THE INFLUENCE OF PEOPLE INCOME ON FRUITS CONSUMPTION IN ROMANIA

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Abstract

The paper analysis the people income influence of fruits' consumption, starting from the premise that the consumption of fruits increases along with income growth. The research answers the question what are the direction and the intensity of income influence on fruit consumption? For answering this question, data related to income and fruits consumption have been analyzed using the regression models. The results show that 1-unit change in the level of income leads to 0.664 units change in the level of fruits' consumption and to 0.850 units' change in the level of meridional and exotic fruits' consumption. The consumption of meridional and exotic fruits reacts more evident to changes in the level of income, as compared to the consumption of fruits, in general.

Keywords: fruit consumption, people income, regression, market.

Introduction

The objective of the research is to identify the direction and the intensity of the relationship between fruit consumption and people income. For pursuing this, data from the National Institute of Statistic of Romania have been analyzed using the regression models. The hypothesis tested in this study is that the level of fruit consumption increases along with people income growth (Ion, 2015). The issue has grown in importance because that fruits are required in human nutrition as a result of the intake of vitamins and minerals. Due of great significance on health, fruits become a relevant topic of research.

Fruit consumption is viewed from two points of view, the general one at the level of supply from the markets, the producers, and the individual one at the level of the person and the possibility of securing consumption from own incomes. From the first point of view the fruit consumption results from the fruits' market features. In this order it can be noticed that fruits' market has a specific behavior different from other agro-food markets, as a result of its numerous features (Preda, 2001, Turek et al.2008) The most important of them refer to atomicity of demand and supply, fruit homogeneity, fruit seasonality, fruit zoning, and perishability.

As respect to atomicity, there are a large number of producers and consumers with approximately equal economic power as a result of the decapitalization of agricultural holdings and the decline in purchasing power of the population. For the most part, the fruits are obtained in the producers' households, on small surfaces, diversified as species and varieties. They are the main bidders on the fresh fruits market, participating directly in consumer transactions. Individual producers act, as a rule, in urban, disorganized markets,

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the conditions in which marketing is rudimentary, which creates a favorable framework for small retailers.

The fruit homogeneity and fruit zoning refer to the same quality of supply from different producers and, also, induces changes in population consumption. There are products with different degrees of seasonality that enter the market at the moment of their appearance, over short periods of time. The zoning of fruits and the existence of a poorly developed collection system lead to a high level of self-consumption, mainly in rural areas where it can be 80%. As a result, only 20% of total production is in the rural markets. This phenomenon occurs due to the lack of market transparency and also a lack of an information system, which exacerbates the discrepancies between demand and supply at the local level. All these generate either surpluses or quantitative deficits, which, amplified by cyclical fluctuations of products, create strong market distortions (Manole et al., 2005). In order to step-down these is recurring to storage activities and fresh sale during the year (for example, apple), which is related by perishability. But for very perishable fruits, fresh storage is impossible for long periods of time, therefore, supply often exceeds demand, which affects the market in the sense of its imbalance and falling prices. For this purpose, it is necessary to resort to various managerial interventions for the elaboration of operative programs regarding the staging and rhythm of the supply of fruit on the market, depending on the demand of consumers. The offer will have to meet both quantitative and qualitative requirements to meet buyers' tastes, active market participants and unique solvency requirements. Besides these particularities, it should be mentioned that the demand for fruit is continuous, while the offer is seasonal. For this purpose, imports are needed to ensure the annual consumption of fruits. Also, because fruit production has diverse destinations: for fresh consumption, processing and export, the organization of distribution channels to consumers is required. In this respect, in many of the European Union member states, the model of fresh fruit distribution and industrialization is developed (Marin et al., 2017), such as the take-over of the products from the producers or their markets, the gross market.

The second point of view takes into consideration the people possibility of securing consumption from own incomes. Fruit consumption at the person level is influenced by many factors. It is about the body's capacity to accept fruit, lifestyle and education. These include the understanding of the role of fruit for health. Starting from the assumption that all these are tolerated, it is necessary to see the extent to which income allows individuals to provide fresh fruit within a year. This enunciation corresponds to the research question in this paper.

1. Materials and methods

For analyzing the income influence on the level of the fruits' consumption, the data related to the income and the consumption of fruits are centralized in Table 1 and Figure 1. The income is expressed in lei per person per month, it is taken from the National Institute of Statistics databases. It refers to the period 2001-2016 and its values have been updated to 2016 using the prices indices. The income increased over the period under analysis from 472 lei per person per month to 1112 lei per person per month.

The consumption of fruits refers to all fruits and products obtained from fruits and expressed as fresh fruits. The data are taken from the National Institute of Statistics database and they are gathered for the period 2001-2016. The consumption of fruits doubled in the period under analysis, from 48 kilograms per person per year to 96 kilograms per person per year.

As seen in Figure 1 ad Table 1, the consumption of meridional and exotic fruits has increased over the period under analysis, from 9.7 kilogram per person per year in 2001, to 34.4 kilograms per person per year in 2016. The meridional and exotic fruits are more expensive than other groups of fruits, meaning that their consumption could increase only in the condition of income growth. This is the reason why we found interesting to analyze the relationships between income and the consumption of meridional and exotic fruits.

Table 1. The average consumption of fruits, the average consumption of meridional and exotic fruits, and the average income of population, in Romania, 2001-2016

Year	Average consumption of fruits (kg/person/year)	Average consumption of meridional and exotic fruits (kg/person/year)	Income (lei/person/month)
2001	48.1	9.7	472.81
2002	45.6	9.8	488.09
2003	60	14.8	525.45
2004	78.2	18.1	608.83
2005	77	16.2	626.09
2006	84.7	24.7	674.01
2007	69.9	22.8	784.76
2008	69.8	26.1	921.36
2009	65.7	19.4	951.05
2010	67	20.9	894.25
2011	74.7	19.2	892.34
2012	71.1	20.6	885.78
2013	73.7	23.1	886.17
2014	80.2	25.7	917.68
2015	87.8	29.8	995.00
2016	96	34.4	1112.22

Source: National Institute of Statistic of Romania

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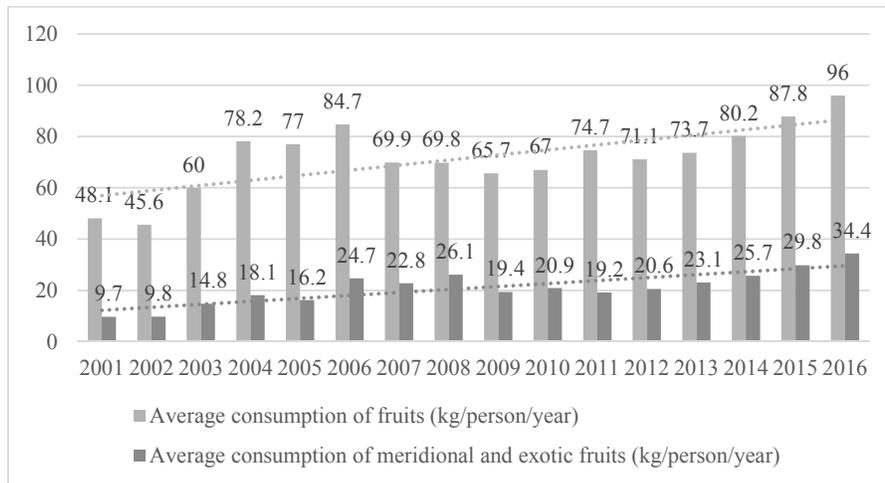
Source: National Institute of Statistic of Romania

Figure 1. Dynamics of the average consumption of fruits and the average consumption of meridional and exotic fruits, in Romania, 2001-2016, kg/person/year

2. Findings

The first step of the econometric model is to test the database normalization. The results for Average Consumption of fruits are as following: the mean ($\bar{x}$) registering a value of 71.84 kg, the median (μ) registering 72.4 kg, the maximum registering 96 kg, the minimum 45 kt. The Skewness value of 0.3961 means the sample is positively skewed and strives towards right. The Kurtosis value is 2.935 is close the value of 3 and indicates normal distribution. The probability of 0.83616 which is greater than 0.05 accepts the null hypothesis resulting a normal distribution for the first variable.

The results for Income are as following: the mean ($\bar{x}$) registering a value of 789.7436 lei, the median (μ) registering 885.9769 lei, the maximum registering 1112.220 lei, the minimum 472.8087 lei. The Skewness value of 0.001671 means the sample is positively skewed and strives towards right. The Kurtosis value is -0.315493 indicates normal distribution. The probability of 0.574866 which is greater than 0.05 accepts the null hypothesis resulting a normal distribution for the second variable.

Then, the model is established with the probability testing of the Covariance Analysis that has registered a value of 0.0050, which is smaller than 0.05 indicating an inexistent correlation at 5% level. According to the test the correlation coefficient is 0.664304, value that represents a moderate link, indicating the independence of the analyzed variables, which is a limit of the research.

The causality between variables using the Granger Test has been tested. The probability is higher than 0.05, registering 0.2571 for Average Consumption of fruits, value that does not Granger Cause Income, resulting an inexistent causality relation between the variables in this trajectory. For model's accuracy there must not be any preexistent causality.

The following step contains the linear model of the simple regression. Under the t-statistic test, the variables registered the following values: the probability afferent of this test is 0.0050 for Average Consumption of fruits and 0.0047 for Constant which are close to 0.05 resulting

the relatively great impact of the exogenously variable over the endogen one. R-squared is 0.4413 resulting the low capacity of the independent variable to explain the endogen variable. F-statistics is 0.005003 resulting a significant probability and a valid model. Durbin – Watson is 0.697747 and is not close to value of 2 resulting that the errors can be correlated.

Finally, model's validity is tested with the heteroscedasticity test, applied for residual values with the White Test probability. H0. The errors are homoscedastic. For the probability with a value below 0.05, H0 is rejected and above 0.05, H0 is accepted. The value of the probabilities for F is 0.2252, for Chi-Square is 0.1989 and for the second Chi-square is 0.4318, all values are above 0.05 therefore, accepting H0. From the Residual values autocorrelation testing, the following hypotheses are considered: H0. There is no correlation between the residual values in time. H1. There exists a correlation between the residual values in time. If Prob Chi-square is smaller or equal than 0.05, H0 will be rejected. The study has registered a value of 0.0174 for Prob. Chi-Square for the Breusch – Godfrey Serial Correlation LM Test therefore, accepting H1, which is a limit of the research.

The results of the regression models are presented in Table 2 and Figures 2 and 3. The models are statistically significant since the values of Sig. are below 0.05. Medium correlations have been found between income and the average consumption of fruits, since the value of R Square is 0.441. Strong correlations have been found between income and the consumption of meridional and exotic fruits. The value of R Square is 0.723.

Table 2. The influence of income on consumption of fruits and on consumption of meridional and exotic fruits

Variable	R Square	Coefficients of regression function	Standard error	Sig.
Average consumption of fruits	0.441	0.664	0.013	0.005
Average consumption of meridional and exotic fruits	0.723	0.850	0.005	0.000

Source: results of the regression model
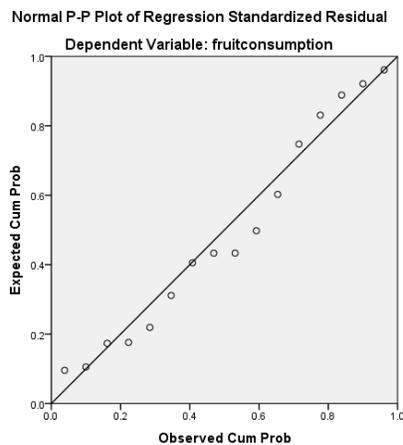
Source: results of the regression model
Figure 2. Relationships between income on consumption of fruits

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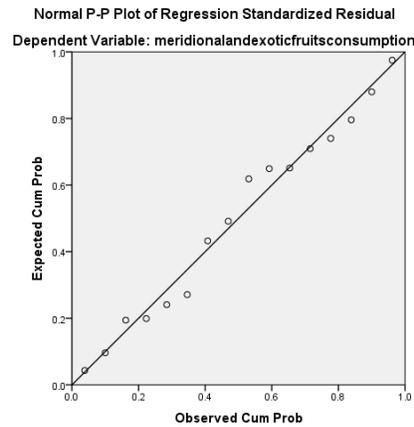
Source: results of the regression model
**Figure 3. Relationships between income on consumption of meridional
and exotic fruits**

The results of the regression model show that 1-unit change in the level of income leads to 0.664 units change in the level of the average consumption of fruits. It means that if income increases by one leu per month, or 12 lei per year, the consumption of fruits grow with 0.664 kilograms per year. The model also shows that 1-unit change in the level of income leads to 0.850 units change in the level of the average consumption of meridional and exotic fruits. It means that if income increases by one leu per month, or 12 lei per year, the consumption of fruits grow with 0.850 kilograms per year. It can be noticed that the consumption of meridional and exotic fruits reacts more evident to changes in the level of income, as compared to the consumption of fruits, in general.

Small reactions in the level of apple consumption have been identified, showing that apples' consumption do not depend on the market and people income, as long as they are more or less acquired from the peoples own households. Another explanation is that apples are cheaper food as compared to meridional and exotic fruits, and the changes in the level of income do not influence their purchase in a strong manner.

Conclusions

Analyzing the data, the results of the research show that the hypothesis aimed to be tested in this study, namely that the level of fruit consumption increases along with people income growth, is validated. Moreover, it has been found that, among other fruits, the meridional and exotic group of fruits reacts strongly to income changes. Bearing in mind the features of the fruit market, the need of guiding the producers and other economic agents in the pipeline in performing efficient and less uncertain activities is required. For producers, the solutions could be their organization in different forms such as associations with legal personality, farms of joint stock agricultural companies. For those who will be formed in accordance with the Law of commercial agricultural holdings, the market is the fundamental element of their functioning and existence in the economic competitive environment.

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