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Demand Analysis for Major Consumer Commodities in Jordan

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Abstract

The objectives of this research is to analysis the demand pattern, estimates the demand function for the necessary commodities in Jordan. Data from household expenditure and income surveys (HEIS) for the years 1992, 1997, 2000, 2003, 2006, 2008 and 2010 are utilized for comparisons, and to draw a sample of (700) household which represent (5%) of the total population of (HEIS) in 2010 in order to analysis the demand of the main commodities.

The study finds that there are significant differences between both governorates and among years and there are decrease in percentages of expenditure on food items during the period of study. Moreover, the own-price and expenditure elasticities are consistent with economic theory excluding meat and eggs, the expenditure elasticities for vegetables, fruits and vegetable oils and fats are greater than one while for milk and its products is one. The other groups have expenditure elasticities less than one. The result of study can be considered as useful information for policy analysis such as price support and nutrition policy.

Keywords: demand pattern, demand analysis, demand elasticities, household survey data, Jordan.

I. INTRODUCTION

Changes in prices and income, due to shocks or economic growth and reform, influence the overall and food consumption levels of households. However, it is often not clear to what extent they are affected by these factors and what interventions might be needed to help them. The reaction of households to such price and income changes can be predicted and quantified through economic parameters that are called 'demand elasticities. These demand elasticities are important to know for those stakeholders who want to anticipate and alleviate the negative impact on the economy as a whole and on vulnerable households in particular. Understanding food demand patterns is an important prerequisite for designing food, economic, social and agricultural policies as well as predicting and analyzing the impacts of these policies. Knowledge on food demand patterns of a particular country is useful to its policy planners in addressing three major policy issues. First, it helps policy planners identify which policy interventions are most appropriate in improving the nutritional status of individuals and households. Second, it is useful in designing various food subsidy strategies that must be pursued by the government. Third, the knowledge on food demand behavior is essential for conducting sectoral and macroeconomic policy analyses (Sadoulet & de Janvry, 1995).

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During the last decades Jordan witness changeable economic conditions that affect the income and the prices in Jordan. in particularly economic crisis and rising oil prices, which led to unprecedented increases in commodity prices, especially commodities that affecting the daily lives of human as in food products, fuel and other,. One impacts is the increasing percentage of families living below the absolute poverty line from 18.7% in 1987 to 21.3% in 1992 and to 26% in 1996 (Khasawneh et al., 1998), while the proportion of households living below the extreme poverty line of 1.5% of the total population in 1987 to 6.6% in 1992 and to 9% in 1998.

Subsequently economic policies pursued by governments in order to reduce the negative impact of high oil prices, increase in international food prices, poverty alleviation, these policies imply subsidized the prices which has heavy burden and negative impacts in the budget. Such policies did not take into consideration the consumption effects in the household in Jordan, and the impact in demand are particularly in consume inadequate quantities of calories, protein and other nutrients. This is a result of less attention given to demand analysis. Also, this lack of price and income elasticities lead to miscalculation social consequences of economic support policies, especially in a period of economic crisis and subsequently the direct support to those who deserve it. The analysis of demand functions for commodities and determine the impacts of factors that affect the demand for goods and services is a key for many purposes, including economic, social and help decision-maker to make integrated and consistent economic and social policies to reduce the negative impact of those policies, especially on poor and middle income people.

Due to the lack of studies in this field in Jordan, there is a need to interfere with the analysis demand pattern for most consumer goods in Jordan and estimate price and income elasticities for these goods in order to ensure their use in planning and forecasting for local production and imports of goods and services and building production, and economic policies, and identify the impact of rising prices and other factors affecting the demand, this is what the researcher aspires to get it.

Therefore, the main objective of this research is to analysis the demand pattern for the necessary commodities in Jordan and estimates the demand function for these commodities, and how households adjust their consumption in response to changes in prices and income due to the effects of various shocks to market prices and commodity supplies. In addition, comparisons of income, expenditure, prices index, percentages of expenditure in main commodities group among different household and rural, urban and governorates.

II. METHODOLOGY

A major problem of using household survey data to estimate a demand system lies in its difficulty in defining price variables. Earlier household budget studies often assumed that prices are constant, and they focused on fitting the Engel curves. In an attempt to retrieve price effects in household survey data, Theil and Neudecker derived conceptual relationships of substitution and complementarity from the residual variations around the Engel curves. Their methodology, however, is far from practical in developing a working model for empirical application. Recently, Deaton (1988), in a series of articles, developed a procedure by using the residuals of estimated unit value (defined as the ratio of expenditure to quantity) and expenditure

share equations to obtain a system of demand equations. By applying a separability assumption, it was able to derive information about price effects from the estimated covariance of residuals. The problem of applying his approach, however, is that there is no guarantee of obtaining accurate estimates of price responses, because many unexplained factors influence covariance of residuals, not price variations alone.

Cox and Wohlgenant (1986) proposed an alternative approach, which was then adopted in some cross sectional demand analyses, such as Park, Holcomb, and Raper (1996). They assumed that the deviations of unit values from regional or seasonal means reflected the quality effects induced by household characteristics and nonsystematic supply-related factors. By regressing the mean-deviated unit values on household characteristics, they filtered the quality effects out of unit values to obtain the quality-adjusted prices for the subsequent demand system estimation. Specifically, quality adjusted prices were calculated as the sum of an estimated constant term and residuals from related unit-value equations. A problem with this approach is that the adjusted prices are random, vary from household to household, and are not consistent with the fact that households face quite similar market prices in a short survey period.

III. REVIEW OF LITERATURE

Hmedat and Ghazo (2011) investigated determinants of demand for each stage of the private education in Jordan during the period 1979/1980-2004/2005. the study finds that the determinants of the demand for private education at the pre-school stage are the ratio of private education price index to the consumer price index. It shows the impact of fees in determining the demand for this stage of education, the proportion of the (4-5) year old population to the total population, the number of students for this stage in the previous year, per capita income in addition to the time trend. On the other hand, the determinants of the demand for basic education were the private education price index, GDP in the previous year, the average cost for the student in institutions public education that reflect the quality of education in these institutions. The study finds that, the most important determinants of the demand for secondary private education is a ratio of private education price index to the consumer price index, average per capita income, and population of the age group (16-17), the rate of cost of student organizations of public education. Finally, the study showed determinants of the demand for private higher education is a private education price index. Gross domestic product that is expected in the next year to indicate the impact of expected income, the number of high school graduates, the opportunity cost of higher education (wage for low education level), and the number of students enrolled at this stage of education in the previous year.

Jabarin and Al-Karablieh (2011) estimated the different types of demand elasticities for the main fresh vegetables consumed in Jordan, through the estimation of a Linear Approximate Almost Ideal Demand Systems (LA/AIDS) for Jordan fresh vegetable crops demand system using cross-sectional data of household expenditure survey in 2005. All of the own-price demand elasticities have the correct negative signs and statistically significant. According to the expenditure elasticity, tomato, cucumber, and potato are the necessity goods. The mean budget shares indicate that consumers spend 30 percent of their allocated budget to vegetables on tomatoes and potatoes. The green bean elasticity is the highest indicating that demand for beans is highly

responsive to any changes in the price. The expenditure elasticities reveal that the demand on all vegetables is expected to grow over the coming few years. High own-price elasticities of all vegetables studied suggests that any changes in the prices of these crops could bring about a significant shift in fruits and vegetable consumption patterns.

Kumar et al. (2011) examined food demand in India, in the context of a structural shift in the dietary pattern of its population. The results have reinforced the hypothesis of a significant diversification in the dietary pattern of households in recent years and have found stark differences in the consumption pattern across different income quartiles. The study has revealed that the estimated income elasticities vary across income classes and are lowest for cereals group and highest for horticultural and livestock products. The analysis of price and income effects based on the estimated demand system has suggested that with increase in food price inflation, the demand for staple food (rice, wheat and sugar) may not be affected adversely but, that of high-value food commodities is likely to be affected negatively. Therefore, the study has cautioned that if inflation in food prices remains unabated for an extended period, there is the possibility of reversal of the trend of diversification and that of consumers returning to cereal-dominated diet, thus accentuating under-nourishment.

Pangaribowo and Tsegai (2011) analyze the demand responses of Indonesian households to food prices, income changes and other socioeconomic factors. The Indonesian Family Life Survey data was used and methodologically an extended form of the Quadratic Almost Ideal Demand System model which includes demographic and regional factors was employed. Results reveal the well known pattern that food demand behavior varies significantly between urban and rural households as well as income groups. The poorest households consume relatively more staple food as well as alcohol and tobacco goods while the richest households consume relatively more meat, snack and dried food. It is shown that the poorest households' expenditure elasticity on alcohol and tobacco is high implying that the poorest households transfer their extra resources on alcohol and tobacco goods instead of more nutritious food items. Results also show that price and expenditure elasticities have changed across time (1997-2007). Own price elasticities have increased for most food items implying that people have become more responsive to changes in prices. In contrast, the expenditure elasticity has declined for most food items (except for 'alcohol and tobacco goods') which would imply welfare improvement since the 1997 crisis.

Bektas et al. (2011) analysed the frozen food demand among consumers in Izmir, provinces in Turkey. The study used a questionnaire survey of 271 randomly selected consumers; data was collected between December 2006 and February 2007. Heckman models were used for demand estimates. From demand estimates, price elasticity was found to be -0.53 for potatoes, -0.49 for peas, -0.28 for green beans, -0.80 for strawberries and -0.69 for cherries. The study calculated price premium that consumers would be willing to pay for consuming frozen food. It was found that consumers would pay an 82% price premium for frozen peas; 108% for frozen strawberries; and 130% for frozen cherries. It was found that consumers were not willing to pay a price premium for frozen potatoes or frozen green beans.

In this study of Lippe, Seebens and Qaim (2010), food demand elasticities are estimated for urban Thailand, based on a survey of 500 households in Bangkok and Chiang Mai, by estimating a Linear Almost Ideal Demand System (LAIDS) for 8 aggregate food items and explicitly account for censored data. As expect, the demand for higher-value foods such as fruits, vegetables, meat, fish and seafood rises more with increasing incomes than the demand for staple foods, especially rice. Likewise, households are more price responsiveness with respect to higher-value foods. These results suggest that economic developments and policies that foster income growth and competition in the farm and agribusiness sector will contribute to better nutrition and a more diverse diet.

Andreyeva, Long, and Brownell (2010) reviewed 160 studies on the price elasticity of demand for major food categories to assess mean elasticities by food category and variations in estimates by study design. Price elasticities for foods and nonalcoholic beverages ranged from 0.27 to 0.81 (absolute values), with food away from home, soft drinks, juice, and meats being most responsive to price changes (0.7– 0.8). As an example, a 10% increase in soft drinks prices should reduce consumption by 8% to 10%. Studies estimating price effects on substitutions from unhealthy to healthy food and price responsiveness among at-risk populations are particularly needed.

Ahmed and Ahmed (2009) estimated Potatoes demand function in wholesale market for vegetables and fruits in Tanta city during the period (1990-2005). Using the formula multi-linear and double logarithmic formula to get the best possible. Research has shown that as the selection rate for the transactions demand functions of potatoes that have proven statistically significant estimates of the level of each of the Nile and Summer season as they reached about 0.66, 0.65 respectively, while the average coefficient of determination in the function demand of Potatoes annually about 0.78 In the light of the outcome of the search results it can be recommended as follows To provide information concerning the conditions of supply and demand and market prices, whether on the local or global marketing in order to achieve efficiency in both its technological and economic, which helps in solving the problem of price fluctuations and the high value of marketing margins.

Russo, Green, and Howitt (2008) provided updated estimates of domestic own-price, cross-price and income elasticities of demand and estimated price elasticities of supply for six commodities selected represent some of the highest valued crops in California, these are: almonds, walnuts, alfalfa, cotton, rice, and tomatoes (fresh and processed). Flexible functional forms including the Box-Cox specification and the nonlinear almost ideal demand system are estimated and bootstrap standard errors obtained. Partial adjustment models are used to model the supply side. All of the estimated own-price demand elasticities are inelastic and, in general, the income elasticities are all less than one. On the supply side, all the short-run price elasticities are inelastic. The long-run price elasticities are all greater than their short-run counterparts. The long-run price supply elasticities for cotton, almonds, and alfalfa are elastic, i.e., greater than one. Policy makers can use these estimates to measure the changes in welfare of consumers and producers with respect to changes in policies and economic variables.

Regoršek, Erjavek, and Pfajfar (2006) analyzed food consumption patterns in Slovenia for households segmented by quartile income levels and for whole Slovenian population. Food items are divided into seven commodity groups. Cross-sectional household data from Household Budget Survey 2001 were used. Apply the linearly approximated Almost Ideal Demand System (LA/AIDS) the empirical results show positive expenditure elasticities being close to one where in general demands for dairy products and for vegetables have expenditure elasticities higher than unity. All Marshallian and Hicksian own price elasticities are negative and less than one. Demand for meat and fish is quite price inelastic whereas demand for vegetables is pretty sensitive to its own price changes. Results indicate that Slovenia is losing consumption characteristics typical for countries in transition however, some unique food habits persists.

Weliwita et al. (2003) estimates price and food expenditure elasticities of demand for twelve food groups in Tanzania by applying the linearized Almost Ideal Demand system to the latest household survey data. The results indicate that maize, rice, other cereals, pulses, sugar, edible oils, fish, starch, fruits and vegetables, meat, and other foods are price inelastic while milk and dairy products have unitary elasticity of demand. Most of the food groups are income elastic. The results also reveal that household income and family size have significant effects on food demand patterns. Main policy implications of the results include inter alia (a) income oriented policies will have a greater effect on promoting food consumption than price related policies, (2) a significant price decline associated with increased production of maize and rice will benefit a majority of households since the two commodities have high budget shares and low own-price elasticities of demand, and (3) meat was found to be inelastic with respect to the expenditure on food.

Skoufias (2003) examined the effect of price and income on food and calorie demand using SUSENAS data of 1996 and 1999 round, in attempted to capture the behavioral change of consumption in the aftermath of economic crisis. Nonparametric methods were implemented to observe the different elasticity estimates of poor and rich households. The empirical findings reveal that the income elasticity for calorie demand is slightly higher in 1999 (post crisis period) compared to that of in 1996 (pre crisis period). This figure indicates that the calorie-income elasticity is insensitive to price changes even when the price is very volatile in the crisis time. The households smooth their consumption in the time of crisis, through the increase of calorie-income elasticity for cereals while the calorie-income elasticity for other food decreased.

Bopape and Myers (2007) analyzes food expenditure patterns in South Africa, taking into account differences in demand behavior across rural and urban households, as well as across income groups. The analysis is carried out using the QUAIDS model, accounting for demographic effects, structural change, and seasonality effects. Expenditure endogeneity is also tested and controlled for. The study makes use of household food consumption data, collected as part of the KwaZulu-Natal Income Dynamics Study. Demand behavior differs significantly between rural and urban households, as well as across income groups, implying that an accurate analysis of expenditure patterns in South Africa requires a disaggregated analysis that takes into account these differences in demand behavior.

IV. THEORETICAL BACKGROUND

Consumption pattern is considered as one of the most important indicators of economic development in a country. In theory, the change in consumption pattern is determined by price and income changes together with changes in tastes and preferences. As what is evident in most developing countries, food constitutes the largest share of household expenditure and within the food category, 'staple food' is the most dominant consumption category (Indonesian Bureau of Statistics 2009).

Demand is the quantity of a good or service that consumers are willing and able to purchase during a specified period under a given set of economic conditions. The time frame may be an hour, a day, a month or a year. Demand for a commodity refers to the quantity of the commodity that people are willing to purchase at a specific price per unit of time, other factors (such as price of related goods, income, tastes and preferences, advertising, etc) being constant. Demand includes the desire to buy the commodity accompanied by the willingness to buy it and sufficient purchasing power to purchase it.

Demand may arise from individuals, household and market. When goods are demanded by individuals (for instance-clothes, shoes), it is called as individual demand. Goods demanded by household constitute household demand (for instance-demand for house, washing machine). Demand for a commodity by all individuals/households in the market in total constitutes market demand.

4.1. Law of Demand

The law of demand states that there is an inverse relationship between quantity demanded of a commodity and it's price, other factors being constant. In other words, higher the price, lower the demand and vice versa, other things remaining constant

4.2. Demand Function

Demand function is a mathematical function showing relationship between the quantity demanded of a commodity and the factors influencing demand.

$$Dx = f\ (Px,\ Py,\ T,\ Y,\ A,\ Pp,\ Ep,\ U)$$

In the above equation,
Dx = Quantity demanded of a commodity
Px = Price of the commodity
Py = Price of related goods
T   = Tastes and preferences of consumer
Y   =   Income level
A   = Advertising and promotional activities
Pp = Population (Size of the market)
Ep = Consumer's expectations about future prices
U   = Specific factors affecting demand for a commodity such as seasonal changes,
        taxation policy, availability of credit facilities, etc.

4.3. Exceptions to Law of Demand

The instances where law of demand is not applicable are as follows:
1. There are certain goods which are purchased mainly for their snob appeal, such as, diamonds, air conditioners, luxury cars, antique paintings, etc. These goods are used as status symbols to display one's wealth. The more expensive these goods become, more valuable will be they as status symbols and more will be there demand. Thus, such goods are purchased more at higher price and are purchased less at lower prices. Such goods are called as conspicuous goods.
2. The law of demand is also not applicable in case of giffen goods. Giffen goods are those inferior goods, whose income effect is stronger than substitution effect. These are consumed by poor households as a necessity. For instance, potatoes, animal fat oil, low quality rice, etc. An increase in price of such good increases its demand and a decrease in price of such good decreases its demand.
3. The law of demand does not apply in case of expectations of change in price of the commodity, i.e, in case of speculation. Consumers tend to purchase less or tend to postpone the purchase if they expect a fall in price of commodity in future. Similarly, they tend to purchase more at high price expecting the prices to increase in future.

4.4. Econometric Modeling

Economists use two main types of statistical models to forecast and provide policy analysis.
1. Single-equation models study a variable of interest with a single (linear or non-linear) function of a number of explanatory variables.
2. In multiple or simultaneous equation models, the variable of interest is a function of several explanatory variables which are related to each other with a set of equations.
    Specific estimation techniques may be needed depending on the data type:
1. Times series is a time-ordered (daily, weekly) sequence of data (price, income, etc) which often requires special statistical treatment.
2. Cross section refers to data collected by observing many subjects (individuals, firms or countries) at the same point in time.

4.5. Factors Affecting Demand

The general factors affecting demand of commodities include: disposable income, population, consumer tastes and preferences, substitutes and other products. Disposable income refers to the income left for spending on goods and services or for savings after taxes have been deducted. For superior goods such as stake there is a direct relationship between income and demand of the good. For inferior goods such as beans there is an inverse relationship between income and demand for the good. A rapidly expanding population will directly increase demand, contributing to general economic prosperity. However, per capita income levels must be maintained or raised. A change in consumer preferences and tastes affects the demand of individual commodities more than it affects aggregate demand. The introduction of completely new products also tends to shift demand levels among commodities. Goat meat is

a substitute for beef and its low price makes it attractive. Additionally, environmental and cultural factors also affect demand levels of agricultural commodities.

Its analysis usually consists of comparing the differences among the subject. Non-Economic Factors are Cultural: (Culture, Subculture), Social Class such as Social: Group (Reference Group), Family, Individual: Age, Life-Cycle Stage, Occupation, Economic Situation, Lifestyle, Personality, Self Concept Psychological: Motivation, Perception, Learning Beliefs, Attitudes.

4.6. Quantity Demanded (*Qd*)

• Amount of a good or service consumers are willing and able to purchase during a given period of time.

4.7. General Demand Function

• **Six variables that influence *Qd***
    o Price of good or service *(P)*
    o Incomes of consumers *(M)*
    o Prices of related goods and services *(PR)*
    o Expected future price of product *(Pe)*
    o Number of consumers in market *(N)*
• **General demand function**

$$Qd = a + bP + cM + dPR + e\acute{A} + fPe + gN$$

Variable	Sign of Slope Relation to Qd	Parameter
P	Inverse	b = DQd/DP is negative
M	Direct for normal goods	c = DQd/DM is positive
	Inverse for inferior goods	c = DQd/DM is negative
Pe	Direct for substitutes	d = DQd/DPR is positive
	Inverse for complements	d = DQd/DPR is negative
Á	Direct	e = DQd/D Á is positive
PR	Direct	f = DQd/DPe is positive
N	Direct	g = DQd/DN is positive

The price elasticity of demand is a dimensionless construct referring to the percentage change in purchased quantity or demand with a 1% change in price. It is determined by a multitude of factors, those are: availability of substitutes, household income, consumer preferences, expected duration of price change, and the product's share of a household's income. When the relative change in purchased quantity is below the relative change in price, demand is inelastic (numerically, the absolute value of price elasticity is below 1.0). In contrast, changes in demand that exceed the relative price change reflect elastic demand (the absolute value of price elasticity is above 1.0). For example, when a commodity's purchased quantity falls by 5% owing to a 10% increase in price, the price elasticity of demand is –0.5, reflecting inelastic demand. If the same price increase reduces the commodity's purchased quantity by 15%, demand for the product is elastic (–1.5).

V. DATA AND METHODS

In this study the data from the Jordan household expenditure and income surveys for the years 1992, 1997, 2000,2003, 2006, 2008 and 2010, that done by the department of statistics of Jordan (DOS). This survey cover (14) thousand household distributed over the entire kingdom. Other annual reports of DOS utilized in order to collect data on price indexes, population, and other parameters. A necessary comparison is done to predict the trend of expenditure, income, percentage share of the expenditure among the seven household expenditure and income surveys.

A sample of (700) household was data derived from the household expenditure and income survey, which represent (5%) of the total population of the survey in 2010 in order to analysis the demand of the main commodities that consisted more than (%) of the expenditure of the household.

5.1. Model Specification

In specifying the demand system we assumed that consumers allocate their expenditures in two stages. In the first stage, they decide how much to spend on each of the broad categories of goods and services such as food, housing, clothing, transportation, entertainment etc. Allocation of expenditure on individual groups is determined by consumers' total income and group price indexes (Heien & Pompelli, 1989). In the second stage, the group expenditure is allocated among various commodities in that group depending on the prices of individual commodities and the expenditure allocated to that group in the first stage. The second-stage budgeting procedure assumes weak separability of the direct utility function over the broad categories of goods (Fan, Wailes, & Cramer, 1995).

The Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980a, 1980b) was employed to model the demand for food in the second-stage. The AIDS model has been widely used for demand analysis because of its linearity and flexibility and because it satisfies the axioms of the demand theory (Heien & Wessells, 1990).

A common treatment of consumer behavior is to assume two-stage budgeting, which has found wide application within the empirical literature (Haden, 1990; Fan, 1995; Piumsombun, 2003; Shiptsova, Goodwin, & Holcomb, 2004; Jabarin, 2005; Menezes, Azzoni, & Silveria, 2008; Mergenthaler, Weinberger, & Qaim, 2009). At the first stage, the consumer decides on which group of goods to spend money, while at the second stage, group expenditure is allocated to particular items within the group. At the core of two-stage budgeting is the assumption of weak separability, that is, preferences for items within groups are assumed to be independent of items in another group (Deaton & Muellbauer, 1980). Weak separability therefore implies that the effects of price changes in one commodity group can be modeled via a combination of intra-group expenditure elasticities and changes in the allocation of expenditure across groups (Edgerton, 1997). Due to its practicability, we employ two-stage budgeting to obtain expenditure and own-price elasticities. As we are primarily interested in patterns of food purchase for home consumption, we consider only this category at the second stage decision on expenditure allocation.

An important feature of demand data that calls for consideration is that not all households consume all goods, such that the data is subject to censoring. To account

for this issue we employ the approach proposed by Shonkwiler and Yen (1999) to estimate a Linear Almost Ideal Demand System (LAIDS).

1. Factors Affecting Consumption and Demand in Jordan

a) The Population

The total population of Jordan for 2012 is 6.4 million with an average growth rate 2.2%. The population is increased by 32% that is from (4.7) millions in 1999 to 6.3 millions in 2011. This increase in population means that the demand for the commodities increases due to the increase in population, the amount of increase reach 32%.

Table 1
Population and Population Growth Rate for Jordan 1999-2011

Year	Population	Growth Rate	Urban Percentage
1999	4738	2.5	78.7
2000	4857	2.5	78.7
2001	4978	2.5	78.7
2002	5098	2.4	78.7
2003	5230	2.6	78.7
2004	5350	2.3	82.3
2005	5473	2.3	82.6
2006	5600	2.3	82.6
2007	5723	2.2	82.6
2008	5850	2.2	82.6
2009	5980	2.2	82.6
2010	6113	2.2	82.6
2011	6249	2.2	82.6

Source: calculated from Department of Statistics (DOS) reports, Amman, Jordan

The table shows that the percentage of urban population (according to DOS "Urban" includes localities of (5000) population or more) is almost constant (82.6%) for the period 2004-2011, while this percentage is 78.7% for the period 1999-2003. This may due to the above mentioned definition of the urban and rural areas adopted by (DOS).

b) Income of Household Member

Table 2 shows the index number of income of the household member by governorates during the seven household expenditure and income surveys, were 1992 is the base-year. The table indicates that household member income became (229.7%) of that in 1992 at the kingdom level, at the same time as this income is increased by (291.4%) and (260.2%) on urban and rural areas. The lowest income increase was in Aqaba and Madaba governorates which is estimated to be (174.5%) and (188.9%) respectively, and the highest increase is in Karak and Mafraq governorates which estimated to be (444.2%) and (327.4%) of the income in 1992 survey respectively.

The table illustrates also, that the income of the household member increased by the same percentage (240-243%) for Amman, Balqa, Zarqa governorates, these governorates consist the central parts of Jordan. However, the northern governorates exhibit moderate increase in household increase in income, that is (252.6%), (257.9%) and (278.1%) for Irbid, Jarash, and Ajlun governorates. Despite the high increase in

household income in Tafiela governorate, the southern governorates shows low increase in household income, which is less than 200%.

Table 2
Incremental Increase in Average Annual Income of Household Member by Governorates (%)

	2010	2008	2006	2003	1997	1992*
Amman	240.4	191.7	154.1	127.3	106.5	877.3
Balqa	242.2	193.2	174.2	153.7	127.2	558
Zarqa	243.6	205.5	150.2	121.5	124.2	559.3
Madaba	188.9	150.2	133.0	113.9	106.5	665.4
Irbid	252.6	203.2	172.2	146.5	114.4	562.8
Mafraq	327.4	275.6	241.0	173.8	153.5	375.3
Jarash	278.1	236.9	163.1	144.9	119.9	491.8
Ajlun	257.9	233.6	177.7	145.0	114.4	507.0
Karak	444.2	339.7	280.1	241.6	207.2	363.1
Tafiela	319.8	247.0	194.2	183.9	135.0	436.4
Ma'an	200.9	172.0	135.7	103.2	94.4	647.2
Aqaba	174.5	157.4	128.2	105.5	94.4	822.6
Urban	260.2	212.6	169.6	143.4	115.8	662.8
Rural	291.4	234.3	192.5	155.6	127.6	465
Kingdom	229.7	186.8	149.9	124.6	112.6	722.9

Source: gathered and calculated from Household Expenditure and Income Sample Surveys, DOS, different reports.
Note: * 1992 based year.

To investigate the difference among different surveys and different governorates analysis of variance was done. Table 3 shows that the value of (F ratio) is statistical significant at (0.05) this lead to conclude that there are significant differences both between governorates and among the different household expenditure and income surveys.

Table 3
Result of ANOVA for Testing the Differences in Household Member Income

F tabulated	P-value	F ratio	Group
Governorates	2.77	0.012783	2.12
Years	39.08	0.000	2.39

c) Expenditure of the Household Member
     The annual household member expenditure at the kingdom level according to the household expenditure and income surveys is increase from 908.6 JD in 1992 to 1793JD in 2010, which represent 97.3% increase over the period 1992-2010. Most of this increase comes from the increase of the expenditure of urban population expenditure. The expenditure of urban household member increased by 187.2% while th rural household member expenditure increased by 81.1% over the same period. Table 2 shows that the highest increase was in the household expenditure in Karak

governorate which estimated to be 204.5%. While the lowest increase was in Ma'an governorate with only (84.8%). Aqaba, Ma'an, and Zarqa governorates shows an increase in the expenditure less than 100% whereas the increase in expenditure in the rest of governorates the by more than 100% and less than 190%.

The table shows that the increase in the expenditure differ from household survey to another, Table 3 shows that those differences between years to years to significantly differ, while the differences between governorates is statistical insignificant. This means that the expenditure of the household member increase during the period 1992-2010, while all governorates shows the same increase.

Table 4
Incremental Increase Average Annual Expenditure of Household Member by Governorates (%)

Governorate	2010	2008	2006	2003	1997	1992* JD
Kingdom	197.3	165.9	143.8	142.5	103.7	908.6
Rural	181.1	143.8	134.9	109.2	105.7	790
Urban	287.2	244.3	208.7	114.2	100.3	651
Aqaba	222.2	204.5	164.2	143.8	115.8	641.1*
Ma'an	184.8	174.7	157.7	132.5	100.7	645.1
Tafielah	259.9	212.5	184.4	129.4	105.6	503.3
Karak	304.5	225.9	180.5	140.7	115.5	563.7
Ajlun	220.5	219.0	166.9	132.1	106.5	568.1*
Jarash	239.5	172.6	151.2	131.2	103.3	685.2*
Mafraq	231.4	181.3	175.4	137.8	107.8	557.6
Irbid	275.4	236.4	216.4	124.9	101.2	557.4
Madaba	212.4	169.0	188.6	125.9	102.0	683.1*
Zarqa	198.2	160.1	139.1	137.6	104.7	765.9
Balqa	271.8	220.0	211.1	137.0	109.9	560.9
Amman	290.5	246.8	208.0	126.6	100.9	782.0

Source: calculated from Household Expenditure and Income Sample Surveys, Department of Statistics (DOS)
* These governorates included in other governorates and the values were estimated by the researcher.
** Note: 1992 is base year

Table 4 shows the percentages of expenditure of the household member on different commodities group, the table shows that most of the expenditure is on food and food staff, this percentage varies from 40.9%- 33.0% for the years 1992 and 2006, which represent the lowest percentage, than it is increased to 37.8% and 35.2% in 2008 and 2010. In the other hand the expenditure percentage on Housing and Related Expenditure become in the second place, with a percentage of 25.5% for the year 2010, this percentage increased from 15.8% in 1997, than increase to reach 26.4% of the total expenditure of the household member in Jordan.

Expenditure on transportation and commutations is almost double during the period 1992-2010, and reach 17.1 %. This increase in the percentage is due to rapid expansion of internet and mobile services, an addition to the increase prices of oil.

Studies shows that every person in Jordan has 1.3 mobile and the internet cover more than 80% of the population (Haddad, 2010).

Other group of commodities show slit increase comparing to the above mentioned commodities. Table 5 shows that rural household member expend more than urban household member on food items, and transportations and communications while he expends less on other group of commodities, the reasons beyond this is that most of the rural household members works in cities especially in Amman so the expend more on transportation. It is concluded that the expenditure on food items decreased during the period of study, the expenditure percentage on Housing and Related Expenditure, transportation and communications, and educations increased for urban and rural as well as the kingdom level.

Table 5

Household Member Annual Percentage of Expenditure on Groups of Commodities and Services by Urban\Rural and kingdom

Group of Commodities and Services	1992	1997	2003	2006	2008	2010
			Kingdom			
Total	40.5	40.9	**36.2**	**33.0**	37.6	**35.2**
Alcohol, Tobacco and Cigarettes	3.4	3.3	**3.5**	**3.6**	4	**4.4**
Clothing and Footwear	8.1	6.1	**4.8**	**5.0**	4.1	**3.5**
Housing and Related Expenditure	26.8	28.3	**26.4**	**26.8**	24.7	**25.5**
Transportation and Communication	8.2	8.2	**13.2**	**15.8**	17	**17.1**
Education	4.5	4.5	**6.2**	**7.0**	5.1	**5.7**
Medical Care	2.5	2.5	**2.8**	**2.7**	1.9	**2.2**
Personal Care	3.2	3.2	**3.3**	**3.0**	3	**3.0**
Culture, Recreation and Sport	1.5	1.5	**2**	**1.6**	0.9	**1.3**
Other Expenses	1.3	1.3	**1.6**	**1.4**	1.5	**1.9**
Group of Commodities and Services			**Urban**			
Total food items	35.6	39.1	**34.8**	**32.2**	36.9	**34.5**
Alcohol, Tobacco and Cigarettes	3.4	3.4	**3.5**	**3.5**	3.9	**4.3**
Clothing and Footwear	8.1	6.1	**4.8**	**4.9**	4	**3.5**
Housing and Related Expenditure	27.8	29	**27.1**	**27.5**	25.3	**26.1**
Transportation and Communication	11.6	8.5	**13.3**	**15.7**	16.9	**16.9**
Education	3.8	5	**6.4**	**7.3**	5.4	**6.0**
Medical Care	2.4	2.6	**3**	**2.9**	2	**2.3**
Personal Care	3.4	3.2	**3.4**	**3.0**	3	**3.0**
Culture, Recreation and Sport	2.2	1.6	**2.1**	**1.6**	1	**1.4**
Other Expenses	2.1	1.4	**1.7**	**1.4**	1.6	**1.9**
Group of Commodities and Services			**Rural**			
Total food items	46.4	49.9	**43**	**37.9**	42	**39.5**
Alcohol, Tobacco and Cigarettes	3.1	3.7	**3.8**	**3.9**	4.7	**5.1**
Clothing and Footwear	9	6.5	**5.2**	**5.4**	4.3	**3.9**
Housing and Related Expenditure	22.9	24	**23**	**22.8**	21.3	**21.6**
Transportation and Communication	9.1	6.7	**12.5**	**16.5**	18	**18.5**
Education	1.9	2.3	**4.9**	**5.3**	3.4	**4.0**
Medical Care	1.3	1.6	**1.5**	**1.9**	1.1	**1.5**
Personal Care	3.3	2.8	**3.2**	**3.4**	3.1	**3.2**
Culture, Recreation and Sport	1.3	1.2	**1.5**	**1.5**	0.6	**1**
Other Expenses	1.9	1.2	**1.2**	**1.4**	1.4	**1.7**

Source: calculated from Household Expenditure and Income Sample Surveys, Department of Statistics

d) Prices of the Commodities

Prices indexes represent the increase in the prices in reference to certain year, Table 6 shows that the prices in Jordan increase from 97% in 1997 to 162.5% in 2012 for all items. The highest increase was in the prices of education services which reach 179.6% of the prices of 1998. While the prices of transportations increase by 171.5% of the prices in 1998, this due to the international oil prices increase, the table shows that the prices of transportations and communications is fluctuated from year to year this may due to the decrease in the commutations prices which if added to high prices in transportation down the index price for both.

The prices indexes shows the prices of Food items, transportation and communications, educations, and others items increase by more than 70% of the prices on 1998. Whereas the prices clothing and footwear, housing and related expenditure other good and services, personal care and medical care increase with percentage ranging between 40-65% of the prices of 1998.

Table 6
Index Number for Prices of the Main Commodities in Jordan 1997-2012

	1997	1999	2002	2006	2007	2008	2009	2010	2011	2012
All Items	97.0	100.59	105.0	121.2	127.0	144.7	143.7	150.9	157.6	162.5
Food Items	96.2	99.18	98.9	120.0	130.6	154.7	157.3	165.2	172.0	178.0
Clothing and Footwear	96.4	105.29	106.5	102.9	109.3	117.3	124.2	126.5	134.3	138.0
Housing	98.2	100.82	106.4	118.7	121.1	137.5	135.1	140.8	146.1	149.0
Other Goods and Services	97.5	102.06	115.5	132.2	134.8	148.1	142.2	151.1	158.8	164.6
Transportation Communication	101.3	99.79	121.0	140.1	142.4	163.0	145.4	157.3	164.9	171.5
Education	97.1	102.15	117.4	137.5	140.4	148.1	158.0	167.5	175.9	179.6
Medical Care	97.2	103.55	103.8	119.1	121.9	126.1	123.2	126.7	131.3	140.8
Personal Care	101.9	99.25	100.7	117.0	124.1	132.6	136.6	145.3	159.0	165.2
Recreation	99.9	100.07	96.2	91.2	90.8	95.1	96.7	95.6	99.3	101.2
Others	72.6	116.60	143.9	161.7	161.0	166.9	168.9	171.9	173.3	178.9

Source: calculated from Department of statistics (DOS) reports, Amman, Jordan in order to be suitable for comparison so 1998 the base year.

2. Empirical Results of Estimation of the Demand Functions and Elasticities

In this section demand function and elasticities for the main commodities that consumed by the Jordanian household member is estimated using the data of the sample selected.

The main commodities groups are: meats and poultry, fuel and lighting, cereals and cereal products, dairy products and eggs, vegetables, other food items, sugar, confect and honey, fruits, oils and fats, beverages, house cleaning materials, tea, coffee and cacao, women's clothing, furniture and furnishing. The expenditure of the household member is more than 1% of the total annual expenditure, the total expenditure for all those groups is accounted for (41%) for 2010 and (48.5%) for the year 1992.

The results are for the LES model in unrestricted (single equation models) and restricted (demand systems estimation) forms using six commodity groups namely: cereals and legumes, vegetables, fruits, meats and eggs, milk and its products and

vegetable oils and fats. The results of Engel curve analysis are also presented. The major results comprise basic parameters estimates, elasticities, and testing results.

Table 7 includes the results of applying the cereals and legumes demand equation of the LES to Jordan data comprising the estimates of the regression parameters, testing results and the Marshallian (M) and compensated (Hicksian (H)) elasticities with respect to total food expenditure.

2.1. Results of the Single Equation Approach

a. Cereals and Legumes

Table 7 shows that all regression coefficients are statistically insignificant at the 5% level of significance except the intercept which is significant at the 5% level. The regression coefficient with respect to total food expenditure is statistically significant at the 10% level. The joint F test is significant at the 5% level. Adjusted R-Square denotes that 92% of the variations in cereals and legumes expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian elasticities coincide with economic theory. The compensated (Hicksian) elasticities can be higher or less than the Marshallian elasticities. The own-price elasticity indicates an inverse relationship between the consumption level and the retail price of cereals and legumes and a rigid demand. The cross-price elasticities denote that cereals and legumes are gross substitute with meats and eggs and gross complement with the other groups. The income elasticity of demand shows a positive relationship between consumption level and expenditure pointing out to a necessity good.

It shows an inverse relationship between consumption level and income coinciding with economic theory and indicating a dominating price effect. The signs and magnitudes of the own- price elasticities coincide with economic theory and very close to international estimates. This conclusion applies also for expenditure and cross-price elasticities. The income elasticity indicates that cereals and legumes are necessity goods. The own-price elasticity of cereals and legumes is estimated at -0.51 reaching the highest valueamong the food groups and ranging between -0.51 and -2.075. While at international level the smallest own-price elasticity was in West Pakistan (-0.1) and the highest was in Ghana (-2.32). Canadian estimates of the AIDS model in 2005 show that the own- price elasticity is -0.70 for cereals and pasta and -0.43 for bakery[5]. The income elasticity of this group equals to 0.89 ranging from 0.83 to 0.94, which is smaller than the income elasticities of the other food groups except for meats and eggs. At international level on the other hand, the income elasticity was smallest in Argentina (0.16) and highest in India (1.06). Canadian estimates of the AIDS present an income elasticity of 0.89 for cereals and 0.94 for bakery.

b. Vegetables

All regression coefficients are statically significant at either the 5% level of significance or the 10% level of significance for the vegetables estimation. Adjusted R-Square denotes that 79% of the variations in vegetables expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian elasticities comply with economic theory. The compensated elasticities can be higher or less than the Marshallian elasticities. The own-price elasticity implies an inverse relationship between the consumption level and the retail price of vegetables and a rigid demand.

The cross-price elasticities denote that vegetables are gross complement with all groups excluding milk, which is gross substitute with vegetables. The income elasticity of demand shows a positive relationship between consumption level and expenditure indicating a luxury good.

The estimates coincide with economic theory and with international estimates. The income elasticity implies that vegetables are luxury goods. The own-price elasticity of this group is the smallest one (-0.03) among those of the other groups excluding that of the vegetable oils and fats and ranges between -0.03 and -1.02. International estimates show that the own-price elasticity varies between -0.13 (Argentina) and -1.11 (Java). Canadian assessment of the AIDS for the own-price elasticity is -0.65. The income elasticity of vegetables is about 1.33 and fluctuates between 1.28 and 1.37, which is smaller than the income elasticity of fruits and higher than the income elasticities of the remaining groups. At international level the income elasticity of vegetables varies between 0.04 (Argentina) and 0.67 (Java). Canadian estimation of the AIDS for the income elasticity of vegetables is 1.31.

c. Fruits

Table includes that all regression coefficients are statically significant at either the 5% level of significance or the 10% level of significance. Adjusted R-Square indicates that 97% of the variations in fruit expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian elasticities coincide with economic theory. The compensated elasticities can be higher or less than the Marshallian elasticities. The estimates comply with economic theory and international estimates. The income elasticity implies that fruits are luxury goods. The own-price elasticity of this group is about -0.44 and varies between -0.44 and -1.01, which is smaller than the own-price elasticity of cereals and legumes and greater than the elasticities of the remaining groups. Internationally, the own-price elasticity of fruits is about -0.95. Canadian estimates of the AIDS show an own-price elasticity of -0.84 for fruits. The income elasticity of fruits is about 1.47 and ranges between 1.41 and 1.61, which is the greatest elasticity compared with those of the other groups. International estimate of the income elasticity of fruits is about 1.39. Canadian assessment of the AIDS presents an income elasticity of 1.28 for fruits.

The own-price elasticity implies an inverse relationship between the consumption level and the retail price of fruits and a rigid demand. The cross-price elasticities denote that fruits are gross complement with all groups with the exception cereals and legumes and vegetable oils and fats, which are gross substitute with fruits. The income elasticity of demand indicates a positive relationship between consumption level and expenditure pointing out to a luxury good. It shows a positive relationship between the consumption level and income coinciding with economic theory. This means as income increases, the share of expenditure devoted to fruits also increases.

d. Meats and Eggs

Table includes the results of applying the meats and eggs demand equation of the LES shows that all regression coefficients are statistically insignificant at the 5% level of significance excluding the price of meats and eggs and the time trend. Adjusted R-Square implies that 96% of the variations in meats and eggs expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian

elasticities coincide with economic theory except the own-price elasticity because of its positive sign. The compensated elasticities are approximately equal to the Marshallian. The own-price elasticity implies a positive relationship between the consumption level and the retail price of meats and eggs and a rigid demand. The cross-price elasticities denote that meats and eggs are gross complement with all groups except for milk, which is gross substitute with meats and eggs. The income elasticity of demand indicates a positive relationship between the consumption level and expenditure pointing out to a necessity good. It indicates a positive relationship between the retail price and quantity consumed. The own-price elasticity of this group is about 0.23 and varies between -1.06 and 0.23, which doesn't comply with economic theory, but it complies with international estimates of the own- price elasticities. At international level, the own-price elasticity of meats and eggs varies between -2.16 and 6.33. Canadian estimates of the AIDS show an own-price elasticity ranging from -0.81 to -0.1 for meats and eggs. The income elasticity of meats and eggs is about 0.11 and fluctuates between 0.07 and 0.15 implying a necessity good, which is the smallest elasticity compared with those of the other groups and much lower than international estimates, which vary between 0.57 and 1.62 . Canadian assessment of the AIDS presents an income elasticity ranging from 0.61 to 0.90.

Table 7
The Estimates of Demand For The Main Commodities In Jordan

	Varia-ble	Inter-cept	Cere-als and Legu-mes	Meats and eggs	Vege-tables	Fruits	Milk	Vege-table oils and fats	Total food expen-diture	Time trend
Cereals and legumes	Coeff.	-320.18	137.03	6.24	-20.33	-33.49	184.34	-10.62	0.14	-12.28
	P- Value	0.01	0.26	0.27	0.57	0.14	0.11	0.35	0.09	0.25
	M		-0.51	0.28	-0.12	-0.35	0.85	-0.29	0.83	-0.22
	H		-0.37	0.44	0.01	-0.12	0.93	-0.21		
Meats and eggs	Coeff.	124.44	-30.67	32.58	-43.14	-27.99	27.05	-12.39	0.01	18.56
	P- Value	0.17	0.74	0	0.13	0.12	0.76	0.18	0.82	0.04
	M		-0.09	0.23	-0.22	-0.25	0.11	-0.29	0.07	0.28
	H		-0.08	0.25	-0.21	-0.23	0.11	-0.28		
Vegeta-bles	Coeff.	165.33	-343.73	-12.92	157.43	-29.84	175.54	-16.86	0.21	14.21
	P- Value	0.07	0	0.01	0	0.09	0.06	0.07	0	0.09
	M		-1.43	-0.66	-0.03	-0.36	0.93	-0.52	1.28	0.29
	H		-1.22	-0.41	0.18	0.01	1.05	-0.4		
Vegeta-ble oils and fats	Coeff.	-16.53	122.57	-4.96	-4.26	-22.97	-165.54	24.23	0.09	8.37
	P- Value	0.46	0	0	0.33	0	0	0	0	0
	M		0.74	-0.37	-0.07	-0.23	-1.28	0.17	0.96	0.25
	H		0.9	-0.18	0.2	-0.07	-1.19	0.26		
Fruits	Coeff.	29.75	220.47	-21.19	-87.59	96.49	-334.63	27.15	0.45	-30.33
	P- Value	0.8	0.09	0	0.03	0	0.01	0.03	0	0.01
	M		0.3	-0.47	-0.55	-0.44	-0.91	0.43	1.61	-0.31
	H		0.73	-0.23	-0.04	0.01	-0.75	0.58		
Milk	Coeff.	17.2	-105.66	0.24	16.6	-0.91	113.24	-11.51	0.1	1.47
	P- Value	0.79	0.13	0.94	0.41	0.94	0.09	0.09	0.04	0.8
	M		-0.71	0.02	0.18	-0.02	-0.06	-0.58	1.0008	0.05
	H		-0.55	0.22	0.35	0.27	0.03	-0.48		

e. Milk and Its Products

Table shows that all regression coefficients demand equation are statistically insignificant at the 10% level of significance excluding the price of milk, the price of vegetable oils and fats and the total food expenditure. Adjusted R-Square implies that 72% of the variations in milk expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian elasticities coincide with economic theory. The compensated elasticities are lower or greater than the Marshallians. The own-price elasticity indicates a negative relationship between the consumption level and the retail price of milk and a rigid demand. The cross-price elasticities denote that milk is gross complement with all groups except for meats and eggs, which are gross substitute. The income elasticity of demand implies a positive relationship between consumption level and expenditure pointing out to a luxury good. It shows a positive relationship between the consumption level and income.

The estimates comply with economic theory and international estimates. The income elasticity implies that milk is a luxury good. The own-price elasticity of this group is about -0.06 and varies between -0.06 and -0.33 representing the smallest own-price elasticity of the studied groups after vegetables. Internationally, the own-price elasticity of milk and its products differ between -1.37 and 1.58. Canadian estimates of the AIDS show an own-price elasticity of -0.88 for dairies. The income elasticity of milk is about 1.00 and fluctuates between 0.88 and 1.08, which is ranked fourth among the studied groups. International estimates of the income elasticity of milk and its products vary between 0.17 and 1.16. Canadian assessment of the AIDS presents an income elasticity of 1.08 for dairies.

f. Vegetable Oils and Fats

The results in Table 7 shows that all regression coefficients are statistically significant at the 5% level of significance excluding the intercept and the retail price of fruits (Annex Table 15). Adjusted R-Square indicates that 99.5% of the variations in vegetable oils and fats expenditure are explained by the demand equation. The signs and magnitudes of the Marshallian elasticities coincide with economic theory except the own price elasticity because of its positive sign. The compensated elasticities are lower or greater than the Marshallians. The own-price elasticity indicates a positive relationship between the consumption level and the retail price of vegetable oils and fats and a rigid demand. The cross-price elasticities denote that vegetable oils and fats are gross complement with all groups except for cereals and legumes, which are gross substitute. The income elasticity of demand implies a positive relationship between consumption level and expenditure pointing out to a necessity good.

A positive relationship between the retail price and quantity consumed. However, the relationship between the quantity consumed of vegetable oils and fats with its corresponding lagged (past price) retail price shows an inverse relationship between the quantity consumed of vegetable oils and fats and the retail price. a linear Engel curve related to vegetable oils and fats, which depicts the relationship between the level of consumption and income holding all other factors affecting demand constant, for the period considering total food expenditures. It shows a decreasing trend for the consumed quantity.

The own-price elasticity of this group is about -0.01 and varies between -1.20 and 0.17 representing the smallest own-price elasticity of the studied groups. Internationally, the own- price elasticity of vegetable oils and fats fluctuates between -0.05 and -0.08. Canadian estimates of the AIDS show an own-price elasticity of -0.22 for fats and oils. The income elasticity is about 1.04 and differs between 0.96 and 1.08, which is ranked third among the studied groups and representing a luxury good. International estimates of the income elasticity of milk and its products have values between 0.50 and 1.16. Canadian assessment of the AIDS presents an income elasticity of 0.68 for fats and oils.

VI. CONCLUDING

This study focuses on presenting the results of applying a dynamic model of a demand systems estimation using the LES to Jordanian data. The model is used to measure quantitatively the relationships between consumer demand, prices and food expenditure taking into consideration 6 food groups namely: cereals and legumes, vegetables, fruits, meats and eggs, milk and its products and vegetable oils and fats.

The own-price elasticies are consistent with economic theory excluding meat and eggs. Their magnitudes and signs are reasonable compared with international estimates. They are negative and less than one with the exception of meats and eggs. The estimates of the expenditure elasticities are also complying with economic theory and international assessments of various countries. The expenditure elasticities for vegetables, fruits and vegetable oils and fats are greater than one. Milk and its products have an expenditure elasticity of one. The other groups have expenditure elasticities less than one.

The result of this study can be considered as useful information for policy analysis such as tax reforms, trade restrictions, nutrition requirements, and other regulations that may lead to higher prices, forecast demand and establishment of policy scenarios.

Finally, this study is the first of its kind to investigate consumer demand and to assess the demand elasticities. It's considered also a base for conducting detailed demand studies in the near future to describe the structure of Jordan agriculture and food system and to determine the impact of changes in policies and programs, regulations, prices and income on the agricultural sector and its related agro-industry.

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