,2005 and 2010 reached about 4.9kg,4 kg for rural and urban respectively. Table (1,2)show that the expenditure shares for milk group was 11%, 9% for urban and rural respectively .And Matrouh was the highest expenditure share with 13% for urban and Red Sea was the highest expenditure for rural with 12% .

Fig(6) PerCapita Milk Consumption Kg/Year





Oil group:

Fig(7) shows that the per capita oil consumption increased between 1990 to 1995 from 33.5 kg to 44.2 kg for urban and from 26.4 to 36.7 kg for rural . There was a considerable decrease between years 2000and 2005 from 49 kg to11 kg for urban and from 32.8 to 10.7 for rural, with a decrease rate amounted about 77.6%,67.4%for urban and rural respectively. Also, there was a decrease between years 2005, 2010 for both rural and urban from 11 to 8.7kg, and from 10.7 kg to 8.6 kg respectively, with a decrease rate amounted about 21%,20% for urban and rural respectively.Table(1,2)show that the expenditure shares for oils group was 8% for both urban and rural .And Matrouh was the highest expenditure share with 9% for urban but the lowest for rural with 7% .

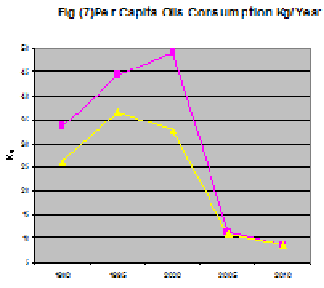
Table (1): Average Annual per Capita Expenditure on Different Food Groups in Urban Frontier Governorates in (1990-2010)

Food	Red Sea		New Valley		Matrouh		North Sinai		Average	
group	Value	%	Value	%	Value	%	Value	%	Value	%
Cereals	159.236	20	211.23	27	229.57	25	188.42	29	197.11	25
Beans	45.88	6	43.15	6	34.48	4	26.63	4	37.53	5
Meats	229.22	29	270.19	34	304.39	33	195.46	30	249.82	32
Fish	105.65	13	34.89	4	58.15	6	64.52	10	65.8	8
Egg	28.09	4	36.99	5	22.56	2	25.57	4	28.30	4
Milk	93.91	12	71.89	9	120.4	13	67.68	10	88.47	11
Oils	69.67	8	65.74	8	78.11	9	49.31	7	65.71	8
Sugar	63.26	8	57.46	7	72.28	8	40.2	6	58.3	7
Total	794.92	100	791.54	100	919.94	100	657.79	100	791.04	100

Source :HIECS

Sugar group:

Fig(8) shows that the per capita sugar consumption increased between 1990 to 1995 from 23.1 kg to 52.3 kg for urban and from 15.8 to 40.1 kg for rural . There was a considerable decrease between years 2000and 2005 from 52.8 kg to16 kg for urban and from 34.4to 11.1 for rural, with a decrease around 70%,68%for urban and rural respectively. Inversely, there was a considerable increase between years 2005, 2010 for both rural and urban from 16 to37.7kg, and from 11.1kg to 24 kg respectively, with a rate amounted about 135.6%,116.2% for urban and rural respectively. Table (1,2)show that the expenditure shares for sugar group was 7%, 6% for urban and rural respectively .And Red Sea and Matrouh was the highest expenditure share with 8%for urban ,while Red Sea was the highest with 7% for rural .



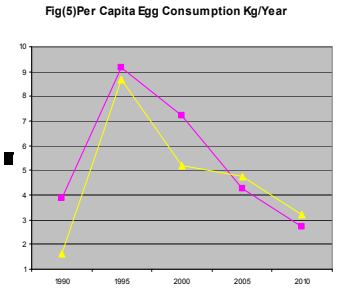


Table (2): Average Annual per Capita Expenditure on Different Food Groups in Rural Frontier Governorates in (1990-2010)

Food group	Red Sea		New Valley		Matrouh		North Sinai		Average	
	Value	%	Value	%	Value	%	Value	%	Value	%
Cereals	168.36	24	143.09	20	171.67	21.2	143.46	28	156.65	23
Beans	43.41	6	47.88	7	49.95	6.2	30.63	6	42.97	6
Meats	211.97	30	289.74	41	343.188	42.3	164.372	33	252.32	37
Fish	58.59	8	18.29	3	55.23	7	51.91	10	46	7
Egg	29.79	4	38.26	5	22.12	3	16.02	3	26.55	4
Milk	86.2	12	63.06	9	66.17	8.2	24.98	5	60.1	9
Oils	61.18	9	61.35	9	59.35	7	44.28	9	56.54	8
Sugar	46.19	7	39.39	6	43.12	5.1	29.86	6	39.64	6
Total	705.69	100	701.06	100	810.798	100	505.512	100	680.77	100

Source: HIECS

Methodology

The econometric studies of demand include both single equations and systems of demand equations. There are many advantages of the use of complete demand systems
in empirical estimation are the following reasons (Dawoud ,2005) according to Raunikar and Huang, 1987):

- Empirical estimation of a complete demand system usually generates expenditure elasticities and own- and cross-price elasticities (compensated and uncompensated).
- The substitutive or complementary relationships between goods can be described because of simultaneously taking into account existing interdependencies between demand for specific goods.
- Some system specifications also provide welfare indicators, e.g. the marginal propensity to consume and the subsistence levels of consumption or expenditure for specific goods.
- In addition, the complete demand system provides information for testing hypotheses about restrictions derived from demand theory.

The Almost Ideal Demand System (AIDS) model of Deaton and Muellbauer (1980b). Starting from a specific cost function, the AIDS model gives the share equations in an *n*-good system as

$$w_{ir} = a_i + \sum_{j=1}^{n} \gamma_{ij} \ln P_{jr} + \beta_i \ln(X / P)r + u_i$$

Where :

• w_i the budget (expenditure) share of the i^{th} good;
,I=1,2,……8
,r=1,2,……40(where there are 4 desert governorates and each one has two observations in urban and rural in five years surveys)

• p_j is the nominal price of the j^{th} *good*;

• X is total expenditure on the system of goods given by:

$$X = \sum_{i=1}^{n} p_i q_i$$

• u is the random or error term; and

• P is the price index defined by:

$$LnP = a_0 + \sum_{i=1}^{n} Ln P_i + 1/2 \sum_{i=1}^{n} \sum_{j=1}^{n} \gamma_{ij} LnP_i LnP_j$$

Deaton and Muellbauer (1980a) also suggested a linear approximation of the nonlinear AIDS model by specifying a linear price index given by

$$LnP = \sum_{i=1}^{n} W_i LnP_i$$

The following restrictions can be imposed on the parameters in the AIDS model:

- ***Adding-up*** implies the following parameter restrictions

$$\sum_{i=1}^{n} a_i = 1 \qquad \sum_{i=1}^{n} \beta_i = 0 \qquad \sum_{i=1}^{n} \gamma i_j = 0$$

It imply that the sum of expenditure share have to equal 1

- ***Homogeneity*** requires that:

$$\sum_{i=1}^{n} \gamma i_j = 0$$

It implies that the sum of the nominal price parameters in each share equation adds up to 0. It is also known as the “absence of money illusion” since the units in which prices and 0. Practically the homogeneity restriction implies that if all prices and income are multiplied by a positive constant, θ, the quantity demanded must remain unchanged. The null hypothesis is thus that the prices are homogeneous of degree zero, whereas the alternative hypothesis indicates non-homogeneous prices.

- ***Symmetry*** is satisfied if :

$$\gamma i_j = \gamma_{ji}$$

The symmetry restriction, in turn, restricts cross price derivatives of the demand functions to be identical.

The expenditure elasticity (ε_I) which measures sensitivity of demand in response to changes
in expenditure, is calculated using

$$\mathcal{E}_{ii} = 1 + (\beta_i / w_i)$$

The uncompensated own price (Marshal)elasticity (ε_{ij}):

$$\varepsilon_{ii} = (\gamma_{ii} / w_i) - (\beta_i + 1)$$

the compensated (Hicksian) price elasticities (ε_{ii}^*),(ε_{ij}^*) , which measure the price effects on the demand assuming the real expenditure x/ P is constant, are
calculated as:

$$\varepsilon_{ii}^* = \gamma_{ii} / w_i + w_i - 1$$

$$\varepsilon_{ij}^* = \gamma_{ij} / w_i + w_j$$

Empirical results

This section describes the procedure of the estimation, and then the result of the model and elasticities derived from it.

- Procedure:

The model was estimated using the Seemingly Unrelated Regression (SUR) procedure (Zellner, 1962) with E Views 5(Vogelvang,2005).The procedure in E Views summarized in estimating the equation without restrictions but with dropping the last equation to avoid the singularity problem of covariance matrix when the symmetry hypotheses imposed. Then Wald test is estimated for the symmetry and homogeneity hypotheses(table 3) ,if the result of the test is not significant, this mean the model satisfy the demand properties and this variables can be removed without a signicant effect on the estimation.

Table(3): Wald Test Statistics For Testing Homogeneity And Symmetry Restrictions For LA/AIDS Model

Restrictions	Wald Test Statistic	P-Value
Homogeneity in:		
Cereals Share Equation	0.352	0.604
Beans Share Equation	0.778	0.5
Meats Share Equation	0.05	0.811
Fish Share Equation	0.383	0.536
Egg Share Equation	0.443	0.352
Milk Share Equation	0.009	0.997
Oil Share Equation	0.026	0.872
Symmetry for:		
Cereals and(Beans ,Meat, Fish ,Egg ,Milk ,Oil, Sugar)	4.867	0.351
Beans and(Meat, Fish ,Egg, Milk ,Oil, Sugar)	3.339	0.765
Meat and(Fish, Egg, Milk, Oil, Sugar)	2.90	0.715
Fish and(Egg, Milk, Oil, Sugar)	1.63	0.803
Egg and(Milk, Oil, Sugar)	0.7	0.852
Milk and(Oil, Sugar)	0.021	0.989
Oil and(Sugar)	0.051	0.819

It is clear that for the all share equations, there is a probability of making an error when rejecting any of the null hypotheses (homogeneity and symmetry) . It can be concluded that price parameters are homogeneous of degree zero and symmetric in the demand model.

The results of the RSUR system are shown in Table(4). The majority of the estimated equations contain a number of statistically significant coefficients, and overall the model fits the data well.

Table (4):Parameter Estimates For The Restricted LA/AIDS Model

Explanatory Variable	Dependent Variable							
	Cereals	**Beans**	**Meats**	**Fish**	**Egg**	**Milk**	**Oil**	**sugar**
Cereals	0.1000 (3.908)*							
Beans	0.0050 (2.563)*	0.0187 (3.695)*						
Meats	-0.0010 (-1.570)	0.0109 (3.697)*	-0.170 (-3.763)*					
Fish	0.0090 (3.573)*	0.0090 (3.702)*	0.100 (3.309)*	0.026 (0.915)				
Egg	0.0015 (2.5017)*	0.0080 (3.705)*	0.070 (3.405)*	0.015 (0.734)	0.021 (3.587)*			
Milk	-0.0010 (-1.66)	0.0030 (2.34)*	0.059 (3.177)*	0.014 (1.831)	0.007 (2.830)*	0.037 (7.091)		
Oil	-0.0050 (-0.554)	-0.0340 (-3.755)*	-0.090 (-3.079)*	-0.02 (-3.743)*	-0.007 (-2.818)*	0.008 (4.180)**	0.008 (3.426)*	
Sugar	-0.0050 (-0.647)	-0.0030 (-3.633)*	0.025 (0.475)	0.005 (1.737)	0.001 (3.166)*	0.003 (11.557)**	0.002 (5.515)**	0.0039 (7.232)**
Expenditure	-0.0900 (-1.342)	-0.027 (-1.134)	0.1656 (4.750)**	-0.028 (-1.737)	-0.0048 (-3.166)*	0.0096 (2.339)*	-0.0130 (-1.405)	-0.0124 (-0.424)
R^2	0.61	0.58	0.31	0.21	0.45	0.61	0.65	0.40

t-ratios are in parentheses, where: *,,denotes significance at 5%,1% respectively.**

Uncompensated (Marshallian) Elasticities:

Expenditure elasticities

It can be seen from Table(5) that expenditure elasticities for all food groups are positive and less than one ($0 < \varepsilon_i < 1$)except for meats, and milk, indicating that food groups are normal and necessary goods, and there are no inferior products. For cereals, beans, fish ,egg, oil and sugar groups ,the expenditure elasticities amount to 0.591,0.55,0.65,0.88,0.86,0.82 respectively. Meats, and milk groups have expenditure elasticities larger than unity ($\varepsilon_i > 1$) which identifies them as luxuries ,they estimated about 1.49,1.1 respectively.

Own-price elasticities

Uncompensated own-price elasticities of demand for all food groups are negative and

consistent with the a priori expectation. The absolute amounts of these elasticities for all commodity groups are lower than unity, they estimated at -0.86,-0.66,-0.65,-0.47,-0.64,-0.90,-0.93 for cereals, beans, fish ,egg, milk, oil and sugar groups respectively, but the own price elasticity for meats group is higher than one ,it estimated at -1.66 ,this mean the demand for meats is elastic.

Cross price elasticities

The cross-price elasticities show the relation between commodities as substitutes or complements. Table (5) shows that the major relationship between food group is substitute but in different degrees, there are high substitute relation between beans and meats group, and between meats group and fish, they estimated about 0.33,0.26 respectively. Also there is a substitute relationship between fish and both egg and milk by about 0.21 ,and a substitute relationship between beans and fish and between egg and milk by about 0.19 ,and a small substitute degree between cereals and meats groups by about 0.14.finally there are very little amount of cross price elasticities between sugar and other food groups in the system , it amounted about 0.009,0.08,0.04,0.09,0.03,0.02,0.03 for cereals,beans,meat, fish ,egg, milk and oil respectively, to reveal no relationship between sugar and other food groups . Oil group reveals a complementary relationship between most of food groups in the system, it amounted about -0.53,-0.31,-0.22,-0.16 for beans, meats, fish and egg group respectively.

Table(5):Uncompensated(Marshallian) Price Elasticities (1990-2010)

	Cereals	**Beans**	**Meat**	**Fish**	**Egg**	**Milk**	**Oil**	**Sugar**
Cereals	**-0.86**							
Beans	0.05	**-0.66**						
Meat	0.14	0.33	**-1.66**					
Fish	0.07	0.19	0.26	**-0.65**				
Egg	0.02	0.15	0.19	0.21	**-0.47**			
Milk	0.04	0.10	0.12	0.21	0.19	**-0.64**		
Oil	0.014	-0.53	-0.31	-0.22	-0.16	0.07	**-0.90**	
Sugar	0.006	0.08	0.04	0.09	0.03	0.02	0.03	**-0.93**
Expenditure elasticity	0.591	0.55	1.49	0.65	0.88	1.1	0.86	0.82

Source: LA/AIDS Model

Uncompensated (Hicksian) Elasticities:

Own price elacticities

Compensated or Hicksian elasticities are reduced to contain only price effects, and are thus compensated for the effect of a change in the relative income on demand. Table(6) shows that the compensated own-price elasticities are negative for all groups . For all commodity groups, they are lower in absolute terms than the uncompensated ones, it estimated at -0.73,-0.63,-1.16,-0.59,-0.44,-0.53,-0.82,-0.87for cereals, beans, meats, fish, egg ,milk, oil, and sugar groups respectively.

Cross price elacticities

Cross-price elasticities carry positive signs as expected for substitute products for major food groups ,it estimated about 0.52 between beans and meats, and estimated about 0.37,0.34 between meats and both of fish and cereals groups respectively. Also the complementary relationship between oil and other food groups estimated at -0.48, -0.17,-0.16 ,-0.09 for beans ,meats, fish and egg groups respectively.

Table(6):compensated(Hicksian) Price Elasticities (1990-2010)

	Cereals	Beans	Meat	Fish	Egg	Milk	Oil	Sugar
Cereals	**-0.73**							
Beans	0.08	**-0.63**						
Meat	0.34	0.52	**-1.16**					
Fish	0.12	0.23	0.37	**-0.59**				
Egg	0.05	0.17	0.25	0.23	**-0.44**			
Milk	0.09	0.15	0.27	0.28	0.28	**-0.53**		
Oil	0.07	-0.48	-0.17	-0.16	-0.09	0.17	**-0.82**	
Sugar	0.05	0.12	0.14	0.13	0.09	0.1	0.09	**-0.87**

Source :LA/AIDS Model

Conclusion

The results of the analysis of food expenditure elasticities of demand for different food groups showed that expenditure elasticities for all food groups were positive and less than one except for meats and milk groups which imply that they are luxury goods rather than other necessary good in the system. The results showed that the Marshallian own-price elasticity was the highest for sugar, followed by oil, cereals, beans ,fish ,milk and egg. On the other hand, the cross-price elasticities of oil showed a complementary relationship with the other food groups.There is a high substitutive relationship between beans and meats group, and between meats and fish groups. Compensated own-price elasticity estimates show similar trends but smaller values than uncompensated ones, which is theoretically consistent.

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التحليل القياسى للانفاق الاستهلاكى فى محافظات الصحارى

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الملخص

استخدمت الدراسة نموذج الطلب الاقرب للمثالية فى الصورة الخطية التقريبية لتقدير علاقات الطلب على اهم المجموعات السلعية وهى الحبوب،البقول،اللحوم،الاسماك،البيض،اللبن،الزيوت،السكر فى محافظات الصحارى خلال الفترة ١٩٩٠- ٢٠١٠لتحديد المرونات السعرية الذاتية والمرونات التقاطعيةغير التعويضية لمارشال والتى تفترض عدم فصل الاثر السعرى والدخلى والمرونات الانفاقية وكذلك المرونات التقاطعية التعويضية لهكس التى تهتم بالاثر السعرى فقط.وقد اوضحت الدراسة أن المرونات الانفاقية على المجموعات السلعية بالنموذج كانت موجبةوتقل عن الواحد الصحيح لتدل على ان هذه السلع ضرورية فيما عدا مجموعتى اللحوم والالبان التى تزيد مرونتها الانفاقية عن الواحد مما يشير الى انهما سلعتين كماليتين.وبدراسة المرونات السعرية الذاتية لمارشال ،اتضح ان اعلى مرونة سعرية كانت لمجموعة اللحوم يليهاالسكر ثم مجموعة الزيوت يليهم مجموعات الحبوب ثم البقول والاسماك واخيرا مجموعة البيض ،فى حين أوضحت المرونة التقاطعية أن الزيوت تعتبر سلعة تكاملية مع مجموعات الغذاء الاخرى.من جهة أخرى هناك علاقة احلالية كبيرة بين كل من اللحوم والبقول ،واللحوم والأسماك.واوضحت الدراسة أيضا أن المرونة الذاتية التعويضية لهكس اخذت نفس اتجاه المرونة غير التعويضية ولكن بقيم اقل منها مما يتسق مع النظرية الإقتصادية

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