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# THE NORM IN THE PROCESS OF MARKET DEMAND OF FOODS

The results from a research of the aggregate consumer's attitudes concerning changes of the factors "income" and "time" in the process of market consumer's demand of foods and soft drinks are presented here. The formula of satiety has been established. Through it the aggregate subjective norm in the behavior of aggregate subject of market demand and the economic results from its action have been determined.

JEL: D12; Q11

The norm is a key to the essence and nature of consumer market demand for food and non-alcoholic drinks, especially when it is regarded as a process. Then it can determine the direction and speed of movement of the components of demand. The food demand process in its most archaic appearance is in fact standardized, even before there is any market. As per the famous anthropology theory of optimal gathering (see Crapo, 2000, p. 61) this process is generally subjected to the basic rate, which is expressed in the ratio of energy costs to collect food and the obtained food energy. The theory explains for example, why the protein treasure - the insects are eaten by humans only in limited places on the planet. The study of the norm in the process of market demand is more than justified. The market as a higher form of development of the free gathering is a highly socialized activity and more standardized.

The article reveals the results of a survey of aggregate consumer's attitudes as a subject of aggregate consumer market demand, highlighting the norm, that determines its behavior. This is the aggregate subjective norm, which is aggregated from subjective norms in the behavior of individual participants in the market demand and is manifested by aggregate consumer's attitudes – aggregate consumer's attitudes have been derived from those of the individual consumers.

The above results supplement the results, published by Todorov (2014a), but for reader's convenience we will recall the foundations of methodical treatment. The influence of market supply factors should be set apart from that of market demand, i.e. the attitudes of aggregate vendor as subject of the aggregate supply should be distinguished from those of the aggregate consumer. Since it is impossible to make an absolutely empirical differentiation, at least according to the current state of economic knowledge, *the Tree of Preferences* has been used as an instrument of relatively reliable results in this sense.

This is a scheme of attitudes for setting aside food- and non-alcoholic drinks expenses from total income and their distribution per products. The Tree of Preferences outlines successive branches in this scheme: total income - expenses for food and soft drinks and other expenses - the cost per food groups (vegetable, oil, sweets, drinks) of the total cost of food and soft drinks - the cost of sub-groups of food groups and so the cost of individual product. Most important in the scheme are sustainable and strong linear dependences among each branch and its sub-branches.[1] In other

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[1] The principles of the Tree of Preferences are presented in Todorov (2010) and in more details in Todorov (2014). Some results from experiments with the Tree of Preferences can be found in Todorov (2014a) and Todorov (2015).

words, there is a scheme of dendriform arrangement of costs incurred for food and beverages per products in which the relationship between any branch of the tree and any of its sub-branches is linear and markedly strong.

The Tree of Preferences shows how aggregate consumer prefers to distribute his income and particularly that part of it chosen by him to spend on food and soft drinks, and what are his attitudes on this occasion. Established sustainable relationships make market consumer's demand relatively predictable under certain assumptions. Such an assumption is that the Tree of Preferences is a predictable scheme of spending provided that the components of market supply fluctuate within the range in which they hesitate over the period for which they have established these linear dependencies.

The aggregate user consumes products as per the sums of money allocated to them and following their prices, but within the proportions among the components of food energy. In other words, he makes his choice among products, because of the substitutability among them and his choice is motivated by his income and their prices, but within proportions of fats, proteins and carbohydrates.

Everything mentioned above outlines attitudes. The aggregate user demonstrates his market behavior by virtue of his behavioral attitudes. The Tree of Preferences expresses his attitudes to spend for types of food and non-alcoholic drinks, for consumption in certain amounts and to pay appropriate prices for them, for consumption of food energy, whose components are in certain proportions. These are his attitudes in the process of consumer market demand.

The aggregate user is displayed in this scheme with the parameters of the average country user - these are indicators defined as „average per capita". Or if his parameters are multiplied by the number of population we will obtain aggregate spent money and aggregate products consumed annually.

If a process means a consequent change of states of consumer market demand, the aggregate subjective norm in behavior of his subject can be identified by the sequential change of state of the demand under the influence of factors of change in demand. The present results are the product of an experiment with the Tree of Preferences in 4 consecutive years: 2008, 2009, 2010 and 2011. Data for it are derived from annual publications of NSI "Household Budgets in the Republic of Bulgaria" and "Average prices and purchased quantities of basic food and non-food items from households" for the period 1997-2011 on the inventory in those posts methods. The first two (2008 and 2009) of the last four years of the period are with the best market status of aggregate user since 1997; in the next two years this status deteriorates, which increases especially in 2012 and 2013. The group of years applied in the experiment is with relatively balanced conditions in this regard.

The experiment includes identification of aggregate consumer's attitudes on amending his income and time. It happens in the following 4 modes and each of them contains 6 steps:

1. By invariable state of cost for food and soft drinks and modification of time. This mode is indicated in the charts with "OR = 0". The attitudes of aggregate user are

to reduce the proportion of total expenditure on food and drinks in his total income. By this mode a rate of increase of income is sought which will lead to practically invariable state (zero growth) of the average result in the total expenditure on food for the four years. For the five steps in amending the time, the average amount of total income rises about 3%. Therefore, if in 5 consecutive years the total income per capita grows evenly and if finally it is up by 3% compared to the initial year, the attitude of aggregate user is to set aside this time the same amount as total cost of food and drinks.

2. When amending income by 4% for each additional unit of time and by change of time. This mode is indicated in the charts with "OD = 4".

3. When amending income by 8% for each additional unit of time and by change of time. This mode is indicated in the charts with "OD = 8".

4. When amending income by 12% for each additional unit of time and by change of time. This mode is indicated in the charts with "OD = 12".

As an indicator of the aggregate consumer's income is used the total income, respectively, the total cost of food and soft drinks. The  year is used as a time unit. All parameters are average annual values.

Attitudes in each of the regimes are established in 6 steps of amendment of the total income and years. For example, in the second mode, the steps are:

1) a basic total income in the base year;

2) income that is 104% of baseline in the first year;

3) income that is 108% of the baseline in the second year;

4) income that is 112% of the base in the third year;

5) income that is 116% of the base in the fourth year;

6) income that is 120% of baseline in the fifth year.

Here the attitudes of aggregate user to formation of behavior for each of the four years (2008, 2009, 2010, 2011) are checked at 5-fold increase in the values of total income and the time unit, the amount of basic income per person in the respective year is: 3502 BGN for 2008, 3693 BGN for 2009, 3648 BGN for 2010 and 3782 BGN for 2011. These are actually reported amounts. The above results are further averaged from the results for the four years. The experiment reports interchangeability of foods. Their indicators are aggregated and the groups of products are reduced to:

• plant foods with high energy content - included are: legumes, rice, potatoes, onions, mushrooms, the so-called other cereals listed in "Household Budgets";

• vegetables - including all other vegetables;

• vegetable oils: oil, margarine, etc.;

• bread and bakery products;

• animal fats;

• meat and fish - meat, meat sub-products, meat products, fish;

• eggs;
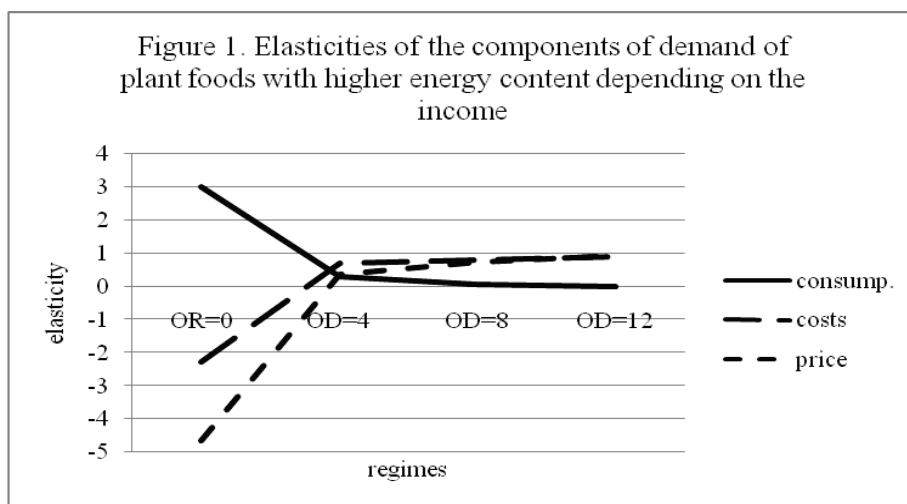
• milk;

• dairy products;

• fruits and fruit juices;

- other desserts - chocolate and sugar confectionery, flour confectionery, incl. flour;
- sugar and honey;
- drinks - soft drinks and mineral water;
- other products - canned fruits and vegetables, which are almost entirely from domestic production and are not subject to market demand, plus salt, vinegar, tea, coffee.

The groups include the exhaustive list of products from "Household Budgets in the Republic of Bulgaria". The amount of their cost is equal to the total cost of food and soft drinks. The amounts of the contained therein calories and energy components - fats, proteins and carbohydrates are equal to the total amount of calories and components consumed. The last two elements in the group - "drinks" and "other products" are included in the study only as their cost.
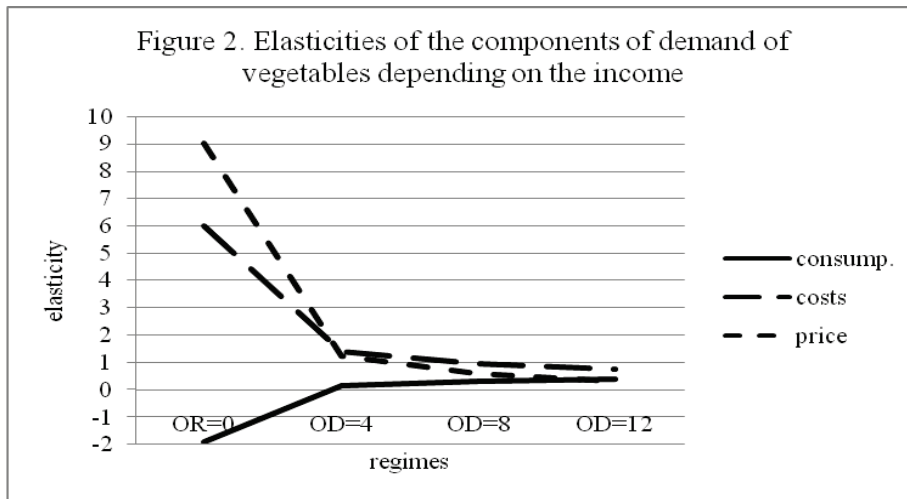
The results are expressed as elasticity of market demand components - consumption, costs and prices, depending on income. Figures 1 - 4 present the trajectories of elasticity of the latter, the highest step (VI) for any of the preceding four consecutive modes. The products are sorted into 4 groups according to the configurations of these trajectories:

1) plant foods with higher energy content, eggs and sugar;
2) vegetables;
3) vegetable fats, meat and fish, dairy products;
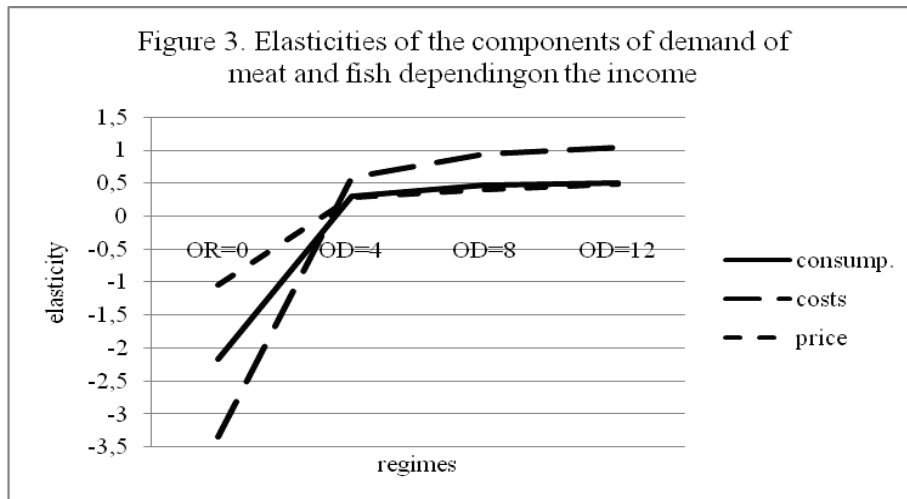4) bread and bread products, fruit, other desserts, milk.

The first group has a downward trajectory of elasticity of consumption depending on income and upward trajectories of elasticity of costs and prices. This configuration is shown in Figure 1 of the example of plant foods with higher energy content.



Figure 1. Elasticities of the components of demand of plant foods with higher energy content depending on the income

The trajectory of elasticity of consumption of vegetable is upward, but of costs and prices - downward (Figure 2).



Figure 2. Elasticities of the components of demand of vegetables depending on the income
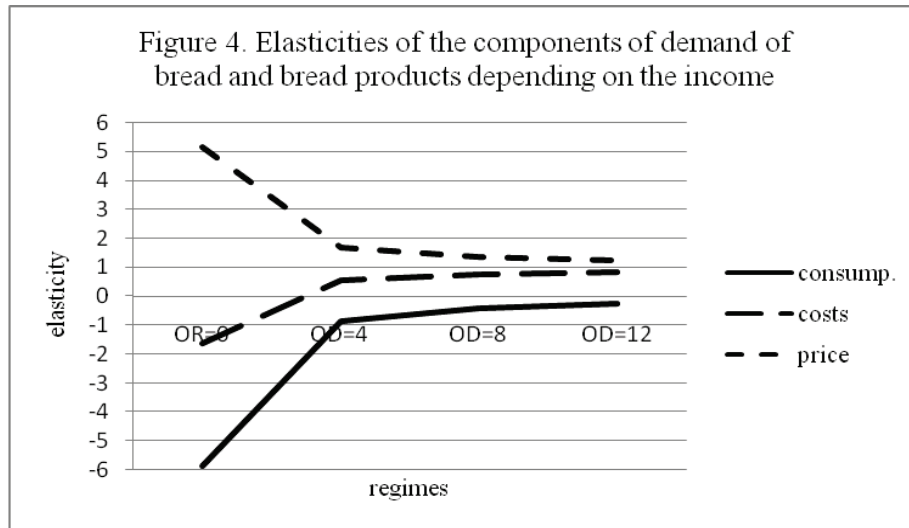
The third group is with upward trajectories of elasticity of consumption, costs and prices. In Figure 3 this configuration is presented as an example of meat and fish.



Figure 3. Elasticities of the components of demand of meat and fish dependingon the income

The fourth group has upward trajectories of elasticity of consumption and costs and downward trajectory – of prices. Figure 4 presents this configuration as an example of bread and bread products.

Figure 4. Elasticities of the components of demand of bread and bread products depending on the income

The trajectory of the elasticity of the costs of soft drinks is rising, and of the "other products" is declining, as for vegetables.

The summary of configurations represents the formula of satiety of consumer market demand for food and soft drinks. The elasticity of consumption tends to zero, the elasticity of cost and price tends to 1, depending on income. Explained by the example of bread, that means that by further steps to increase of income that would be higher than 12%, the elasticity of demand will be more and more than -0,24 as it is here in step with 12% increase in income and will remain negative, i.e. the attitude of aggregate user for consumption of bread will continue to be reduced. Each percent increase of income will call attitudes of smaller reduction in consumption and that percentage will move increasingly to its zero value.

In subsequent steps of increasing the income the elasticity of the cost of bread will be higher than 0.85, as it is here in the step with 12% increase of income and will be positive, i.e. the attitude of aggregate user to the cost of bread will continue to rise. Each BGN increase in income will call attitudes to lower increase of cost of bread and this ratio will approach increasingly a value of 1,0, i.e. 1,0% increase in the cost of bread for each 1,0% increase of income. Respectively the elasticity of price will move lower than 1,27, it will be positive, i.e. the attitude of aggregate consumer to this price will continue to rise. And because each additional percentage increase of income will lead to closer to zero reducing consumption tending to 1,0% inflated costs, the price increase will be delayed and will get to 1,0%.

The formula of satiety leads to an understanding of the attitudes of aggregate user in the process of user' market demand as dependent on subjective norms for consumption. Subjective standards for food consumption of the aggregate user

have a collective character regarding the subjective norms of consumption of individuals and groups of users that make up the aggregate user. In the case of absolute aggregate subjective norm for consumption of bread and bread products the amount would correspond to the elasticity of consumption depending on income, equal to 0,0. But the aggregate subjective norm for consumption does not exist as an absolute one. Its understanding is only a direction of aggregate user's attitudes in the motivational mechanism of his behavior- attitudes to demand movement in the formula of satiety.

Strictly speaking, the trajectory of elasticity of consumption will never "lie" on the horizontal zero, it will tend to it. The values of this elasticity, as they are close to zero, are only an expression of the attitudes of aggregate user at a given moment, although the elasticity results from the impact of the "time" factor. In the next moment they will not be quite the same. The elasticity of consumption depending on income, which is at -0,24 mode with the highest step of raising income in the experiment does not give grounds alone to assess the degree of proximity of the quantity of bread and bread products to an absolute aggregate subjective norm of consumption. This elasticity has a comparative importance. Compared to the elasticities of other products it can determine the location of each product on the scale of "'closeness to the absolute norm for consumption" - attitudes to consumption of certain quantity of one product are closer to the absolute norm compared with attitudes for another product.

These arguments deny reasonableness of the reverse interpretation as well- what earnings growth would be needed to unlock attitudes to zeroing the growth of consumption. The norm is in the movement of attitudes.

The products in the following lists are sorted as per the increasing absolute value of the elasticity of consumption depending on income in the two modes with the highest step of raising income.

●In the step with 8% increase of income:

1) other desserts – 0,02;
2) eggs – minus 0,04;
3) milk – minus 0,06;
4) plant foods with high energy content – 0,06;
5) vegetable fats – 0,10;
6) sugar – minus 0,16;
7) vegetables – 0,33;
8) bread and bread products – minus 0,38;
9) dairy products – 0,44;
10) meat and fish – 0,47;
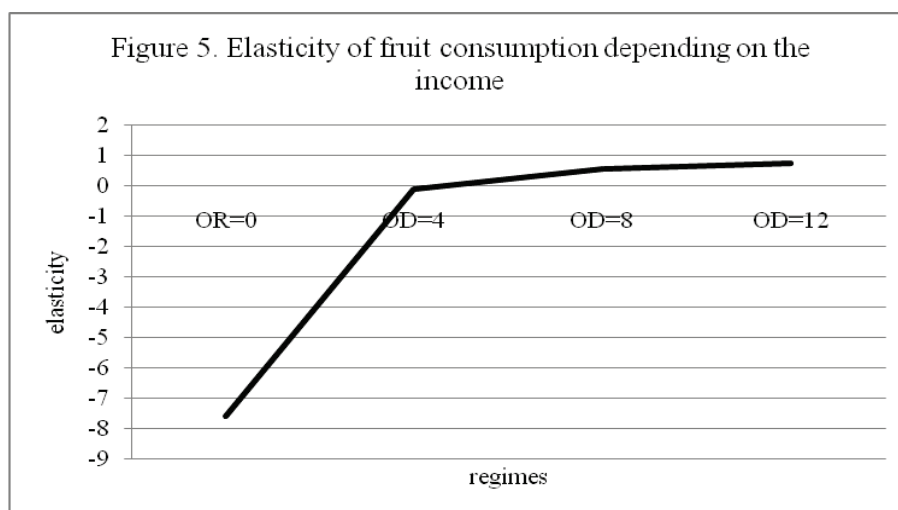11) fruit – 0,53.

●In the step with 12% increase of income:

1) plant foods with high energy content – 0,01;
2) milk – 0,11;

3) eggs – minus 0,13;
4) vegetable fats – minus 0,16;
5) other desserts – 0,17;
6) sugar – minus 0,22;
7) bread and bread products– minus 0,24;
8) vegetables – 0,39;
9) meat and fish – 0,50;
10) dairy products– 0,56;
11) fruit– 0,73.

The discrepancies in the sequence between the two lists are in their first half - for products which consumption is the closest to the absolute norm. The higher step in increasing the income rearranges elasticities of these products around the zero horizontal line. However, this does not result in conclusions about a radical change in the attitudes of the aggregate user because of low levels of elasticity. Negative elasticities of "eggs" and "sugar" rise up as an absolute value, i.e. even seemingly depart from "zero" but with a lower rate of growth between modes with 4% inflated income and mode with 8% increase, or the trajectory in its last part has a slighter slope than the last but one as per zero horizontal. The formula of satiety is not disintegrated. The same applies to other similar cases.

Eggs, sugar, bread and bakery products emerge as products with attitudes for definite reduction of consumption under these conditions. Attitudes towards consumption of vegetables, meat and fish, dairy products and fruit appear to be furthest from the absolute norm. Figure 5 illustrates graphically the difference in inclination in the last two parts of the trajectory of elasticity of fruit where their growth in the last mode is the highest.



Figure 5. Elasticity of fruit consumption depending on the income

Products in the following lists are arranged as per increasing value of the elasticity of costs depending on income in the same two modes.

●In the step with 8% increase of income:

1) eggs - 0,69;
2) bread and bread products - 0,76;
3) plant foods with high energy content - 0,80;
4) vegetable fats - 0,81;
5) milk - 0,87;
6) sugar - 0,88;
7) meat and fish - 0,94;
8) vegetables - 0,97;
9) other products - 0,97;
10) fruit - 1,05;
11) dairy products - 1,05;
12) other desserts - 1,10;
13) beverages - 1,25.

●In the step with 12% increase of income:

1) vegetables - 0,75;
2) other products - 0,78;
3) eggs - 0,79;
4) bread and bread products - 0,83;
5) plant foods with high energy content - 0,89;
6) milk - 0,95;
7) sugar - 0,97;
8) vegetable fats - 0,97;
9) meat and fish - 1,03;
10) fruit - 1,12;
11) dairy products - 1,20;
12) other desserts - 1,21;
13) beverages - 1,43.

The most noticeable is the shift of vegetables and other products which is due to the only downward trajectory of the elasticities of spending on them. The substantial margin here is the discrepancy between the growth rate of income and growth rate of the cost of individual products. The group of meat and fish "crosses" that line from one mode to the other and can be expected that by even higher step of raising the income the elasticity will remain above 1,0, but the slope of the trajectory will decrease. Vegetable oils may "cross" that border at the same terms. That could hardly happen to sugar and even less - to milk, taking into account the slopes of trajectories of their elasticity. The last three products have elasticity in the last mode close to 1,0.

Products in the following lists are arranged as per increasing value of elasticity of prices depending on income in the same two modes.

●In the step with 8% increase of income:

1) meat and fish - 0,40;
2) fruit - 0,43;
3) dairy products - 0,52;
4) vegetables - 0,58;
5) vegetable fats - 0,68;
6) plant foods with high energy content - 0,72;
7) eggs - 0,74;
8) milk - 0,95;
9) other desserts - 1,09;
10) sugar - 1,11;
11) bread and bread products - 1,36.

●In the step with 12% increase of income:

1) fruit - 0,28;
2) vegetables - 0,30;
3) meat and fish - 0,48;
4) dairy products - 0,63;
5) vegetable fats - 0,72;
6) milk - 0,79;
7) plant foods with high energy content - 0,93;
8) other desserts - 0,98;
9) eggs - 0,997;
10) bread and bread products - 1,25;
11) sugar - 1,37.

There are two separate groups: products from 1 to 5 and products from 6 to 11, where slight shifts. The attitudes to directions of change of price elasticity are derivatives of trajectories configurations of elasticity of consumption and costs. "Sugar" and "Bread and bread products" are with visible elasticities > 1,0, i.e. prices will overtake the growth of income. Regarding sugar this comes from the combination between the upward trajectory of elasticity of costs and downward trajectory of elasticity of consumption (Figure 1). For bread and its products - from strongly higher elasticities of spending compared to the elasticity of consumption. Or, if we leave the territory of the elasticities costs rise in both products while consumption decreases.

The trajectories of elasticities of sugar and the trajectories of elasticities of eggs and plant foods with high energy content have the same configuration, which explains their relatively high price elasticity (Figure 1). Similar to the configuration of trajectories of bread and its products are configurations of other desserts and milk (Figure 4).

The downward trajectory of elasticity of the price of vegetables is due to the configuration from the upward trajectory of elasticity of consumption and the downward trajectory of elasticity of the costs (Figure 2). For the other products with
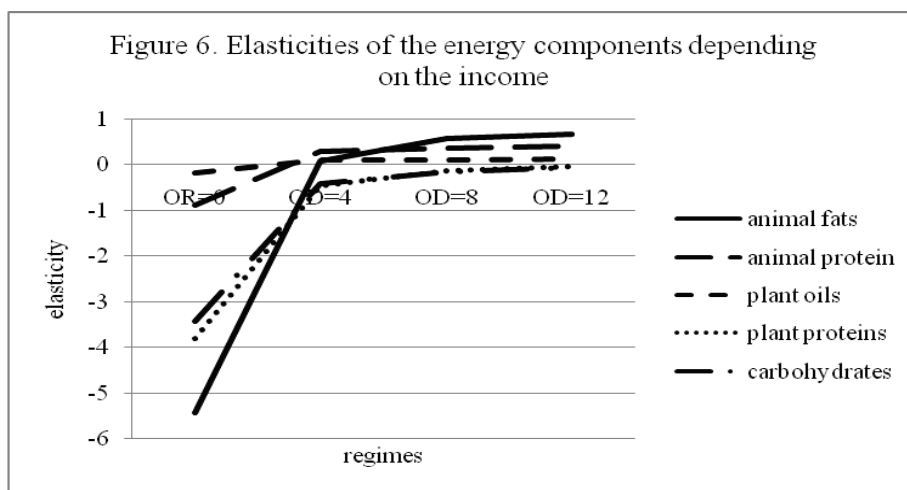
downward trajectories of price elasticity this is due to the steeper slope of trajectory of elasticity of consumption as compared with the trajectory of the elasticity of costs.

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The norm in the behavior of the subject of aggregate consumer market demand for food and non-alcoholic drinks is a derivative from the formula of satiety in the process of this demand, which formula outlines direction and speed of movement of the components of this process: consumption, costs, prices. So, it is a landmark to the attitudes of aggregate user in a mode of changing conditions of market demand.

Attitudes of aggregate user outline the nature of aggregate demand. The presented results give reason to assume that aggregate user is adjusted to increase demand and hence the market at a significant increase of its income - of meat and meat products, dairy products, fruit and soft drinks - by volume and value - and vegetables, but mainly by volume.

In Figure 6 these attitudes are generalized as trajectories of elasticity of energy components depending on income - animal fats, animal proteins, vegetable fats, vegetable proteins and carbohydrates.



Figure 6. Elasticities of the energy components depending on the income

The more substantial increase in income unlocks attitudes to increase demand for animal fats and protein. The trajectories of plant energy components tend stronger to the zero horizontal. Prominent winners of these components are not fruits, vegetables and soft drinks.
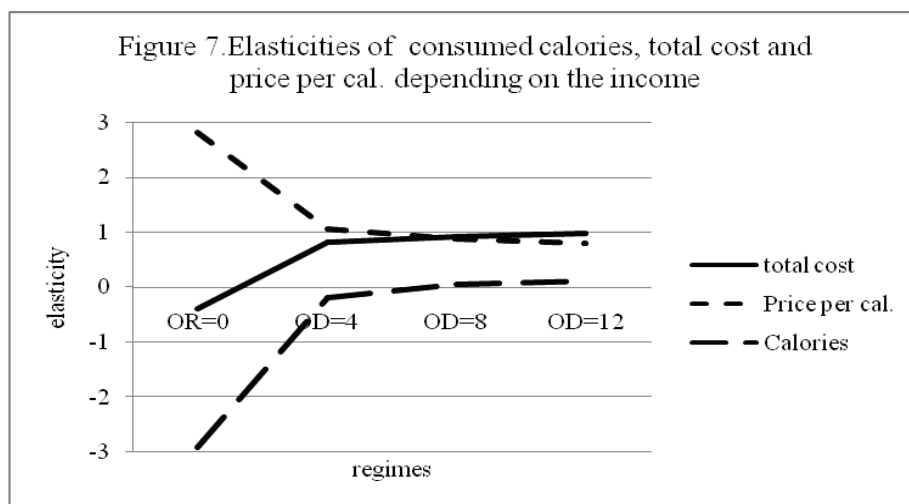
Elasticities of costs depending on income by product groups in the last two modes summarize attitudes towards expanding demand in value terms:

- Vegetarian food - from 0,87 to 0,84;
- Oil-based foods - from 0,90 to 1,00;

• Desserts - from 1,05 to 1,14;
• Soft drinks - from 1,25 to 1,43.
Figure 7 summarizes the described picture.



Figure 7.Elasticities of consumed calories, total cost and price per cal. depending on the income

The downward trajectory of elasticity in the price of food energy is a result of the stronger inclination (to the horizontal) of the path of elasticity of energy consumed (in calories) than the slope of the trajectory of the elasticities of total expenditure on food and soft drinks. The attitudes of the subject of aggregate consumer's demand are to increase the total cost of food and soft drinks with increasing his income but with a slower pace and to reduce the price of food energy with a slower pace as well.

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