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Identification of Decision Making for Food Under Economic Crisis: The Case of Greece

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Abstract

The aim of this paper is to examine the changes on food consumption patterns of Greek households, following the economic crisis in Greece and the austerity measures that have greatly reduced the households' incomes. A sample survey among a random sample of 932 households living in the region of Thessaly was carried out while the consuming behaviour is focused on 20 basic food products. In order to identify the effects of economic crisis on consumers' behaviour, an exploratory Factor Analysis (EFA) followed by a hierarchical classification of the households have been implemented. Six patterns of food consumption's behaviour have been detected, revealing that most of the households have modified their eating habits, reducing the quantities consumed and/or looking for less expensive brands. Only 15% of the households do not seem to be affected by the crisis and the austerity policy. Quite enlightening is the research being made on the spatial basis. The results of this approach signify that low income households in urban areas, where the majority of the population lives, are deeply affected by the crisis, with these percentages to be even higher at semi urban and rural areas. This is the first attempt of assessment of the impact of the economic crisis in Greece on food consumption patterns

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1. Introduction

The Greek economic crisis is the outcome of a combination of two negative factors, occurring simultaneously,

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which are high public debt and high deficit. Up to now there is a series of argumentation regarding the reasoning of this outcome, with the most important ones to be waste of public money, overpricing of projects, failure to stop tax evasion and corruption of both political parties and public employees [17].

Frangos [6] assess the impact of this crisis on young people studying in universities in Athens. This study focuses on both eating habits and their psychological attitudes. The main findings are that there are significant increases for food and for the overall cost of living, increased mistrust for politicians, significant income inequality and increased sense of abandonment from the other EU countries. The dominant emotion is panic, there is need for psychological assistance and considerable number of them is planning to emigrate in order to find a more secure working and social environment.

The present study examines the impact of these adverse economic and financial changes on eating habits of Greeks. The results are extracted by implementing an exploratory factor analysis followed by a hierarchical cluster analysis, in order to detect and assess these changes on a spatial level too, dividing the country into three major categories, urban, semi-urban and rural areas.

2. Materials and Methods

The impact of the Greek crisis on the consumers' behaviour as regards food products has been examined through a sample survey implemented in Thessaly, one of the 13 regions of Greece[†]. Located in the central-eastern part of continental Greece, Thessaly can be considered as a representative region of Greece with a clear contrast between urban and rural areas[‡] and a diversified topography which includes mountain ranges, rolling hills, lowlands and islands. A stratified random sample [14], according to the average size of households living in each one of the urban, semi-urban and rural areas of Thessaly, was selected. Following the statistical approach for calculating overall and stratum sample sizes, the sample size required was about 930 households (with error percentage of 5% and t-value of 2).

The questionnaire submitted to the households focused on 20 basic food products; the objective of the research was to evaluate in what extent, the economic crisis and the austerity's measures have generated new consumption's attitudes and more over new food purchasing habits (decrease of demand, preferences for cheaper food products and even abandonment). For each one of the 20 food products, the consumers' behaviour after the beginning of the crisis was defined on a progressive scale (a Likert-type one) from 1 to 5 where 1 corresponds to no change nor reduction in the consumption, 2: limited reduction (less than 10%), 3: relatively important reduction (more than 10%), 4: change of food brand (less expensive) and 5: abandonment of consumption or abandonment of supply through the market, following alternative supply modes (own production, especially in case of vegetables). We deliberately adopted a fairly simple scale to enable consumers to respond more easily.

3. Theory / Calculation

After a systematic control of the questionnaires, the responses have been analyzed through Exploratory Factor Analysis (EFA). This method could be described as orderly simplification of interrelated measures. The major objectives of the EFA are to explore the likely underlying formation of a set of interrelated variables without imposing any fixed structure of the outcome. This method allows us to "identify the factor structure or model for a set of variables" [1].

The EFA model is $Y = X\beta + E$ [1]

where Y is a matrix of measured variables

X is a matrix of common factors

[†] With the 1997 Law on decentralized government in Greece, the country has been divided into 13 regions forming devolved units of state administration.

[‡] The two largest municipalities of the region (Larissa and Volos) occupy – in terms of population – the 6th and 7th ranks among the Greek municipalities (EL. STAT, Census 2011)

β is a matrix of weights (factor loadings)

E is a matrix of unique factors, error variation

If EFA is a very useful method that has been implemented in various empirical studies, it almost presents some important limitations:

(i) The correlations, the basis of factor analysis, describe relationships. No casual inferences can be made from correlations alone.

(ii) The choice of the initial variables is determining for the interpretation of the extracted factors. It is necessary to avoid sample specific variables.

(iii) Another important limitation concerns the reliability of the measurement, especially when measuring attitudes, behaviours and psychological attributes through Likert-type scales [8]. For this reason, it is suggested to perform reliability analysis in order to verify in which extent the construct of a single item can effectively summarized a complex concept.

(iv) Finally, the results are largely dependent of the sample selection and the sample size (larger sample leads to larger correlation). An important literature has been produced about the necessary absolute sample size.

4. Results / Discussion

In order to approach the impacts from the crisis on food consumption, a Factor Analysis (FA) was performed to determine whether the collected data relative to consumers' attitudes allowed us to detect different categories of products. The extraction method was in Principal Component Analysis (PCA), based on varimax rotation[§]. We decide to use PCA because our objective was principally to explore what are the food consumption's patterns emerging in the new crisis context, by reducing the number of initial variables. It showed that three categories are clearly put in evidence, loading three (3) principal factors (eigenvalues > 1) as it appears in the following pattern matrix (table 1). The implementation of the scree test confirms this result (3 factors to be retained). The linear regression applied on the 20 eigenvalues, produced $R^2 = 0.255$ while dropping the first eigenvalue, $R^2 = 0.625$ and increased to 0.965 when dropping the three first eigenvalues. The Kaiser-Meyer-Olkin measure of sampling adequacy is especially high (0.905) with a total variance explained by the 3 main factors about 64%.

The first category (1st component) concerns eight products for which the crisis has a relatively limited impact on the consumers' behaviour (Table 2). The proportion of households reducing significantly their volume of consumption is limited (less than 20%). In case of needs - consequently to the crisis - they prefer to opt for a less expensive brand while the percent of abandonment is not significant.

The second category (2nd component) concerns mainly meat, fish and cheese consumption. This kind of products is more directly concerned by the crisis comparatively to the first group: generally less than 40% of households have not changed their behaviour after the crises whiles the abandonment is quite significant, excepted for Chicken and Feta which is a staple cheese in Greek culinary traditions. This result may suggest that chicken and Feta's consumption is less elastic comparatively to the other products of the second category.

The third category (3rd component) is mostly affected by the crisis: the abandonment is quite frequent and in case of consumption's reduction, the households tend to opt for a relatively high level: the proportion of households with limited reduction is clearly lower than the proportion for high reduction (Table 4). The level of abandonment is really important; in case of crisis, such products can be considered for a large part of households as "luxury goods", consequently they are the first ones concerned by a decrease in consumption expenditures. Moreover the increase of VAT rates decided by the authorities in order to increase public revenues has generated a drastic decrease of this category of demand.

[§] As proposed by Yaremko, Harari, Harrison, and Lynn (1986), the rotation of the factor axes (dimensions) identified in the initial extraction of factors, allows us to obtain simple and interpretable factors. Due to the fact that the simple structure of the factor analysis was clear and respect the criteria proposed by Thurstone [18] in order to identify simple structure, we used orthogonal rotation rather than oblique; more precisely the varimax rotation as suggested by different authors [9]; Tabachnik and Fidell, 2007; [3].

Table 1. - Cronbach's Alpha Reliability Statistics

	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I – Basic food products:		Cronbach's Alpha = 0.909 (8 items)	
P3 – Pasta	.762	.627	.892
P5 – Potatoes	.757	.600	.892
P1 - Olive Oil	.679	.470	.899
P4 – Rice	.729	.607	.895
P2 – Bread	.647	.440	.902
P7 – Vegetables	.737	.608	.894
P9 – Milk	.651	.434	.902
P8 – Fruits	.684	.550	.899
II- Meat, Fish and Cheese (*)		Cronbach's Alpha = 0.877 (9 items)	
P13 – Beef	.671	.482	.859
P15 - Sheep and Goat	.619	.411	.864
P14 – Pork	.648	.461	.861
P20 - Cold Cuts	.609	.399	.865
P12 – Chicken	.647	.440	.862
P21 – Fish	.576	.362	.867
P19 – Sweets	.556	.325	.869
P11 – Cheese	.633	.436	.862
P10 – Feta	.614	.417	.864
III- Spirits, wine and sweets		Cronbach's Alpha = 0.825 (3 items)	
P17 – Tsipouro	.735	.543	.701
P18 – Spirits	.631	.405	.806
P16 – Wine	.679	.481	.759

(*) Sweets are included in the second group

Table 2. - Pattern matrix of Factor Analysis

	Component		
	1	2	3
Pasta	.777		
Potatoes	.775		
Olive oil	.750		
Rice	.747		
Bread	.707		
Vegetables	.638		
Milk	.591		
Fruits	.590		
Beef		.664	
Sheep and goat		.618	
Pork		.615	
Cold Cuts		.607	
Chicken		.594	
Fishes		.563	
Sweets		.547	
Cheese		.545	
Feta		.508	
Tsipouro			.837
Spirits			.786
Wine			.754

Table 3. – Basic food products: attitudes of Households (% for each type of behaviour)

1 st Category		Type of consumption's behaviour				
		No change (%)	Limited reduction (%)	High reduction (%)	Change of brand (%)	Abandonment (%)
Pasta	P3	43	10	7	37	2
Potatoes	P5	47	11	9	28	4
Olive oil	P1	43	15	10	28	4
Rice	P4	40	11	8	39	3
Bread	P2	52	13	11	19	5
Vegetables	P7	47	14	12	22	5
Milk	P9	51	11	6	28	5
Fruits	P8	42	15	15	23	5

Table 4. – Meat, Fish and Cheese: Attitudes of Households (% for each type of behaviour)

2 nd Category		Type of consumption's behaviour				
		No change (%)	Limited reduction (%)	High reduction (%)	Change of brand (%)	Abandonment (%)
Beef	P13	35	14	18	18	16
Sheep and goat	P15	26	9	17	15	33
Pork	P14	37	15	18	19	11
Cold Cuts	P20	28	8	17	26	22
Chicken	P12	47	16	11	21	5
Fish	P21	36	12	20	20	12
Sweets	P19	26	9	21	21	24
Cheese	P11	28	8	15	27	22
Feta	P10	38	13	11	30	8

In order to verify in which extent the products are effectively related to each other, we used the reliability analysis which also allowed us to confirm the internal consistency of the scale used for each item. The results of the analysis are summarized in the Table 4.5. We observe that in each case, the Cronbach's α value of internal reliability is greater than 0.823 which is a "good" result, especially if we take into consideration that the number of items for the 3rd category is limited. We have to notice that the result can be qualified as "excellent" for the 1st category of products [7].

Examining - for each category of products - the Cronbach's alpha reliability coefficient if one of the items is deleted (Table 5), it appears that the removal of any product would lead to degradation in Cronbach's alpha. In other terms, the different products forming each one of the three categories identified by the factor analysis are consistent.

Finally, each one of the three factors identified by the APC can be interpreted as an index of consumers' behaviour after the beginning of the crisis. The APC allows us to reduce the number of variables from 20 to 3, without losing much information. These 3 composite variables can be defined as a propensity level to change attitudes as regards (a) basic products, (b) meat, fish and cheese and finally (c) spirits and wine.

Table 5. – Wine and spirits: Attitudes of Households (% for each type of behaviour)

		Type of consumption's behaviour				
		No change (%)	Limited reduction (%)	High reduction (%)	Change of brand (%)	Abandonment (%)
Tsipouro(*)	P17	24	3	11	14	48
Spirits	P18	18	4	15	17	46
Wine	P16	26	7	12	24	31

(*) Tsipouro is a widespread spirit in Greece

From the above analysis, it is evidenced that the crisis has generated important changes in food consumptions' levels and patterns. Finally, we can consider that around 15% of households (Group I) do not present significant changes of consumption behaviour. Even if they are confronted to an average decrease of their monthly income by 10%, the reduction of their food expenses in € are very limited (-5.4%) and significantly lower than the other 5 groups **. Households of Groups II and III have partially modified their attitudes, in terms of quantities, as regards products as meat, cheese (not Feta), fish and spirits but maintained their consumption of basic foods. The decrease of their food expenses is significantly^{††} smaller than that of the three following groups (Table 13). This limited reduction can be explained by the fact that on average the households constituting these 2 groups declare the highest monthly income (around 1,600€). Households of Group VI have quite systematically opted for less expensive products. It concerns households with the lowest level of monthly income. Despite their new consumption's behaviour, they almost declare a significant decrease of food expenses (around 15.4%).

Finally, the crisis and the austerity measures taken by governments, have deeply affected in terms of consumption's behaviour, around 36% of the households participated in this survey (Group IV and V). In these cases, we observed a decrease relatively important and/or a tendency to opt for less expensive products as regards the basic ones. Their monthly incomes are among the lowest, while at the same time they affirm the highest incomes' decrease. It is necessary to notice that in these two Groups, the percentage of retired head of households is relatively high comparatively to the other 4 groups and the difference is systematically significant at $p=1\%$ (Table 7).

Table 6. – Impacts of the crisis on monthly income and food expenses

Categories of consumption's behaviour	Monthly Income of Households (€)	Decrease of monthly Income (%)	Decrease of monthly Food Expenses (%)
I	1,481	10.4	-5.4
II	1,623	13.6	-10.5
III	1,574	13.8	-12.3
IV	1,174	14.8	-14.7
V	1,000	15.6	-21.2
VI	961	13.5	-15.4
Total	1,286	13.7	-13.1

** The compare means T-test for independent samples is systematically significant at $p<1\%$ when we compare the percent of expenses' decreases between Group I and each one of the 5 other groups.

†† $p<1\%$

Table 7. – Employment Status of Head of Households (percentage by group)

Categories of consumption's behaviour	% of heads of households by status		
	Employed	Unemployed	Retired
I	80	12	7
II	72	20	8
III	79	14	7
IV	79	11	9
V	63	14	23
VI	62	18	20
Total	73	15	12

4.1. Some spatial differences of consumption's attitudes

As mentioned before, the survey was implemented on a regional level, taking into consideration its spatial differences. The questionnaires were completed in urban, semi-urban and rural areas. The distribution of households by category of attitudes allows us to detect some significant spatial differences (Table 8). The Chi-Square value confirms that the consumption's attitude is related to the place of residence (two-side asymptotic significance less than 1%) while the symmetric measures confirm that this relation is statistically significant.

Table 8. – Consumption's attitudes by area

(a) Number of households

AREAS	Consumption's Behaviours						Total
	I	II	III	IV	V	VI	
URBAN	115	93	134	157	82	116	697
SEMI-URBAN	13	13	21	38	17	15	117
RURAL	10	10	7	32	24	35	118
TOTAL	138	116	162	227	123	166	932

(b) % of households

AREAS	Consumption's Behaviours						Total
	I	II	III	IV	V	VI	
URBAN	16.6	13.3	19.2	22.5	11.8	16.6	100
SEMI-URBAN	11.0	11.0	17.8	32.2	14.4	13.6	100
RURAL	8.5	8.5	6.0	27.4	20.5	29.1	100
TOTAL	14.8	12.4	17.4	24.4	13.2	17.8	100

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.159	10	.000
Likelihood Ratio	39.762	10	.000
Symmetric values			
Phi	.202		.000
Cramer's V	.143		.000

Contingency Coefficient	.198	.000
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The impact of the crisis seems to be relatively less intensive in urban areas: around 50% of households deeply changed their behaviour (IV, V and VI) while this percent reaches 60% and even 77% in semi-urban and rural areas respectively. The percent of households that maintain their consumption's levels after the crisis is also significantly higher in urban areas. Once again, we observed a true opposition between the rural and urban areas of the country: the crisis up to now seems to affect more intensively cities with lower households' income as it results from the following Table. It is nevertheless interesting to notify that the decrease of monthly food expenses is less pronounced in rural areas comparatively to semi urban ones. This is possibly due to the fact that self-consumption – especially for fresh foods – and direct purchases from local producers are quite frequent in rural areas.

5. Conclusions

This research confirms that the ongoing economic crisis in Greece has a direct negative impact on food consumption. The implementation of the EFA methodology proved that the reduction of food consumption is not horizontal, but there are three discrete groups of foods with significant differences in reductions. The high scores of all the reliability statistics justify the consistency of this research.

Quite enlightening is the research being made on the spatial basis. The results of this approach signify that low income households in urban areas, where the majority of the population lives, are deeply affected by the crisis, with these percentages to be even higher at semi urban and rural areas. This finding has a rationale, because the majority of households in rural areas are low income pensioners and farmers.

Finally, the continuing financial crisis and the continuous recession of the economy signify that these changes of food consumption will continue towards the same direction. This field research was concluded after the implementation of the first two packages of austerity measures. Therefore, there is the necessity this research to be repeated, taking into consideration the current findings, in order to follow the evolution of the phenomenon and assess in a more complete and accurate way the impact of income reduction on consuming attitudes of first priority goods, such as food is. It is important to examine not only the consumption's levels but also the alternative supply's modes as for example the direct selling without intermediaries which seems to be a new market channel in Greece.

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