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ESTIMATION OF PRICE ELASTICITIES AND EXPENDITURE FOR THE MAIN IMPORTANT FOOD COMMODITIES IN EGYPT

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ABSTRACT

The objective of this research was to estimate price (direct and cross) and expenditure elasticities for major food commodities in Egypt. The food commodities were divided into six groups depending on the homogeneity within each group of commodities and the data availability quantities consumed and the corresponding retail prices for each group. Some commodities were aggregated in groups such as beans, vegetables, fruits (1), fruits (2), and oils. The Linear Almost Ideal Demand System (LAIDS) model was applied to estimating a system of demand equations for each group of food commodities. To avoid the invalid interference and spurious regression problems that may be created by non-stationary data series, the Fully Modified Least Squares (FMLS) estimator was used. The demand parameters satisfy the Engel aggregation, Cournot aggregation, homogeneity, and symmetry conditions. The results indicated that expenditure elasticities of the major food commodities/groups were less than unity except for the fruits (2) 1.110, indicating necessity effects. This can also be interpreted as following the increasing consumption of these commodities was strongly connected with increasing of all income levels. The results also showed that the price elasticities for food commodities/groups are inelastic. For fruits (2), its inelastic price elasticity still indicates that it tends to be very sensitive to price changes. The relative high cross-price elasticities in all groups illustrated the reliable substitute or complementary effects of the price change of one commodity, one quantity consumed from other commodities in the same groups. Therefore, structural implications from the estimated elasticities are essential. The estimated cross-price and expenditure elasticities must be analyzed during the economic reform for better understanding all economic changes affecting prices as well as consumption and expenditures.

Keywords: Linear Almost Ideal Demand System (LAIDS), Food Consumption, Price Elasticities, Expenditure Elasticities.

INTRODUCTION

Consumer demand for food is a vital component of the structure within which the agricultural sector must operate. Since the demand for food is inelastic and production or supply variable, accurate estimates of demand parameters are essential as inputs for the development of national price, stabilization, trade, storage production, and other policies.

Effective analysis of Egyptian agriculture and food policy requires a comprehensive view of the sector. The analysis must take into consideration the interrelationship within the agriculture sector, and in particular, on the consumption side of the market. In Egypt, this aspect of policy analysis is relevant because of the importance of linkages among food consumption, agriculture, and trade policy. The highly sensitive nature of the economy, especially in the reform process, requires careful and comprehensive approaches policy. The agriculture and food sectors are essential to food security and political stability and in themselves as significant components of the economic system in Egypt. The modern theory of consumer (Ahmed, 1989) behavior is the basis for estimating a system of demand equations. These systems yield estimates of price and cross-price elasticities. The Linear Almost Ideal Demand System (LAIDS) model is applied to estimate a system of demand equations for food commodities. The consumer theory is valuable in indicating plausible assumptions for making estimates of demand parameters in a statistically tractable framework. In particular, the theory offers conditions under which price- and cross-price and income elasticities of demand can be estimated with an economy of parameters and with systematic behavioral interrelations.

PROBLEM statement

Structural implications from the estimated demand elasticities are essential. The estimated price and cross-price expenditure elasticities and food policies during the economic reform must be analyzed to understand all economic changes affecting prices as well as consumption and expenditures.

OBJECTIVES

Therefore, the main aim of this research is to estimate food demand elasticities econometrically. The expenditure (or income) and price elasticities of demand can be used for assessing the implications of changes in income or prices on food demand that result from economic trends or changes in policies.

- Estimate the expenditure elasticities for the selected food commodities.
- Estimate the price- and cross-price elasticities for the selected food commodities.

MATERIALS AND METHODS

Data necessary to estimate the parameters required for the LAIDS model are retail prices and per capita food consumption. This research is mainly based on data of the consumption bulletins and Retail prices bulletins issued by Central Agency for Public Mobilization and Statistics (CAPMAS); data of the Economic Bulletins supplied by the Ministry of Internal Trade and Supply; data from the Ministry of Agriculture and Land Reclamation (MALR), the Economic Affairs Sector, the General Department of Agricultural Statistics, Egypt and data of the Food Balance Sheet issued by the FAO.

Given the available data, 6 LAIDS sub-models for the 21 food commodities were estimated. Each model includes selected commodities. For example, milk and dairy products, oils and sugar parameters are estimated in one model. The specific food groups and food commodities within the food groups used in the empirical analysis are:

- **CEREALS & STAPLES = (**Wheat, Maize, Rice, and Potatoes)
- **PULSES** = (Bean, Peas and Other Pulses)
- **MEATS = (Red** Meat, Poultry and Fish)
- **VEGETABLES = (**Onion, Tomatoes and Other Vegetables)
- **FRUITS = (**Citrus, Fruits 1 (Dates, Banana, and Grapes) and Fruits 2 (all other fruits))
- **OTHER FOODS =** Eggs, Milk & Dairy products, Oils, and Sugar

Time series data are used to estimate the six LAIDS models is for the period 1980 to 2017. Price data are from the Statistical Yearbook and unpublished data of the Central Agency for Public Mobilization and Statistics (CAPMAS). The annual prices used for statistical analysis are simple averages of reported monthly prices and also simple averages between rural and urban areas.
Quantity data are mainly from balance sheets that adjust production for stocks, exports, imports, and disappearance prepared by the Agricultural Economics Research Institute (AERI) / Ministry of Agriculture and Land Reclamation (MALR).

THEORETICAL BASES

The two forms of the Almost Ideal Demand System (AIDS)

AIDS has been widely used in applied studies. Although the LAIDS model (Buse, 1994), is intrinsically nonlinear in its parameters, the linear approximation version of LAIDS using the Stone's share weighted price index has been widely applied to simplify the estimation process. Besides its aggregation properties, AIDS is popular due to the availability of this approximate version with linear parameters.

Let a statistical model y = f (x, θ) + ε , where x and y are two vectors of a variable (Deaton and Muellbauer, 1980) θ is a vector of parameters, and ε is the error term. It is said to be nonlinear in parameters if ∂ y/ ∂θ = g (θ , x), which is a function of the parameter. A linear model is a special case of a nonlinear model when ∂ y/ ∂θ = h(x), which is not a function (Fayyad, 1995) of the parameter θ. The AIDS model of Deaton and Muelbauer is derived from a cost function with an appropriately defined functional form. The AIDS model is defined by

$$w_i = \alpha_i + \sum_j \gamma_{ij} \ln p_j + \gamma_i \ln\left(\frac{X}{P}\right) + \mu i \qquad (1)$$

Where w_i is the expenditure share of the i^{th} good, p_i is its price, x is a total expenditure of the estimated food group, αi, βi and γij are parameters to be estimated, P is the price index as defined in (2), μi is the error term and P is

$$\ln P = \alpha_0 + \sum_j \alpha_j \ln p_j + \frac{1}{2}\sum_j \sum_i \gamma_{ij} \ln p_i \ln p_j \qquad (2)$$

The Price Indexes

Most previous empirical applications have used a linear approximation for in (P). The resultant AIDS is linear in parameters and the commonly used linear (Diewert, 1987) estimation procedures can be applied. The linear approximation is Stone's price index, defined as

$$\ln P^* = \sum_k w_k \ln p_k \qquad (3)$$

To avoid many drawbacks with the stone price index in case of the LAIDS, many other price indexes have been developed. The following indexes aim also to have as much as possible similar estimates of the LAIDS as the estimates of the true AIDS.

a. The Hornqvist Price Index

$$\ln P_t^T = \frac{1}{2}\sum_{i=1}^{n} \left(w_{it} + w_i^0\right)\ln\left(\frac{p_{it}}{p_i^0}\right) \qquad (4)$$

Where W_I^0 and p_I^0 are representing the base year for the commodity share and price, respectively.

b. The Paasche Price Index (Fan and G.L, 1995)

$$\ln P_t^S = \sum_{i=1}^{n} w_{it} \ln\left(\frac{p_{it}}{p_i^0}\right) \qquad (5)$$

c. The Lasperez Price Index

$$\ln P_t^C = \sum_{i=1}^{n} w_i^0 \ln p_{it} \qquad (6)$$

In both models, the true AIDS and the LAIDS, the following restrictions have to be satisfied:

1. Adding up:

$\sum_i \alpha_i = 1, \sum_i \gamma_{ij} = 0, \sum_i \beta_i = 0.$

2. Homogeneity:
$\sum_j \gamma_{ij} = 0$

3. Symmetry: $\gamma_{ij} = \gamma_{ji}$

CALCULATING OF THE ELASTICITIES

To calculate the expenditure elasticities the equation (Moschini and A.Visa, 1992) (7) is used in both models (true model and LAIDS).

$$\varepsilon_i = 1 + \beta_i / w_i \quad (7)$$

The calculating of the price elasticities (own and cross) can be done using equation (8) only in the true model.

$$\varepsilon_{ij} = -\delta_{ij} + \gamma_{ij} / w_i - \beta_i \alpha_j / w_i - \frac{\beta_i}{w_i} \sum_k \gamma_{ij} \ln p_k \quad (8)$$

Where δ_{ij} is the Kronecker delta with value equal to one when i = j and equal to zero otherwise.

In the LAIDS model, one of the following equations (9, 10, 11, 12) can be used to calculate the price elasticities.

$$\varepsilon_{ij} = -\delta_{ij} + \gamma_{ij} / w_i - \beta_i \alpha_j / w_i - \frac{\beta_i}{w_i} \sum_k \gamma_{ij} \ln p_k \quad (9)$$

$$\varepsilon_{ij} = -\delta_{ij} + \gamma_{ij} / w_i \quad (10)$$

$$\varepsilon_{ij} = -\delta_{ij} + \gamma_{ij} / w_i - \beta_i \alpha_j / w_i \quad (11)$$

$$\varepsilon_{ij} = -\delta_{ij} + \gamma_{ij} / w_i - \beta_i \alpha_j / w_i - \frac{\beta_i}{w_i} \left[\sum_k w_k \ln p_k \left(\eta_{kj} + \delta_{ij} \right) \right] \quad (12)$$

Estimation Method

The properties of series data are explored, and some data series are found to non-stationary, but integrated. To avoid the invalid inference and spurious regression problems that may be created by non-stationary data series, the Fully Modified Least Squares (FMLS) estimator is utilized. While the linear approximation form of the AIDS was used, the parameters of the last equation of each model were not estimated. They were calculated from the restrictions imposed in each of the six models. In all six LAIDS models, the stone price index was used. The expenditure and price elasticities were calculated using equations (7) and (11), respectively. The total expenditure in each model is equal to the expenditures of the three or four commodities included in the model.

RESULTS AND DISCUSSION

CEREALS AND STAPLES

This group includes four bowls of cereal and staples commodities wheat (including wheat and wheat flour), maize, rice, and potatoes. Estimated parameters for grains are contained in Table (1). Data used in these estimates are from 1980 to 2017. The signs of parameter estimate and their magnitude relative to their standard errors indicate that the demand specification is relatively consistent with the data.

Table (1) - Estimated parameters of the LAIDS for cereals & staples over the period 1980-2017

Commodity	Wheat	Maize	Rice	Potatoes	Expenditure	R-Square
Wheat	0.192035 (0.0280)***	-0.09477 (0.0116)***	-0.06908 (0.0193)**	-0.028186	-0.02061 (0.00437)***	0.5818
Maize		0.160059 (0.16006)***	-0.03657 (0.00722)***	-0.028716	-0.00003 (0.00177)-	0.9463
Rice			0.133603 (0.0214)***	-0.027957	0.013255 (0.00451)*	0.5637
Potatoes				0.084858	.	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (2) - Estimated Price and Expenditure Elasticities for Cereals & Staples over the period 1980-2017

Commodity	Wheat	Maize	Rice	Potatoes	Expenditure
Wheat	-0.40979	-0.17470	-0.12571	-0.05021	0.56034
Maize	-0.48741	-0.17668	-0.18808	-0.14769	0.49985
Rice	-0.41260	-0.21263	-0.28758	-0.15919	0.67200
Potatoes	-0.31420	-0.29586	-0.28767	-0.17467	0.79240

Source: Calculated from the results of the Table (1)

The calculated price and expenditure elasticities for cereals given in Table (2) indicate that direct price elasticities for each commodity have a negative sign, and are all different from zero. The price elasticities are only elastic for wheat and maize and inelastic for rice and potatoes, as expected. The estimated elasticities indicate that a 10 percent increase in the price of wheat reduces its estimated consumption by about 4.5 percent. The calculated cross-price elasticities between wheat and maize have a negative sign, which indicates that consumers view the two commodities as complements rather than substitutes. Also, according to the cross-price elasticities, the consumption of wheat is more affected by the change of maize price than *vice versa*. From the positive cross-price elasticizes among wheat, maize, rice, and potatoes, it is clear that the consumers are considering wheat, maize, rice, and potatoes as substitutes to each other. The lowest price elasticities are for maize, followed by wheat.

The expenditure elasticities shown in Table (2) are positive, implying that all of the cereals and staples commodities are "superior." According to these four elasticities, the consumers are considering the four commodities as necessities. In general terms, these results indicate that a 10 percent increase in total expenditure is associated with an increase of about 5.6, 5.0, 6.7, and 7.9 percent in wheat and maize, rice, and potatoes consumption, respectively.

PULSES

Data used in these estimates are from 1980 to 2017. The estimated parameters for other staples in Table 3 are encouraging, as they are for susceptible commodities to any income changes. Most coefficients of equations in the model are statistically significant at good rejection levels.

Table (3) - Estimated Parameters of the LAIDS for Pulses over the period 1980-2017

Commodity	Bean	Peas	Others	Expenditure	R-Square
Bean	0.116599 (0.0337)**	0.026678 (0.0299)-	-0.14328	-0.08804 (0.00940)***	0.7965
Peas		0.056505 (0.0147)*	-0.083184	0.041419 (0.00990)***	0.5833
Others			0.22646	-0.046621	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (4) - Estimated Price and Expenditure Elasticities for Pulses over the period 1980-2017

Commodity	Bean	Peas	Others	Expenditure
Bean	-0.42789	0.061092	-0.19422	0.56102
Peas	0.00323056	-0.62758	-0.47900	0.70335
Others	-0.75136	-0.38935	-0.261992	0.85271

Source: Calculated from the results of the Table (3)

On an economic basis, the calculated elasticities in Table (4) seem to be plausible. All price elasticities are negative in sign, and expenditure elasticities have positive signs. The price elasticities for the three commodities are magnitudes consistent with observed consumption. The price elasticities of beans and peas are higher compared with the own-price elasticity of other beans. While the cross-price elasticities between bean and peas are positive (substitute effect), all other cross-price elasticities among the three commodities are negative, indicating a complementary rather than a substitute effect. The price changes for beans and peas have almost the same negligible impacts on consumption on the other commodity.

While the estimated expenditure elasticity for bean, 0.561, is lower than the estimated expenditure elasticities for peas and other beans, which indicates that the consumer considering it as a necessity.

MEATS

This group includes three commodities, red meats, poultry, and fish (Eales and Unnevehr, 1993) Estimated parameters for meats are contained in Table (5). Data used in these estimates are from 1980 to 2017. The demand specification was consistent with the data. Most coefficients of the model estimates are statistically significant.

Table (5)- Estimated parameters of the LAIDS for meats over the period 1980-2017

Commodity	**Red Meat**	**Poultry**	**Fish**	Expenditure	R-Square
Red Meat	0.299808 (0.0610)***	-0.03164 (0.0398) -	-0.26817	-0.05185 (0.0112)	0.5903
Poultry		0.060445 (0.0155)**	-0.028804	0.004158 (0.00778)	0.6339
Fish			0.29697	0.047688	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (6)- Estimated price and expenditure elasticities for meats over the period 1980-2017

Commodity	Red Meat	Poultry	Fish	Expenditure
Red Meat	-0.43479	-0.039430	-0.43700	0.71122
Poultry	-0.20507	-0.64033	-0.17963	0.62502
Fish	-0.28477	-0.14699	-0.140911	0.91087

Source: Calculated from the results of the Table (5)

From Table (6), the red meat price elasticity, -0.435, is in the normally expected range. The poultry price elasticity, -0.640, appears high than expected. However, it is important to note that according to the price elasticities, the three commodities are considered inelastic to price changes. Consistent with the theory, all calculated cross-price elasticities are negative, implying that the complementary effects. The effect of the red meat price change on poultry consumption is much less than *vice versa.* The cross-price elasticities show that a 10 percent increase in poultry price decreases the consumption of red meat and fish by 0.3 and 1.5 percent, respectively. The negative cross-price elasticities between poultry and fish indicate that consumers view both of them as complements to each other. Also, the price change of poultry has the same impact on the consumption of fish as vice versa.

The expenditure elasticity of red meat (0.711) implies that the red meat and poultry (0.625) are considered as necessities. The estimated expenditure elasticity for fish (0.911) tends to be equal to the unity implying that each expenditure (income) change will have a similar impact on its consumption.

Vegetables

The parameter estimates in this model are for onion, tomatoes and other vegetables. Data used in these estimates are from 1980 to 2017. Coefficients are statistically significant at high levels of rejection. The signs of parameter estimates in Table (7) relative to standard errors indicate that the specification of the demand system is consistent with the data.

Table (7) - Estimated Parameters of the LAIDS for Vegetables over the period

1980-2017

Commodity	Onion	Tomatoes	Other Vegetables	Expenditure	R-Square
Onion	0.05443 (0.00903)***	-0.02123 (0.00631)*	-0.033196	-0.00315 (0.00298) -	0.5300
Tomatoes		0.240081 (0.0112)***	-0.21885	0.041581 (0.00501)***	0.9464
Other Vegetables			0.25204	-0.038433	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (8) - Estimated price and expenditure elasticities for vegetables over the period 1980-2017

Commodity	Onion	Tomatoes	Other Vegetables	Expenditure
Onion	-0.29350	-0.47498	-0.34389	0.42538
Tomatoes	-0.060381	-0.41098	-0.63786	0.60922
Other Vegetables	-0.054713	-0.35386	-0.52483	0.73340

Source: Calculated from the results of the Table (7)

The relatively low-price elasticities for vegetable commodities in Table (8) (-0.294 for onion, -0.411 for tomatoes and -0.525 for other vegetables), can be justified because that vegetables have a fixed position in the Egyptian menu. All cross-price elasticities among the three commodities have negative signs indicating the complementary effects among the three of them. Also, the cross-price elasticities suggest that the price changes of onion have almost no impacts on the consumption of tomatoes and other vegetables, while the price changes of tomatoes and other vegetables have higher impacts on the consumption of onion than by its price change. This indicates that the consumption of onions is highly linked to the consumption of tomatoes and other vegetables. This argument also explains why the consumption of other vegetables is also affected by the price change of tomatoes.

The expenditure elasticities of onion, tomatoes and other vegetables are as expected, which indicates that the consumers view these commodities as necessities.

FRUITS

Data used in these estimates are from 1980 to 2017. Since the late 1970s fruit has increased its share in expenditure. Most signs and magnitudes of parameter estimates in Table (9), relative to their standard errors, indicate that the specification of the demand system is consistent with the data. Most coefficients of equations in the model are statistically significant at good rejection levels.

Table (9) - Estimated parameters of the LAIDS for fruits over the period 1980-2017

Commodity	Citrus	Fruits(1)	Fruits(2)	Expenditure	R-Square
Citrus	0.089208 (0.0249)**	-0.12314 (0.0289)***	0.033933	-0.03627 (0.00794)***	0.6510
Fruits (1)		0.219633 (0.0656)**	-0.096492	-0.00573 (0.01091)-	0.5959
Fruits (2)			0.062559	0.041992	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (10) - Estimated price and expenditure elasticities for fruits over the period 1980-2017

Commodity	Citrus	Fruits(1)	Fruits(2)	Expenditure
Citrus	-0.33014	-0.32607	-0.52607	0.52373
Fruits (1)	-0.29669	-0.45999	-0.22939	0.88607
Fruits (2)	0.066011	-0.29687	-0.87873	1.10959

Source: Calculated from the results of the Table (9)

The price elasticities represented in Table (10) have negative signs. The estimated citrus, fruits (1) and fruits (2) price elasticities of -330, -460, -0.879, respectively, are plausible. The relatively high fruits (2) price elasticity is expected since this group includes all the fruits with the highest prices. With the exception the substitute effect is between citrus and fruits (2). Also, the price change of watermelons has much less impact on the consumption of fruits (2) than *vice versa*, which can be also observed in the relation between citrus and fruits (2).

Expenditure elasticities of citrus, frits (1) (0.523 and 0.886) indicate that both commodities are necessities, while the high expenditure elasticities of fruits (2) indicate that this group is luxurious, due to their high prices. The consumption of fruits (2) commodities is more likely to increase with a higher income than are any other commodities.

OTHER COMMODITIES

Data used in these estimates are from 1980 to 2011. Eggs, milk, and other dairy products, oils and sugar are included in one sub-model. Milk and eggs are traditionally important food commodities. Not only are they protein sources, but their prices, compared to prices of other food commodities, were for a long time relatively low. The share of oils and sugar tends to be very important components in the family expenditure budget. The main reason is the liberalizing of their prices.
The signs of parameter estimate and their magnitude relative to their standard errors indicate that the demand specification is fairly consistent with the data. Most estimated coefficients are statistically significant (Table 11).

Table (11) - Estimated Parameters of the LAIDS for Other Commodities over the period 1980-2017

Commodity	Eggs	Milk	Oils	Sugar	Expenditure	R-Square
Eggs	0.050221 (0.00779)***	-0.0453 (0.0153)**	0.022529 (0.00738)**	-0.027453	-0.00755 (0.00305) -	0.5786
Milk		0.274937 (0.0579)***	-0.10177 (0.0216)***	-0.12787	0.06023 (0.00856)***	0.7452
Oils			0.063611 (0.0124)***	0.015630	-0.01359 (0.00481)*	0.4329
Sugar				0.13969	-0.039088	

Source: Authors calculation; ( ) Standards errors in parentheses
***, significant at 1%; **, significant at 5%; *, significant at 10%; -, insignificant.

Table (12) - Estimated Price and Expenditure Elasticities for Other ommodities over the period 1980-2017

Commodity	Eggs	Milk	Oils	Sugar	Expenditure
Eggs	- 0.21539	-0.36108	0.15572	-0.22840	0.71838
Milk	-0.067655	-0.67110	-0.15056	-0.19594	0.88525
Oils	0.30205	-0.20547	-0.15444	-0.15444	0.42225
Sugar	-0.14723	-0.27149	0.10614	-0.16459	0.57718

Source: Calculated from the results of the Table (11)

On an economic basis, the calculated elasticities in Table (12) seem to be plausible. All price elasticities are negative in sign and are inelastic and expenditure elasticities have positive signs. The price elasticities for the four commodities are magnitudes consistent with observed consumption. From Table (12), the eggs price elasticity, -0.216, is in the normally expected range. The milk price elasticity, -0.671, is higher than the other price elasticities of this group. However, it is important to note that according to the price elasticities, the four commodities are considered inelastic to price changes, especially the elasticities of oils and sugar (-0.154 and -0.165). Consistent with the theory, cross-price elasticities between eggs and are negative, implying that the complementary effects.

According to the expenditure elasticities of the four commodities, eggs and milk are considered as necessities, especially the oils.

CONCLUSIONS AND RECOMMENDATIONS:

1. The main objective of this study is to provide policy and decision-makers, producers, and other agents of the economy with necessary information about the structure of consumer demand for major food commodities. These results focus attenuation on the impact of economic changes in economic transformation. These estimates of the cross-price and expenditure elasticities are a valuable resource for anticipating has implications of the economic reform.

2. The research provides estimates for price and expenditure elasticities for 21 food commodities using LAIDS and six groups for groups of commodities. Although the results represent newly available information on the final demand for food in Egypt, they are not without limitations. Some of these limitations are particularly fertile areas of future research. Those mentioned here help to illustrate the advantages and disadvantages of the present results and to recommend areas for future work.
3. Structural implications from the estimated elasticities derived work AIDS models are important. Many economic changes affect prices as well as consumption and expenditures.
4. Several areas are specifically recommended for additional research. Using various simulations, it is easy to make some projections about changes in the structure of food consumption, after explaining the price and expenditure elasticities for each commodity. Generally, implications of the demand structure at the farm or wholesale level are much the same as those of the final demand system. This research provides a basis for future detailed analyses of the structural implications in more detail.
5. Also, the set of commodities used in this research should be extended to all food commodities. On the other hand, the elasticities for meats, vegetables, fruits, and oils could be re-estimated by commodity bias and not as an aggregated group.
6. The differences between the rural and urban areas in Egypt are significant and it is difficult to estimate plausible demand systems for both together. The problem of this study was a lack of price and consumption information for both rural and urban areas. Emphasizing the demand systems to rural and urban areas will allow improved analysis of consumption patterns.
7. The effect of the quality change was also not addressed. If there is quality change, then we must adjust demand estimates accordingly to reflect these different features of the food supply.
8. Finally, other researches would complement the analyses of prices and projections. Various simulations using projected prices and expenditures can test the robustness of the results and evaluate implications for estimated consumption, expenditure, and nutrition.

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تقدير المرونات السعرية والإنفاقية لأهم السلع الغذائية فى مصر

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يهدف هذا البحث إلى تقدير المرونات السعرية (الذاتية والعبورية) والمرونات الإنفاقية لأهم المجموعات الغذائية في مصر. وقد تم تقسيم السلع الغذائية في ست مجموعات، تبعا للتجانس فيما بين السلع داخل المجموعة الواحدة، وحسب توافر البيانات للكميات المستهلكة، وأسعار التجزئة لنفس السلع. وقد تم تجميع عدد من السلع في مجموعات سلعية مثل: البقوليات، الخضروات، الفاكهة (1)، الفاكهة (2)، والزيوت. ولتقدير نظام معادلات الطلب لكل نموذج تم استخدام الصيغة الخطية لنموذج الطلب الأمثل (LAIDS) لكل مجموعة من السلع/المجموعات الغذائية حيث يختلف نموذج الطلب الأمثل عن النماذج التقليدية لتقدير الطلب فى أنه يأخذ فى الاعتبار الإختلافات فى مصادر السلع، كما يتضمن قيودا خاصة على دوال الطلب المتعلقة بمصادر السلع، ويفسر التغيرات فى الطلب، ويوضح مدى المنافسة بين المصادر المختلفة. ويقدم ما تتطلبه السياسة الاقتصادية من تقديرات لدرجة إستجابة الطلب للاسعار والانفاق على السلع. وقد تم استيفاء مؤشرات الطلب الخاصة بشروط التجميع لأنجل وكورنت Engel and Cournt aggregation، والتجانس Homogeneity، والتماثل Similarity.

وتبين من نتائج البحث أن المرونات الإنفاقية لجميع السلع/المجموعات الغذائية كانت أقل من الواحد، ما عدا الفواكه $_{(2)}$ كانت أكبر من الواحد 1.110، وهو ما يشير إلى أن السلع المدرجة تحت هذا التجميع تعد كمالية. كما توضح نتائج البحث أن المرونات السعرية الذاتية لكل السلع/المجموعات الغذائية غير مرنة. وبالنسبة للمرونة السعرية الذاتية المرتفعة للفواكه $_{(2)}$، فأنها تعد حساسة جدا لأي تغيرات في أسعارها. وتظهر المرونات السعرية العبورية المرتفعة بين السلع داخل كل من النماذج الست الآثار المكملة أو الاستبدالية القوية فيما بينها، وهو ما يبرهن على مدى تأثير تغير السعر لأي من سلع النموذج على الكميات المستهلكة من باقى سلع نفس النموذج.

لذلك من المهم حصر التداعيات الهيكلية للمرونات المقدرة في هذا البحث، حيث يجب تحليلها خصوصا في فترة الإصلاح الاقتصادي التي تمر بها مصر حاليا، وذلك، لتحديد المتغيرات الاقتصادية التي تؤثر على كل من الأسعار والاستهلاك والإنفاق، وفهمها على نحو أفضل.