The demand for selected food nutrients in Greece: The role of socioeconomic factors

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Abstract
This paper investigates the relationship between the consumption of selected food nutrients and various socioeconomic factors in Greece. Linear multiple regression analysis was used to estimate the relationship between the consumption of each nutrient and the socioeconomic factors hypothesized to influence it. Data from the 1993/94 family budget survey were used in the analysis. Results show that nutrient consumption increases when moving to higher income levels, with a decreasing rate. Most socioeconomic factors other than income, also influence nutrient consumption significantly.

Key Words : *Nutrient demand, household data, Greece*

Introduction

Nutritive value of foods has become a major concern for consumers. The issues of health and diet have increased public interest in nutritional levels. Furthermore, although today food is available at relatively acceptable prices, nutrient consumption levels may not be sufficient. Unequal distribution of economic and other resources and the complexity of channels used to purchase food have resulted in variations in the consumption of food nutrients by households (Raunikar and Huang 1987). Food consumption research until now has mainly focused on specifying the relationship between selected socioeconomic factors and the traditional quantity and expenditure measures. These approaches however are not taking into account the nutritional status of household diets. Therefore a more complete understanding of nutrient consumption patterns is required.

Although food demand analysis is one of the most popular subjects of the related international literature, only a few studies have incorporated nutritional factors into food demand analyses. Some use a cholesterol information index as a variable in demand equations (Brown and Schrader 1990; Capps and Schmitz 1991). Some (Subramanian and Deaton 1996) are dealing with the adequacy of nutrients and estimate income and demand elasticities for calorie consumption. Others propose a formula to calculate nutrient elasticities for use in measuring price and income effects on nutrient availability (Gould, Cox and Perali 1991).

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Lancaster (1966) provided a conceptual framework to link food choice and nutritional status. He viewed nutrients as attributes of food consumption and suggested that consumers attain the nutrient attributes they most desire by maximizing utility as a function of nutrient attributes as opposed to food quantities in classical demand theory. Huang (1996) also linked food choice with nutritional status. He developed an efficient procedure to measure nutrient availability by way of demand elasticities for food items from a traditional demand analysis. In a more recent (Lee et al. 1998) study the authors followed a similar approach but unlike Huang they used U.S. Nationwide Food Consumption Survey data and additionally utility theory was used to derive an extended Rotterdam demand system. Finally, some other studies (Adrian and Daniel 1976; Basiotis et al. 1983; Devaney and Fraker 1989) directly fit demand equations for specific nutrients as functions of income and sociodemographic variables from U.S. household survey data.

The current study will use household survey data to link nutrient consumption at home with income and other socioeconomic factors of households in Greece. Thus, the purpose of this paper is to analyze estimates of the effects of selected characteristics of the household and its constituents on food nutrient consumption in Greece. According to our knowledge there has been no previous work on this subject in the past.

Data and Model

Data from the 1993 – 94 nationwide household consumption survey conducted by the National Statistical Department of Greece are used. The survey contains data from 6756 households located in the entire country area. These data include the quantities of every food item consumed by each household and detailed socioeconomic characteristics of the household and the household members.

The quantities of food nutrients consumed per household are computed by multiplying the quantity of each food item consumed by the household times the percent of each nutrient available in each unit of food. Most nutritive value of foods are compiled from Trichopoulou's "The composition of Foods and Greek menus" which gives a detailed account of the nutritive values of commonly used foods. Additionally, for some food items, data from the U.S. Department of Agriculture nutrient database were used. By adding this product over all foods for each nutrient, an approximation of the quantity of each nutrient available for consumption by the household per month is achieved.

In the present analysis 78 food categories, which represent more than 75% of total food consumption, and 12 selected food nutrients plus energy were used altogether. A detailed list of the nutrients used is presented in table 1. These nutrients are acting as dependent variables in each one of the 13 equations estimated. Food energy is measured in food calories (kcal); protein, fat and carbohydrate in grams; retinol and carotene in micrograms; and all other nutrients in milligrams.

The socioeconomic characteristics of the household hypothesized to influence nutrient consumption are total expenditure (used as a proxy of income), the percentage of household expenditure for food in restaurants, the age of family head, the number of household members in each age group, the degree of urbanization, the quarter of the year and finally the educational attainment of family head. Zero-one dummy variables are used to measure the last three household characteristics. More details for all independent variables are presented in table 2.

Linear multiple regression analysis is used to estimate the relationship between the consumption of each nutrient and the socioeconomic factors hypothesized to influence it. The statistical model has the following form:

$$NUTR_i = b_0 + b_1 EXP_i + b_2 \mathrm{EXP}_i^2 + b_3 FAFH_i + b_4 AGE_i + b_5 N0\_12_i + b_6 N13\_18_i + b_7 N19\_25_i + b_8 N26\_40_i + b_9 N41\_60_i + b_{10} N61\_75_i + b_{11} N75\text{--}_i + b_{12} POP1_i + b_{13} POP2_i + b_{14} POP3_i + b_{15} QUARTER1_i + b_{16} QUARTER2_i + b_{17} QUARTER3_i + b_{18} EDUC1_i + b_{19} EDUC2_i + u_i$$

where $NUTR_i$ the quantities of every nutrient consumed.

Table 1. Food Nutrients used as Dependent Variables

Dependent Variables	
NUTR01	Energy (kcal)
NUTR02	Protein (g)
NUTR03	Fat (g)
NUTR04	Carbohydrate (g)
NUTR05	Cholesterol (mg)
NUTR06	Retinol (μg)
NUTR07	Carotene (μg)
NUTR08	Thiamin (mg)
NUTR09	Riboflavin (mg)
NUTR10	Vitamin C (mg)
NUTR11	Calcium (mg)
NUTR12	Phosphorus (mg)
NUTR13	Iron (mg)

Total household expenditure squared is also included in the model to detect a possible non – linear relation between income and nutrient consumption. Zero – one dummy variables are utilized to analyze the impact of urbanization, quarter of the year and educational attainment of the family head. In each case one variable is excluded from the model to avoid singularity.

The same model is used for each nutrient because nutrients are constituent parts of food and therefore the same factors may affect the consumption of each nutrient. It is implied in the analysis that households behave in a way which can be explained by the consumer behavior theory. Households are hypothesized to purchase the respective nutrients through their allocation of income to various food products. In making this allocation households decide which nutrients will be consumed so that a balanced and adequate diet be maintained. Thus, nutrients are hypothesized to be discrete "goods" towards which households are behaving as they do towards every other concrete good.

The quadratic functional form has been chosen, among several alternative functional forms, to estimate the respective nutrient consumption relationships. Given the fact that cross – section data are used, the White test (White 1980) has been used to check the results for heteroskedasticity.

Table 2. Independent Variables

Independent Variables	
EXP	Household expenditure
FAFH	% Expenditure for food in restaurants etc
AGE	Age of family head
N0_12	Number of household members 0 - 12 years old
N13_18	Number of household members 13 - 18 years old
N19_25	Number of household members 19 - 25 years old
N26_40	Number of household members 26 - 40 years old
N41_60	Number of household members 41 - 60 years old
N61_75	Number of household members 61 - 75 years old
N75__	Number of household members 75+ years old
	Degree of urbanization
POP1	Population > 100.000 = 1, else = 0
POP2	Population 10.000 - 99.999 = 1, else = 0
POP3	Population 2.000 - 9.999 = 1, else = 0
POP4 (*)	Population <1.999 = 1, else = 0
	Quarter
QUARTER1	October - December =1, else = 0
QUARTER2	January - March = 1, else = 0
QUARTER3	April - June = 1, else = 0
QUARTER4 (*)	July - September = 1, else = 0
	Educational attainment of family head
EDUC1	College graduate = 1, else = 0
EDUC2	High School graduate = 1, else = 0
EDUC3 (*)	Elementary School graduate = 1, else = 0

(*) The variables indicated in each zero-one dummy variable category are excluded to avoid multicollinearity

The Results

Regression results for the 13 equations are presented in tables 3 and 4. R^2 was greater than 0.40 for Protein, Carbohydrate, Thiamin, Calcium, Phosphorus and Iron, greater than 0.20 for Energy, Riboflavin and Vitamin C, and greater than 0.10 for fat and Carotene. These results are considered satisfactory, given the fact that cross – section data were used in the analysis.

Income appears to be a significant factor affecting nutrient consumption. Income coefficients have positive sign and are statistically important at 95% for all nutrients. Income squared coefficients are also statistically important except for carbohydrate and carotene. The negative sign of income squared coefficients indicates that consumption of all nutrients increases initially, peaks and declines with successive positive increments of income. The fact that nutrient consumption increases with a decreasing rate proves that an Engel relation (which is common for more food products) also appeals when nutrients are examined separately. The relation between income and the consumption of energy, protein, fat and carbohydrate is further illuminated in figures 1 – 4. These estimates were derived from the respective nutrient consumption estimates by shifting income from level to level and holding all other socioeconomic variables at their means.

Nutrient – income elasticities (table 5), provide a more quantitative view to nutrient consumption – income relationship. These elasticities, computed at the midpoint of the data, do not appear to be particularly small for most nutrients. This means that nutrient consumption is positively and relatively highly responsive to income changes. Among nutrients, carbohydrate is the less responsive to income changes while carotene is the most responsive. Vitamin C, retinol and fat are also relatively highly responsive to income change. The values of these income elasticities are very close to the values of the respective elasticities calculated by Huang (1996). Although Huang followed a different approach in calculating nutrient elasticities, similarities at the elasticity values for almost all nutrients were apparent.

Food consumption outside household affects negatively the consumption of all nutrients. This result was expected considering that the original food consumption data used in the analysis did not include food consumption in restaurants etc. All nutrients however are not affected equally as it is indicated by the respective elasticities. The nutrients affected most are carotene, fat and vitamin C, while carbohydrate, iron and thiamine are affected less.

The age of the family head does not seem to affect the consumption of any nutrient. On the contrary, consumption of most nutrients is affected by the number of household members in each age group. Nutrient consumption is increased as the household size increases. However, as it is indicated by the respective elasticities (table 5), the presence of an additional household member affects nutrient consumption at a different degree according to the age group into which the additional member belongs to. Middle aged household members seem to contribute to nutrient consumption more than children, teenagers and old aged members. Also, the consumption of each nutrient is affected at a different degree according to the age group of the extra member. For low age groups, carbohydrate and some vitamins and minerals, which are common to dairy products and cereals seem to be affected more. At higher age groups the importance of some of these nutrient seems to be smaller.

Table 3. Consumption relationships for Energy, Protein, Fat Carbohydrate, Cholesterol and Retinol

	Energy		Protein		Fat		Carbohydrate		Cholesterol		Retinol	
	Coeff.	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*
Intercept	110839,10	9,07	2475,15	7,88	6409,44	6,07	11556,80	11,14	7228,57	1,91	3933,10	1,29
EXP	0,27	6,64	0,01	7,69	0,02	6,37	0,02	5,42	0,03	4,89	0,03	8,06
EXP2	-7,61E-08	-2,39	-2,40E-09	-2,64	-5,42E-09	-2,55	-4,70E-09	-1,84	-7,00E-09	-2,08	-8,37E-09	-4,04
FAFH	-148634,80	-14,75	-4463,14	-19,45	-9835,09	-10,40	-11246,04	-14,73	-13456,14	-4,97	-11425,36	-4,57
AGE	-255,79	-1,75	-3,84	-0,92	-19,62	-1,66	-17,25	-1,12	14,01	0,34	24,96	0,53
N0_12	28644,96	7,49	1247,75	8,24	836,68	3,26	4305,40	10,40	7204,62	1,71	4355,45	6,49
N13_18	34329,93	11,80	1298,90	15,44	1189,58	4,92	4918,48	16,85	1364,45	1,79	2477,05	3,31
N19_25	36152,48	12,76	1327,79	16,48	1424,55	6,12	4809,70	16,73	1853,23	2,20	3605,94	4,32
N26_40	34230,74	9,91	1319,01	12,04	1370,47	4,69	4433,36	15,11	782,71	0,31	3197,01	3,97
N41_60	43112,32	15,64	1753,95	21,92	1687,22	7,40	5575,01	21,71	5555,41	4,58	4610,81	6,36
N61_75	53984,15	15,83	1891,17	18,48	2542,11	8,64	6275,78	20,41	4946,11	6,33	3314,04	3,70
N75__	41750,42	8,26	1370,79	9,66	1736,38	3,94	5509,93	11,53	1938,69	1,08	2393,98	1,81
POP1	-84157,58	-17,38	-2233,99	-17,66	-4615,16	-10,15	-8977,25	-23,88	-8411,95	-3,29	-5417,03	-4,82
POP2	-55294,59	-9,81	-1446,55	-10,14	-2999,36	-5,69	-5997,85	-13,25	-6932,95	-2,53	-3283,35	-2,40
POP3	-43762,81	-7,64	-1075,73	-5,76	-2344,29	-4,72	-4896,53	-9,41	-3086,11	-0,78	-2469,28	-1,64
QUARTER1	-2642,02	-0,55	396,98	3,28	-315,58	-0,69	-387,29	-1,07	6896,74	2,43	1943,50	1,65
QUARTER2	-6687,86	-1,46	184,62	1,88	-540,04	-1,23	-705,90	-2,03	1128,35	1,53	-536,47	-0,46
QUARTER3	-1575,20	-0,34	84,64	0,85	17,78	0,04	-578,76	-1,61	1628,35	2,12	-88,60	-0,08
EDUC1	-20955,61	-5,94	-356,01	-3,38	-1211,82	-3,99	-2305,97	-7,12	1845,14	0,98	233,35	0,21
EDUC2	-31067,00	-6,51	-637,85	-4,67	-1924,64	-4,48	-2989,53	-7,50	657,86	0,52	454,76	0,32
R2	0,34		0,45		0,15		0,47		0,03		0,06	

Table 4. Consumption relationships for Carotene, Thiamin, Riboflavin, Vitamin C, Calcium, Phosphorus, Iron

	Carotene		Thiamin		Riboflavin		Vitamin C		Calcium		Phosphorus		Iron	
	Coeff.	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*	*Coeff.*	*t-Stat*
Intercept	10581,29	0,64	52,60	9,64	29,42	5,09	2706,09	3,81	15736,41	5,01	39286,62	8,05	467,48	8,98
EXP	0,26	4,65	0,00	6,49	0,00	8,04	0,02	7,04	0,08	9,07	0,12	7,98	0,00	6,78
EXP2	-4,65E-08	-1,02	-3,53E-11	-2,47	-3,38E-11	-2,67	-4,07E-09	-2,31	-2,39E-08	-3,20	-3,53E-08	-2,76	-3,06E-10	-2,56
FAFH	-131444,40	-11,08	-67,18	-17,02	-63,27	-15,14	-7892,85	-15,76	-38454,97	-17,56	-65929,08	-18,53	-591,69	-15,36
AGE	117,28	0,50	-0,09	-1,18	0,02	0,31	4,03	0,40	-3,07	-0,07	-15,37	-0,23	-0,51	-0,67
N0_12	20053,59	4,83	24,16	10,31	26,25	5,40	1089,00	7,10	14702,65	13,91	23927,49	8,83	205,03	7,50
N13_18	15169,87	3,39	26,80	17,65	18,05	12,24	1441,05	7,16	13473,17	15,60	22757,28	18,05	224,77	16,29
N19_25	9531,29	2,02	26,87	18,12	16,24	11,40	1522,69	7,41	12467,67	13,91	22246,49	17,38	223,88	16,34
N26_40	27517,31	5,90	25,43	15,32	15,72	5,19	2011,93	10,96	12015,73	13,09	21197,63	11,69	213,89	12,12
N41_60	42573,98	9,75	32,29	24,29	23,68	14,16	2740,78	15,88	14861,67	19,58	28124,50	22,61	295,33	23,46
N61_75	37675,82	7,75	34,42	21,74	24,85	15,48	2729,42	12,91	15624,69	16,24	29993,02	20,85	331,49	20,65
N75__	22417,08	3,25	26,40	11,54	18,11	6,75	1925,61	6,08	12896,81	9,59	22754,13	10,58	245,98	10,65
POP1	20575,37	3,66	-43,71	-21,96	-20,70	-6,67	-598,31	-2,29	-12349,57	-10,93	-34416,74	-17,18	-445,14	-21,27
POP2	13170,05	1,86	-29,72	-12,52	-14,64	-4,29	-476,79	-1,57	-6400,98	-4,83	-21903,88	-9,57	-293,78	-12,18
POP3	3635,32	0,48	-25,14	-9,28	-10,03	-2,15	-1055,64	-3,24	-6181,32	-3,95	-16410,45	-5,58	-229,03	-7,77
QUARTER1	5490,76	0,94	2,49	1,30	3,57	1,07	-1641,42	-6,80	1525,71	1,32	4151,35	2,03	36,53	1,81
QUARTER2	26770,16	4,59	4,27	2,44	-1,30	-0,79	539,97	2,12	2627,43	2,40	1182,82	0,77	29,87	1,85
QUARTER3	-7186,30	-1,35	-1,24	-0,70	-0,56	-0,34	-1211,79	-5,09	26,33	0,02	-1051,24	-0,67	5,60	0,35
EDUC1	4467,97	0,73	-10,37	-6,11	0,40	0,16	-142,60	-0,59	-686,12	-0,65	-4928,85	-2,89	-91,42	-5,28
EDUC2	598,77	0,07	-15,75	-7,81	-2,70	-1,16	-138,18	-0,46	-706,63	-0,53	-8707,30	-4,52	-136,59	-6,71
R2	0,13		0,51		0,24		0,26		0,43		0,45		0,44	

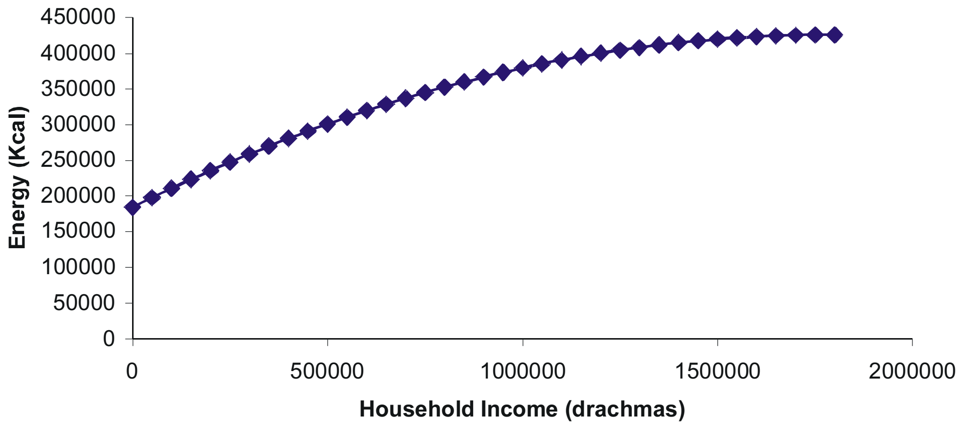

Figure 1. Energy income - consumption relationship

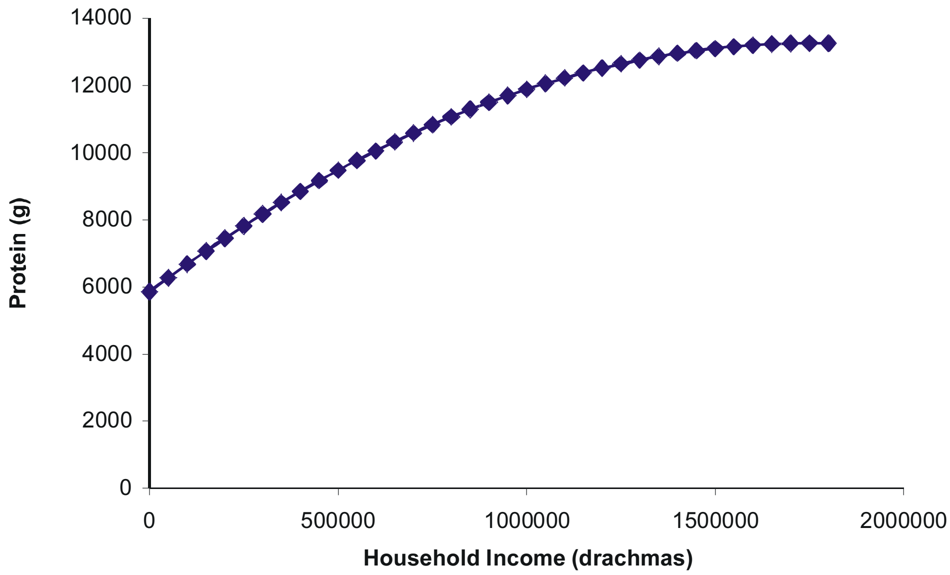

Figure 2. Protein income - consumption relationship

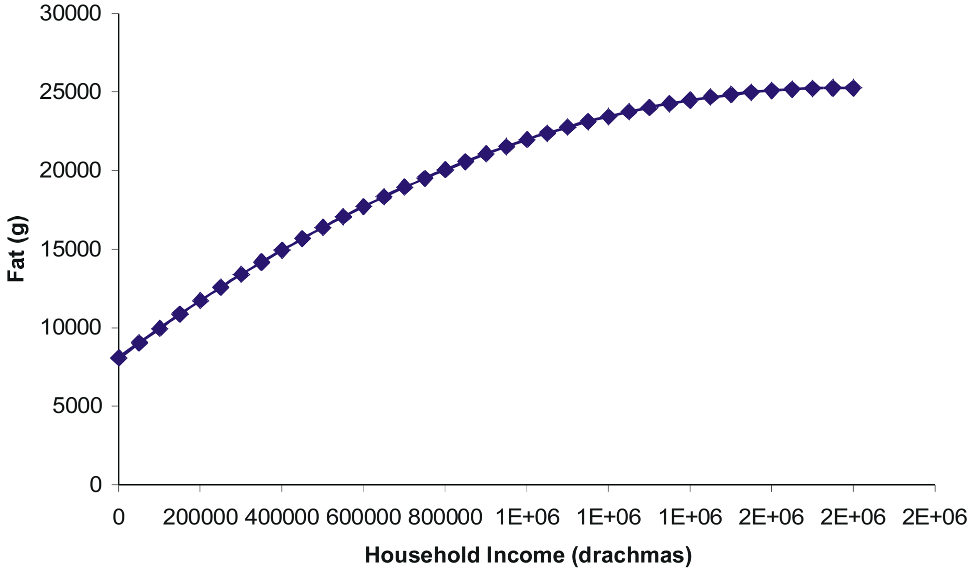

Figure 3. Fat income - consumption relationship

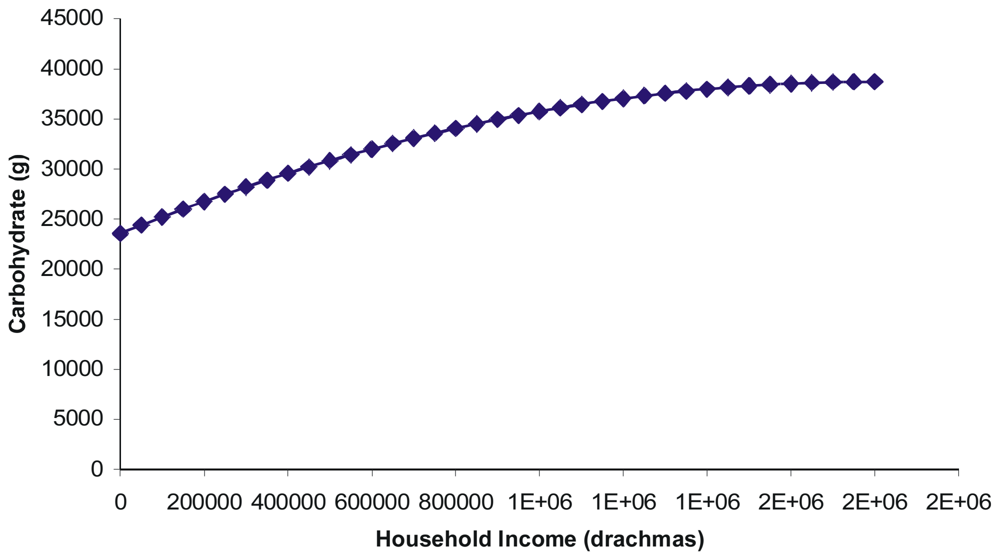

Figure 4. Carbohydrate income - consumption relationship

Table 5. Nutrient Elasticities

Nutrient	EINC		EFAFH		EAGE		E0-12		E13-18		E19-25		E26-40		E41-60		E61-75		E75+	
Energy	0,286	*	-0,107	*	-0,051		0,048	*	0,036	*	0,035	*	0,082	*	0,118	*	0,094	*	0,024	*
Protein	0,281	*	-0,102	*	-0,024		0,067	*	0,043	*	0,040	*	0,100	*	0,152	*	0,105	*	0,025	*
Fat	0,390	*	-0,136	*	-0,075		0,027	*	0,024	*	0,026	*	0,063	*	0,088	*	0,085	*	0,019	*
Carbohydrate	0,165	*	-0,075	*	-0,032		0,067	*	0,048	*	0,043	*	0,098	*	0,141	*	0,102	*	0,029	*
Cholesterol	0,308	*	-0,104	*	0,030		0,131		0,015		0,019	*	0,020		0,164	*	0,093	*	0,012	
Retinol	0,364	*	-0,096	*	0,058		0,086	*	0,030	*	0,040	*	0,089	*	0,148	*	0,068	*	0,016	
Carotene	0,498	*	-0,159	*	0,039		0,057	*	0,027	*	0,015	*	0,110	*	0,196	*	0,111	*	0,021	*
Thiamin	0,200	*	-0,084	*	-0,032		0,071	*	0,049	*	0,045	*	0,106	*	0,154	*	0,105	*	0,026	*
Riboflavin	0,303	*	-0,101	*	0,010		0,099	*	0,042	*	0,035	*	0,084	*	0,145	*	0,097	*	0,023	*
Vitamin C	0,356	*	-0,125	*	0,018		0,040	*	0,033	*	0,032	*	0,106	*	0,165	*	0,105	*	0,024	*
Calcium	0,313	*	-0,099	*	-0,002		0,089	*	0,051	*	0,043	*	0,103	*	0,146	*	0,098	*	0,026	*
Phosphorus	0,253	*	-0,092	*	-0,006		0,078	*	0,046	*	0,041	*	0,098	*	0,149	*	0,102	*	0,025	*
Iron	0,198	*	-0,082	*	-0,020		0,067	*	0,046	*	0,041	*	0,099	*	0,157	*	0,112	*	0,027	*

** Statistically significant at 95%*

An inverse relationship is noted between nutrient consumption and degree of urbanization. Households at urban areas seem to consume less of all nutrients except carotene than households at rural areas do. Indices in table 6 provide a more clear picture of these results. These indices are derived from the values of the expected consumption of each respective nutrient which have been calculated by keeping all other variables at their means. These indices reveal that differences in nutrient consumption according to the degree of urbanization are quite remarkable. Among nutrients, cholesterol, fat, iron, carbohydrate and energy are those consumed less at urban areas by more than 30%. Carotene is the only exception as it seems to be consumed more at urban areas than it does at rural ones.

Table 6. Nutrient consumption indices according to the degree of urbanization

Nutrient	Urban areas	Other urban areas	Semi - urban areas	Rural areas
	Pop. > 100.000	Pop. 10.000 - 99.999	Pop. 2.000 - 9.999	Pop. < 1.999
Energy	68,21	79,11	83,47	100
Protein	73,24	82,67	87,11	100
Fat	66,56	78,27	83,01	100
Carbohydrate	68,57	79,00	82,86	100
Cholesterol	65,74	71,76	87,43	100
Retinol	76,01	85,46	89,07	100
Carotene	113,07	108,36	102,31	100
Thiamin	71,18	80,41	83,43	100
Riboflavin	82,54	87,65	91,54	100
Vitamin C	95,02	96,03	91,21	100
Calcium	83,24	91,31	91,61	100
Phosphorus	74,73	83,92	87,95	100
Iron	67,40	78,49	83,23	100

The quarter of the year does not seem to affect the consumption of any nutrient except vitamin C. For the rest of the nutrients, coefficients for one or more of the dummy variables used were not statistically important. The related indices presented in table 7 provide a more clear picture of the results. Vitamin C seems to be consumed less at the quarters October – December and April – June than it does at the other two quarters.

Finally, educational attainment of the family head seems to be an important factor affecting the consumption of many but not all nutrients. An inverse relation is noted between educational attainment of the family head and the consumption of energy, protein, fat, carbohydrate, thiamine, phosphorus and iron, as is indicated by the negative sign of the respective coefficients. Thus consumption of these nutrients seems to decline when educational attainment of the family head increases. The respective indices presented in table 8 provide a more quantitative view of the results.

Table 7. Nutrient consumption indices according to quarter

Nutrient	October	January	April	July
	December	March	June	September
Energy	99,00	97,47	99,40	100
Protein	104,76	102,21	101,01	100
Fat	97,71	96,09	100,13	100
Carbohydrate	98,64	97,53	97,97	100
Cholesterol	128,09	104,60	106,63	100
Retinol	108,61	97,62	99,61	100
Carotene	103,49	117,00	95,44	100
Thiamin	101,64	102,82	99,18	100
Riboflavin	103,01	98,90	99,53	100
Vitamin C	86,34	104,50	89,91	100
Calcium	102,07	103,57	100,04	100
Phosphorus	103,05	100,87	99,23	100
Iron	102,68	102,19	100,41	100

Table 8. Nutrient consumption indices according to educational attainment of home-maker

Nutrient	College graduate	High School graduate	Elementary School graduate
Energy	88,26	92,08	100
Protein	92,36	95,74	100
Fat	86,05	91,22	100
Carbohydrate	89,53	91,93	100
Cholesterol	102,68	107,51	100
Retinol	102,01	101,03	100
Carotene	100,38	102,84	100
Thiamin	89,62	93,16	100
Riboflavin	97,72	100,34	100
Vitamin C	98,85	98,81	100
Calcium	99,04	99,07	100
Phosphorus	93,61	96,38	100
Iron	90,00	93,31	100

Conclusions

This study constitutes a first attempt to relate the consumption of selected food nutrients with various socioeconomic factors of households in Greece. Several socioeconomic and demographic characteristics of households have been found to influence household consumption of food nutrients.

Income is a significant factor and affects nutrient consumption positively. However, the consumption of nutrients increases with a decreasing rate when moving to higher income levels, which means that an Engel – like relationship between consumption and income appeals in nutrients. This implies that future income increases will have a continuously smaller impact on nutrient consumption in Greece. This result coincides with the finding of Gil et al. (1995) that nutrient consumption in EU countries tend to increase with a decreasing rate and converge.

Other socioeconomic variables except income seem to affect nutrient consumption as well. Food consumption outside household affected negatively the consumption of all nutrients as expected. Carotene, fat and vitamin C were the nutrients affected more. On the contrary, no relation between the age of the family head and nutrient consumption was found.

A positive relation between nutrient consumption and the number of household members was noticed. Middle aged household members seem to add more to household nutrient consumption than other age groups. Also, the consumption of each nutrient is affected at a different degree according to the age group of the extra member, as low age groups seem to consume carbohydrate and some vitamins and minerals, which are common to dairy products and cereals more than other nutrients.

The degree of urbanization also affects nutrient consumption, as households at urban areas consume less of all nutrients than households at rural areas do. The only exception was carotene, which was consumed more at urban areas. The quarter of the year contrariwise did not seem to affect the consumption of any nutrient except vitamin C. The consumption of that particular nutrient was lower at the quarters October – December and April – June than it was at the other two quarters. Finally, an inverse relation was noted between educational attainment of the family head and the consumption of energy, protein, fat, carbohydrate, thiamine, phosphorus and iron, while all other nutrients did not seem to be affected by this factor.

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