Estimation of Consumer's Olive-oil Demand Function at Consumer level in the Syrian Coastal Region

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Abstract

This research was carried out on a sample of consumers in the Syrian coastal region in 2019 using a questionnaire specifically prepared for a random sample of (383) households. It aims to estimate olive-oil function demand and identify the most important factors affecting needed amounts at consumer level.

The findings showed a high demand for olive oil in the coastal region up to (8) kg/capita, accompanied by increasing demand in rural areas compared to urban ones. Thus, it can be said that olive oil-producing areas have a greater demand than nonproducing ones. Production amount of each area has also affected the consumptive demand amount of olive oil, as this demand increased in Lattakia more than in Tartous, in parallel with increased contribution of Lattakia to olive-oil production in Syria of about 27.8% versus 19.2% for Tartous.

The rest of study findings coincided with the economic theory, so that increasing family size, income and food spending will result in an increase in olive olive-oil demand, whereas the increase in purchasing price and spending on competing commodities (alternative oils) will result in a decrease in olive-oil demand.

INTRODUCTION

Olive cultivation occupies vast areas of farmlands that exceeded(650) thousand hectares, i.e. 12% of total cultivable lands (Saqer & Alaa, 2009).It constitutes an important factor in the Syrian national economy as the value of the total resulting income is nearly (85) billion SP and the net (30) billion SP, equivalent to 10% of the value of farm income at country level. Olive production contributed to The National Domestic Product (GDP) by about 3.5% (Directorate of Olive Bureau, 2013).

Olive production witnessed a significant development at the beginning of the new millennium,as a result of increasing cultivated areas and using improved varieties (Marouf, 2015) as Syria moved from importing olive oil to self-sufficiency and then exporting this required commodity globally, ranking the fifth globally in olive production and fourth in olive-oil production in the first decade of the twenty-first century (Saqer, 2006). This is due to the improvement of production, which increased from (866) thousand tons in 2001 to about (1.2) million tons in 2014, of which about (170) thousand tons table olives, and the rest is for producing between 150 and 165 thousand tons of olive oil.This amount is sufficient to satisfy the need of the domestic market, which amounts to (110-120) thousand tons, while the rest is exported, providing a good amount of foreign exchange for the State treasury, on average, reaching approximately $ 110 million per year (Central Bureau of Statistics, 2017).

The increase in production is hardly able to cover the high rate of population growth and not high per capita consumption, leading to low domestic consumption surplus (Abdine*et al*., 2007). These problems have been exacerbated during the recent period as a result of the economic crisis in Syria, which led to a decline in the purchasing power of the Syrian consumer, in addition to low olive-oil quality as a result of poor official control, adulteration and smuggling (Ismander*et al*., 2016).

RESEARCH PROBLEM

Per capita olive oil in Syria has decreased to about 6 kg, and it doesn't suit Syria's rank in terms of global olive-oil production, which occupies the fifth. This indicates that low consumption of olive oil in Syria is not related to low production, but to other factors that may be related to consumer awareness, purchasing power, increasing population and other possible social and economic factors, some of which can be identified through this research. Olive-oil consumption is traditionally done, especially in the light of consumers' lack of familiarity with qualities consumed as a result of the wrong adopted methods for selecting and buying olive oil and lack of any information they have about quality criteria (acidity - peroxide) that represent the most important distinctive organoleptic and gustatory criteria for olive oil. Hence, this research is important for revealing the most important factors that affect consumer's decision about olive-oil consumption quantitatively and qualitatively.

RESEARCH OBJECTIVES

1. Determine per capita consumption of olive oil in the coastal region of Syria.
2. Estimate the consumer's demand function for olive oil.
3. Study some economic and social factors affecting olive-oil consumption in the Syrian coast, in the light of recent economic changes, such as income and price changes.

RESEARCH METHODOLOGY

The research relied on descriptive and standard analysis methods. It was based on preliminary data collected through a questionnaire targeting individual consumer household. A random sample of olive-oil consumers was collected, provided that the household is not an olive-oil producer because self-production of olive oil imposes consumption habits that are restricted by the availability of this commodity at the farm level, which is reflected by lack of purchase options. The estimated purchasing price and other preferential factors are likely to be subject to the bias of these households.

The size of the total sample of olive-oil consumers reached about (383), distributed equally to Lattakia and Tartous. They were randomly distributed to the administrative units of these two governorates according to the relative weight in terms of population.

RESULLTS AND DISCUSSION

Required amounts of olive oil at consumer level:

The required olive-oil amounts at the level of the total sample of consumers was up to about (12533.7) kg, ranging between (16-320) kg/household with an average of (41.6) kg/household and a standard deviation of (19.748). Given the household size, we obtain an average per capita olive oil of (8.7) kg, with a standard deviation of (3.2) kg. Here, it should be noted that this questionnaire is based on households whose consumption is not based on self-production of olive oil, but rather on the purchase of this commodity.

Olive-oil purchasing prices of the study sample:

Olive-oil purchasing price varied widely among consumers of the study sample, with an average purchasing price estimated at (1452.5) SP/kg and a standard deviation of (586.4) SP. Accordingly, the variation coefficient of purchasing price was about 40.4%, i.e. purchasing prices varied among consumers by 40%.

Factors affecting consumer demand for olive oil

The consumer's demand for olive oil is not only subject to the effect of purchasing price, but also to the influence of other factors that directly or indirectly affect the consumer's decision, whether by increasing or decreasing the needed amount. Through the study questionnaire, some variables that could affect the level of consumer demand for olive oil were measured, as these variables relate to the economic and social characteristics of the household and the nature of spending and its levels as discussed previously. The following is a definition of the independent variables assumed to affect the level of demand for olive oil:

1. **Size of consumer's household (X_1)**: It is a quantitative variable, measured by the number of members of the consumer's household who live in one house and share the income.
2. **Number of children per household (X_2)**: It is a quantitative variable, measured by the number of household members under sixteen.
3. **Householder's education (X_3)**: It is an ordinal variable, indicating the recent qualification or academic degree obtained by the householder until the moment of the questionnaire, and it includes six stages: literacy, elementary, preparatory, secondary, intermediate (institute), and university (BSc, Engineering, Higher Education).
4. **Consumptive income of household (X_4)**: It is a quantitative variable, measured by the value of the total monthly income of the consumptive household in Syrian pounds.
5. **Householder's age (X_5)**: It is a quantitative variable, measured by the number of years.
6. **Governorate where the consumer lives (X_6)**: It is a dual categorical variable, indicating the governorate where the consumer lives. It takes only two numbers: (1) in case of Lattakia and (2) in the case of Tartous.
7. **Region where the consumer lives (X_7)**: It is a dummy variable denoting the region where the consumer lives and taking the value (1) if it is rural, and (0) if it is urban.
8. **Householder's gender (X_8)**: It is a dual categorical variable, which aims to distinguish the households headed by a woman. It takes the number (1) in case the household is male-headed and (2) if it is female-headed.
9. **Householder's profession**: It is expressed by five dummy variables, indicating the profession performed by the householder: Permanent government job (X_9)permanent private job(X_{10}), self-employment in agricultural enterprises(X_{11}), self-employment in non-agricultural enterprises(X_{12})and free businesses (daily pay) (X_{13}), and each takes the number (1) in the case of positive and (0) in the case of negative.
10. **Number of employees per household (X_{14})**: It is a quantitative variable, measured by the number of household members who receive income as a result of doing business, jobs or professions, i.e. they contribute to part of the total household income.

11. **Household income sources**: It is expressed by three quantitative variables measured by percentage, the first variable expresses percent income received from government jobs (X_{15}), the second is percent income received from private jobs (X_{16}), and the third is percent income received from subsistence agriculture(X_{17}).

12. **Percent spending of household on food (X_{18})**: It is a quantitative variable, measured by percent spendingon food from the total annual household spending.

13. **Percent saving at household level (X_{19})**: It is a quantitative variable, measured in terms of percent income directed to saving from the total annual income of the household.

14. **Percent spending on alternative or competing oils (X_{20})**: It is a quantitative variable, measured by percent spending on alternative oils to olive oil (spending on other vegetable oils) out of the total spending on oils in general at the consumptive household level.

15. **Consumer experience in estimating olive-oil quality (X_{21})**: It is an ascending categorical variable consisting of three levels (poor, medium, good), which expresses the evaluation of consumer experience in assessing olive-oil quality by answering a set of questions included in the questionnaire.

16. **Sources of purchasing olive oil**: It is expressed in four quantitative variables measured in percentage. The first variable expresses percent olive-oil amount purchased from farms (X_{22}), the second expresses percent olive-oil amount purchased from the presses (X_{23}), the third expresses percent olive-oil amount purchased from the wholesaler (X_{24}), and the fourth expresses percent olive-oil amount purchased from the retailer (X_{25}).

17. **Purchasing price of olive oil by the consumer (Pc)**: It is a quantitative variable that is measured in Syrian pounds, and it expresses the price that the consumer pays for obtaining olive oil from various marketing sources.

As for the dependent variable, it is the annual required amount of olive oil at the level of consumptive household. It is denoted by the symbol Dc and measured in kg.

Stepwise multiple regression analysis was applied to estimate the effect of the previous combined independent factors of (26) factors on the dependent variable Dc. The findings showed that there are only nine factors that significantly affect the dependent variable as shown in Table (1).

Table 1. Statistical indicators of the variables of regression equation for the required amounts of olive oil at consumer level

Variable	Coefficients	Standard error SE	Calculated T	Sig
Constant	24.848	6.917	3.592	.000
P: Purchasing price of olive oil	-0.040	0.009	-4.255	0.00
X_1: Household size	2.363	.819	2.884	.002
X_4: Total income of household	0.0001	.000	3.402	.001
X_6: Governorate (Lattakia=1, Tartous=2)	-5.844	2.805	-2.084	.053
X_7: Region (rural=1, urban=0)	10.225	3.166	3.229	.002
X_{18}: Percent spending of household on food	0.477	0.102	4.676	.000

X_{20}: Percent spending on alternative or competing oils	-.187	.060	-3.094	.004
X_{23}: Percent amount of olive oil purchased from the presses	.062	.028	2.184	.000
X_{25}: Percent amount of olive oil purchased from the retailer.	-.091	.044	-2.089	.042

Source: Calculated and analyzed from the study sample data, 2019

The above t-test states seven variables that significantly affect the function at confidence level 99%, while the variables X_8 and X_{27} affect at 95% confidence level.

As for other factors, they were excluded from the estimated model as they are not significantly influential according to the statistical indicators as shown in Table (2).

Table 2. Statistical indicators of variables excluded from regression equation for the required amounts of olive oil at consumer level

Variable	Coefficients	Calculated T	Sig.
Number of household members (X_2)	-0.064	-.614	.542
Householder's education (X_3)	0.019	.176	.861
Householder's age (X_5)	0.175	1.708	.094
Householder's gender (X_8)	0.101	.965	.339
Householder's profession: Permanent government job (X_9)	0.028	.326	.746
Householder's profession: permanent private job (X_{10})	0.122	1.253	.217
Householder's profession: self-employment in agricultural enterprises (X_{11})	-0.012	-.132	.896
Householder's profession: self-employment in non-agricultural enterprises (X_{12})	0.128	1.484	.145
Householder's profession:free businesses (daily pay) (X_{13})	0.071	.794	.431
Number of employees per household (X_{14})	0.097	.892	.377
Percent income received from government jobs (X_{15})	-0.095	-.904	.371
Percent income received from private jobs (X_{16})	0.022	.202	.841
Percent income received from farm subsistence agriculture(X_{17})	-0.135	-1.269	.211
Percent saving at household level (X_{19})	0.149	1.446	.155
Consumer experience in estimating olive-oil quality (X_{21})	0.242	1.967	0.183
Percent olive-oil amount purchased from the farmer (X_{22})	-0.154	-1.807	.078
Percent olive-oil amount purchased from the wholesaler (X_{24})	0.055	.622	.537

Source: Calculated and analyzed from the study sample data, 2019

The calculated value of f for this model was (28,320), which is significant at confidence level of 99%.The value of determination coefficient for this model was about (0.716), so the nine factors of the model are responsible for 71.6% of the changes in olive-oil amounts required at consumptivehousehold level, while the remaining 28.4% is due to other factors not coveredby the study.

According to the previous findings, the relationship between supplied olive-oil amount and influencing variables was expressed by the following formula:

Dc = 24.848 -0.04Pc + 2.363X1 + 0.0001X4 + 10.225X7 -5.844X8 + 0.477X19

-0.187X21 + 0.062X26 -0.091X28

Variables affecting the required olive-oil amount can be classified at consumer level, depending on effect trend as follows:

-Factors affecting positively, including five factors:
  A. **Household size**: The parameter value of this variable (b=2.363) indicates that increasing household size by one member, while other factors are constant, will increase the required olive-oil amount by (2.3) kg/household.
  B. **Total household income**: The parameter value of this variable (b=0.0001) indicates that increasing family income by (10,000) SP, while other factors are constant, will result in an increase in the required olive-oil amount by (1) kg/household.
  C. **Region** (rural=1, urban=0): The parameter value of this variable (b=10.225) indicates that the rural family increases their demand for olive oil by (10) kg compared to urban household, assuming that other factors are constant.
  D. **Percent household spending on food**: The parameter value of this variable (b=0.467) indicates that increasing percent household spending on food consumption by 100% will, assuming other factors are constant, increase the required amount of olive oil by 46.7%.
  E. **Percent olive-oil amount purchased from the presses**: The parameter value of this variable (b5=0.062) indicates that increasing olive-oil amount provided by the presses (out of the total amount demanded) by 100% will, assuming other factors are constant, increase the required olive-oil amount by a rate of 6.2% at household level, and this differently reflects the higher amount required in the case of purchasing from the presses, i.e. households purchasing olive oil from the presses are those who have high consumption of olive oil, compared to those purchase from other sources.

   - Factors affecting negatively, including five factors:
  A. **Purchasing price of olive oil**: The parameter value of this variable (b=-0.04) indicates that increasing purchasing price of olive oil by 100% will, assuming other factors are constant, result in a decrease in the required olive-oil amount by 4%, This corresponds to the principles of economic theory.

  B. **Governorate** (Lattakia=1, Tartous=2): The parameter value of this variable (b3=-5.844) indicates that the demand of households living in Tartous decrease their demand for olive oil by (5.8) kg compared to those living in Lattakia, assuming that other factors are constant.
  C. **Percent spending on alternative or competing oils**: The parameter value of this variable (b4=-0.187) indicates that percent household spending on consuming alternative oils for olive oil (other vegetable oils such as sunflower, corn, soya bean, etc.) by 100% will, assuming that other factors are constant, reduce required amount of olive oil by 18.7%, and this also corresponds to economic theory that confirms an inverse relationship at the level of consumer demand for competing commodities.
  D. **Percent amount of olive oil purchased from the retailer**: The parameter value of this variable (b=-0.091) indicates that increased percentage of olive-oil amount provided by the retailer (out of the total required amount) by 100% will result in, assuming other factors are constant, a decrease in the required olive-oil amount at a rate of 9.1% at household level. This differently reflects the decrease in the required amount in the case of purchasing from the retailer, i.e. the households that purchase olive oil from the retailer are those who have low olive-oil consumption, compared to those purchasing from other sources.

CONCLUSIONS

The research findings showed that the level of demand for olive oil in the coastal region of Syria increased to (8) kg/capita, compared to an average of (6) kg/capita at country level, despite the economic crisis and low purchasing power of consumers in general. This is likely due to the fact that the coastal region is one of the main areas for olive-oil production, as it is characterized by the presence of established habits that promote olive-oil consumption more than other regions, especially in comparison with the main consumption areas such as Damascus, Aleppo and other olive oil non-producing governorates. This interpretation is also promoted by increased demand in rural areas compared to urban ones, given that rural areas are among the areas where olive cultivation is widespread and the culture of olive-oil consumption is more enhanced than urban areas. Thus, it can be said that olive-oil producing areas have a greater demand compared to non-producing ones. The production amount of each region has also affected the amount of consumptive olive-oil demand as this demand increased in Lattakia more

than Tartous. This was in parallel with the increase in percent contribution of Lattakia to olive-oil production, which reached about 27.8% compared to about 19.2% of Tartous (Annual Agricultural Statistical Abstract, 2018).

The rest of the study coincided with the economic theory, so that increased household size, income and food spending will result in an increase in demand for olive oil, whereas increased purchasing price and spending on competing commodities (alternative oils) will result in a decrease in demand for olive oil.

RECOMMENDATIONS

1. Developing the structure of olive-oil markets in Syria by regulatingun official markets (presses, farmers, etc.).
2. Developing marketing information systems to provide consumers with the necessary information related to available prices and qualities of olive oil.
3. Increasing interest in processed and bottled olive oil in accordance with international marketing standards, in order to control quality, control adulteration and meet consumer requirements quantitatively and qualitatively.
4. Increasing consumer awareness to move from consuming municipal olive oil to processed olive oil.

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