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CONSUMPTION OF THE FRUIT AND VEGETABLE - LUXURY OR NECESSITY IN SLOVAKIA

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Abstract

Fruit and vegetables consumption increases in the Slovakia and the composition of products consumed changes as nations become wealthier. Higher incomes provide consumers with freedom to make purchasing decisions based on factors other than meeting basic caloric needs.

Many studies show a correlation between the level of income and consumption of fruits and vegetables - low-income groups generally consume less fruit and vegetables than higher income groups. High costs likely negatively affect the level of consumption of fruit and vegetables. But not the only low-income groups. Also, people with higher incomes perceive price as a barrier to consumption of these foods. However, it seems that there is a problem more for people with low incomes. Accessibility is therefore likely to be only one of several factors that mitigate the impact of income levels on fruit and vegetable consumption.

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy. In microeconomics, Engel curves are used to describe how the demanded quantity for a particular good or service changes as the income level of the consumer changes.

Keywords: *Fruit, Vegetable, Engel curve, Consumption, Income elasticity*

JEL Classification: *D11, D12, C20*

1 Introduction

Consumer behaviour is a frequently-analysed field in marketing, which aims to predict the consumer behaviour and to obtain information about feelings and preferences based on the physiological changes. We can objectively reveal our inexplicable behaviour to which we are not able to answer using a questionnaire in the traditional market research. An accurate measurement enables marketers to compare the response during research, such as the impact moments associated with a particular product or brand, how they react to different marketing stimuli, noted Horska et al. (2016) and Berčík et al. (2016).

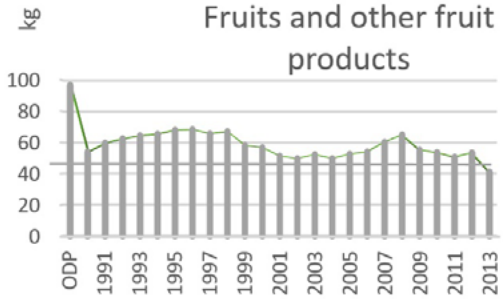
According to data from the Institute of Health Education to only 7.7 percent of people think that they always eat healthily and 42 percent believes that eat mostly healthy. Up to 42 percent of people report that they eat unhealthily. Regularly (daily) consume only 38 percent of fruits and vegetables even only 17 percent of people. Fruits and vegetables have long been an important component of human nutrition. They are characterized by great diversity and variety to please the taste, sensory and olfactory senses. From the professional point of view, highly appreciates the benefits of low power, high contribution of protective substances - vitamins, minerals and trace elements and high in fiber.

1.1 Trends in the Fruit and Vegetable Consumption

In recent years there has been an adverse gradual decline in fruit and vegetable consumption in Slovakia. The consumption of vegetables has decreased over the last 15 years, from 105 kg to 80-85 kg per capita per year. Consumption of fruits decreased from 62 to 51 kg, while domestic consumption falls mainly traditional fruits. Citrus fruits consumption is gradually increasing. Slovakia thus receive only 65-75 percent of the recommended intake of fruit, which is 78-98 kg per person per year.

The graphical analysis, we wanted to highlight the evolution of the consumption of various types of food and also have them graphically compared with the evolution of prices of the main representative of the food groups. Both graphical comparisons were assessed for the same period in Slovakia.

Figure 1 **Consumption of fruits in the years 1990 to 2013 and compared to the recommended daily dose**

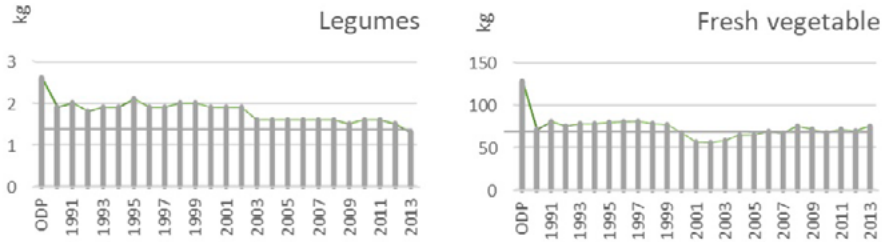


Source: www.statistics.sk, download: 21.1.2014.

Currently, a variety of fruits and vegetables in our market available throughout the year. This applies to both domestic and imported vegetables. Our markets are reaching some species that are not with us are native, and his second home can only receive - for example, Chinese and Beijing cabbage, Chinese celery, fennel salad, eggplant, broccoli, zucchini. Easier situation have gardeners, subsistence, who have the ability to grow their selection according to their own tastes and needs, environmentally friendly. Despite the wider possibilities to achieve intake of fruit, just over three quarters of the recommended consumption.

Intake of vegetables we approach the recommended dose, cases, satisfy the lower limit of normal. Fruit and vegetable intake, however, is unevenly distributed over the year and lack of consumption is reflected especially in winter and spring seasons. From vegetables is absolutely insufficient intake of legumes, whether classic such as peas, beans and lentils, or more traditional such as soybeans and bean. They are a valuable source of protein and fiber of vegetable origin. Their income must increase at least twice. The fruits we must increase the consumption of each species, and in the winter and early spring mainly supply of citrus fruits, which are in our market in a fairly broad range.

Figure 2 **Consumption of vegetables and legumes in the years 1990 to 2013 and compared to the recommended daily dose**



Source: www.statistics.sk, download: 21.1.2014.

Vegetables are among the most difficult commodities in crop production. It results mainly from a large number of species and varieties with different nutritional value and varying difficulty for cultivation, post-harvest treatment, storage and the like.

Vegetables are an important commodity for the National Economy. The share of gross production of vegetable crop production in EUR during the past years is about 14%. Vegetables grown in our conditions are competitive, have comparable, and often better quality parameters in terms of nutritional value, taste characteristics than imported vegetables. Competitiveness of losing our home production after the harvest when there are no adequate facilities for post-harvest treatment, in particular washing, drying, grading, market presentation, packaging, labelling, rapid transport under satisfactory conditions and for storage.

Annual consumption of fresh vegetables to a total of 1 inhabitant reached its highest value in 1997 (80.7 kg). Since 2000, there is a significant drop in consumption due to the low production due to exceptional drought each year. Thus it is not a reversal to a significant increase in consumption.

Health professionals recommended consumption is 127.9 kg together and fresh vegetables 90 kg per capita per year. Permissible interval rational consumption ranges from 116.9 to 138.9 kg, which was achieved in EU countries.

Kubicová (2011) and Moravčíkova et al. (2010) in their research deals with assessing the development of monetary incomes and expenditures of the Slovak households for food using the classification of households by income quartiles and by consumer spending. The analysis confirms the significant differences and unbalanced income distribution. Her research confirms that income differentiation of households is also reflected in their different behaviour in the food market. The demand changes most sensitive to income changes are those of the households with the lowest incomes.

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy.

2 Data and Methods

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy. In microeconomics, Engel curves are used to describe how the demanded quantity for a particular good or service changes as the income level of the consumer changes (Varian, 1996). For this study, we assume that prices are fixed (Lewbel, 2008). This implies that the demanded quantity will be proportional to expenditure, which is the measure usually applied in empirical analyses as has been shown (e.g. Chai and Moneta, 2010 and Ghalwash, 2008, Elfhag, 2008).

We used Engel log-log model, which we investigated estimate elasticities of spending for groups of households by economic status of head of household.

In this paper we analyse the estimation of income and price elasticities using double logarithmic equation for each group of households. Semi-logarithmic specification in many cases proved to be the most appropriate method for estimating the expenditure elasticities of demand. The above specification generates realistic expenditure elasticity, notes in Dawoud's research (2005). Thus, a general model can be written as follows:

$$ln\ wj = \alpha j + \beta j\ ln\ y + \eta j, \tag{1}$$

wj where the average annual share of expenditure on food group j per person, αj and βj are estimated coefficients, y is the average annual income per person is ηj random error. As mentioned in the previous paragraphs, Engel derivation function is calculated assuming constant prices.

Analysis of the impact of changes in consumer's income is based on indifference analysis. We know that a change in income leads to a shift of the budget line, thereby changing the consumer optimum. To reflect the aforementioned changes, the consumer uses the income curve (ICC). Income consumer curve is the set of combinations of goods for which the consumer maximizes utility at varying income (ceteris paribus). Said curve is the basis for deriving the Engel curve, named after the German statistics Ernst Engel. Engel curve shows the relationship between the optimal consumption of certain goods and consumer income levels, ceteris paribus. Analogous tool for analysing the demand for certain commodities depending on the income Engel expenditure curve, which is defined as a relationship between the consumer spending on his goods and his income.

Sensitivity of the demanded quantity on the changes in income, ceteris paribus, we measure the coefficient of income elasticity. Income elasticity of demand is the ratio of the percentage change in demanded quantity product X to percentage change in income and indicates the percentage by which change demand for product X with changing consumer intake of one percent. For normal goods income elasticity it is positive. Unless our classification of goods deepen, for necessary goods, the change in consumer's income by 1% causes less changes in demand for the farm than 1%. Because the share of the estate to total income is declining, the average propensity to consume is decreasing and true: $0 \leq Eid \leq 1$.

In the present analysis, we focused on identifying the income elasticity of demand for fruits and vegetables in Slovakia. For the analysis we used data obtained from the Statistical office of the Slovak Republic and the situation and outlook reports of the National Agricultural and Food Centre namely:

- Money income of private households by economic status of head of household at work per person per month in EUR
- Consumption of fruit per person per year in kg (Situation and Outlook Report - Fruit)
- Consumption of vegetables per person per year in kg (Situation and Outlook Report - Vegetables).

3 Results and Discussion

Hupková et al. (2009), Kamphuis (2007) demonstrated analysis of consumer behaviour on the individual household categories level and the subsequent comparison of impact factors on consumer decision will give us an assumption to the complex understanding of the consumer behaviour determinants. They used panel data to estimate the beef meat demand in Slovakia. The data were obtained from the Household Budget Survey of the Slovak Statistical Office. The estimates of price and income elasticities of the beef meat demand were also obtained.

Analysis of the income elasticity, we investigated for different types of households by economic status of head of household - therefore household employees, self-employed household, the household of pensioners and other household goods. For better orientation in terms, it is necessary to characterize the individual types of households as defined by the Statistical Office of the Slovak Republic:

The employee was a person who worked and received an earned income (wages or salary), including persons receiving a pension and earned income (between staff includes members of production cooperatives).

Self-employed (self-employment represents) was a person who worked in their own business, including pensioners with income from business (entrepreneur - with employees and without employees).

Pensioners were jobless person receiving an old-age pension but no income from employment or business (these people were considered workers); household can live and those who do not receive a pension.

Others - all persons not included above (unemployed parents on parental leave, a student and other).

From the perspective of the structure of consumer spending, we have chosen only the expenditure on the group of foods - fruits and vegetables. Analysis of the income elasticity, we investigated for different types of households by economic status of head of household. From Table 1 we can identify that the calculated elasticity is considerably significant. Some fruits have explained the variability around 0 it some fruits are up to 75%. This item can be observed high variability values. Sign elasticities take the positive and negative values. An interesting finding is that the elastic modulus of the fruit together is almost all groups of households characterized as inferior goods.

After seeing the table elasticities for households of employees we found that all types of fruit are for this type of domestic goods deemed necessary, in addition to grapefruits, which are regarded as inferior beasts. This means that all the food groups with a value between $0 \leq \beta \leq 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

Table 1 **Income elasticity of fruit in private households by economic status of head of household at work**

Eid	Employee					Self-employed				
	alfa	Beta	Eid	R2	Prob	alfa	beta	Eid	R2	Prob
fruit together	5,95	-0,04	inferior good	0,00	0,84	5,94	-0,03	inferior good	0,00	0,85
apples	4,69	0,39	necessary good	0,46	0,02	4,92	0,32	necessary good	0,49	0,02
pears	5,70	0,09	necessary good	0,61	0,00	5,75	0,07	necessary good	0,61	0,00
plums	5,79	0,17	necessary good	0,08	0,41	5,82	0,10	necessary good	0,04	0,54
cherries	6,03	0,20	necessary good	0,08	0,39	5,95	0,11	necessary good	0,04	0,56
cherries	5,49	-0,17	inferior good	0,27	0,10	5,62	-0,12	inferior good	0,20	0,17
apricots	5,82	0,04	necessary good	0,02	0,67	5,84	0,03	necessary good	0,02	0,65
peaches	4,88	0,98	necessary good	0,60	0,01	5,11	0,76	necessary good	0,59	0,01
currants	5,87	0,04	necessary good	0,02	0,68	5,88	0,03	necessary good	0,02	0,67
strawberry garden	5,78	0,30	necessary good	0,40	0,04	5,81	0,23	necessary good	0,39	0,04
grape	5,16	0,51	necessary good	0,37	0,05	5,32	0,40	necessary good	0,38	0,04
orange	5,30	0,24	necessary good	0,15	0,23	5,43	0,19	necessary good	0,16	0,22
tangerines	5,23	0,40	necessary good	0,17	0,21	5,28	0,38	necessary good	0,25	0,12
lemons	5,55	0,40	necessary good	0,17	0,21	5,67	0,25	necessary good	0,11	0,32
grapefruit	5,95	-0,42	inferior good	0,31	0,08	5,94	-0,32	inferior good	0,29	0,09
bananas	4,65	0,56	necessary good	0,25	0,11	4,92	0,44	necessary good	0,26	0,11
kiwi	5,78	-0,34	inferior good	0,51	0,01	5,81	-0,24	inferior good	0,42	0,03

Eid	Pensioners					Others				
	alfa	beta	Eid	R2	Prob	alfa	beta	Eid	R2	Prob
fruit together	6,34	-0,13	inferior good	0,04	0,55	5,44	0,00	necessary good	0,00	0,99
apples	5,67	0,13	necessary good	0,73	0,00	4,71	0,26	necessary good	0,14	0,26
pears	4,26	0,55	necessary good	0,58	0,01	5,35	0,08	necessary good	0,29	0,09
plums	5,80	0,17	necessary good	0,05	0,51	5,42	0,18	necessary good	0,06	0,47
cherries	6,03	0,20	necessary good	0,05	0,50	5,65	0,19	necessary good	0,05	0,49
cherries	5,43	-0,21	inferior good	0,25	0,11	5,06	-0,20	inferior good	0,26	0,11
apricots	5,83	0,07	necessary good	0,04	0,56	5,45	0,03	necessary good	0,01	0,81
peaches	4,85	1,03	luxusný tovar	0,43	0,03	4,48	1,02	luxury good	0,46	0,02
currants	5,95	0,09	necessary good	0,06	0,49	5,40	-0,03	inferior good	0,01	0,81
strawberry garden	5,79	0,29	necessary good	0,25	0,12	5,40	0,38	necessary good	0,46	0,02
grape	5,08	0,58	necessary good	0,32	0,07	4,86	0,46	necessary good	0,21	0,15
orange	5,35	0,22	necessary good	0,09	0,38	4,54	0,42	necessary good	0,34	0,06
tangerines	5,17	0,45	necessary good	0,14	0,26	4,94	0,35	necessary good	0,09	0,37
lemons	5,41	0,64	necessary good	0,29	0,09	5,31	0,21	necessary good	0,03	0,59
grapefruit	6,03	-0,61	inferior good	0,43	0,03	5,57	-0,37	inferior good	0,17	0,21
bananas	4,75	0,51	necessary good	0,14	0,26	3,97	0,70	necessary good	0,29	0,09
kiwi	5,78	-0,37	inferior good	0,41	0,03	5,40	-0,42	inferior good	0,56	0,01

Source: Own calculations, data obtained from VUEPP and the Statistical Office.

Table 2 **The income elasticity vegetables in private households by economic status of head of household at work**

Eid	Employee					Self-employed				
	alfa	Beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
vegetables together	-2,50	1,82	luxury good	0,74	0,001	-0,28	1,34	luxury good	0,65	0,003
tomatoes	2,26	1,27	luxury good	0,29	0,091	3,17	0,95	necessary good	0,26	0,107
onions	4,51	0,60	necessary good	0,31	0,073	4,91	0,43	necessary good	0,26	0,106
Garlic	5,81	-0,22	inferior good	0,18	0,192	5,83	-0,16	inferior good	0,17	0,213
Cauliflower and broccoli	5,32	0,40	necessary good	0,16	0,215	5,46	0,31	necessary good	0,16	0,221
tusk	5,83	-0,03	inferior good	0,00	0,876	5,82	0,03	necessary good	0,00	0,843
cabbage	6,74	-0,34	inferior good	0,06	0,462	6,72	-0,33	inferior good	0,09	0,364
salad	5,74	0,36	necessary good	0,75	0,001	5,78	0,28	necessary good	0,72	0,001
A carrot	2,69	1,32	luxury good	0,68	0,002	3,44	1,01	luxury good	0,65	0,003
parsley	5,67	0,19	necessary good	0,04	0,565	5,76	0,09	inferior good	0,01	0,720
celery	5,77	0,33	necessary good	0,43	0,028	5,80	0,27	necessary good	0,49	0,017
Cucumbers	4,44	0,68	necessary good	0,52	0,012	4,86	0,48	necessary good	0,43	0,028
peas	5,84	0,07	necessary good	0,04	0,537	5,85	0,04	necessary good	0,02	0,665
Bean	6,04	0,38	necessary good	0,46	0,021	6,02	0,30	necessary good	0,48	0,018
Red pepper	4,00	0,99	necessary good	0,75	0,001	4,53	0,71	necessary good	0,64	0,003
spinach	6,02	0,12	necessary good	0,18	0,195	6,00	0,09	necessary good	0,18	0,193
kohlrabi	5,53	0,24	necessary good	0,11	0,328	5,61	0,19	necessary good	0,11	0,324
melons	3,84	1,16	luxury good	0,61	0,004	4,25	0,93	necessary good	0,65	0,003

Eid	Employee					Self-employed				
	alfa	Beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
Other vegetables, including mushrooms	4,335	0,644	necessary good	0,50	0,015	4,73	0,48	necessary good	0,46	0,022

Eid	Pensioners					Others				
	alfa	beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
vegetables together	-4,63	2,29	luxury good	0,77	0,000	-3,34	1,92	luxury good	0,58	0,006
tomatoes	1,31	1,61	luxury good	0,30	0,079	2,03	1,22	luxury good	0,19	0,185
onions	4,08	0,80	necessary good	0,37	0,047	4,31	0,52	necessary good	0,17	0,206
Garlic	5,82	-0,33	inferior good	0,28	0,097	5,44	-0,07	inferior good	0,01	0,732
Cauliflower and broccoli	5,36	0,37	necessary good	0,10	0,354	4,66	0,64	necessary good	0,30	0,081
tusk	5,80	0,04	necessary good	0,00	0,863	5,54	-0,17	inferior good	0,06	0,470
cabbage	6,37	-0,20	inferior good	0,01	0,725	6,93	-0,55	inferior good	0,11	0,314
salad	5,75	0,41	necessary good	0,63	0,004	5,36	0,46	necessary good	0,84	0,000
A carrot	2,31	1,49	luxury good	0,56	0,008	1,94	1,49	luxury good	0,61	0,005
parsley	5,56	0,34	necessary good	0,08	0,388	5,26	0,24	necessary good	0,04	0,538
celery	5,77	0,41	necessary good	0,45	0,023	5,41	0,28	necessary good	0,23	0,134
Cucumbers	4,21	0,80	necessary good	0,48	0,018	3,68	0,88	necessary good	0,62	0,004
peas	5,87	0,14	necessary good	0,12	0,291	5,44	-0,03	inferior good	0,01	0,802
Bean	6,15	0,53	necessary good	0,60	0,005	5,66	0,36	necessary good	0,29	0,084
Red pepper	3,57	1,22	luxury good	0,77	0,000	3,40	1,11	luxury good	0,68	0,002

Eid	Pensioners					Others				
	alfa	beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
spinach	6,15	0,19	necessary good	0,30	0,081	5,54	0,05	necessary good	0,03	0,627
kohlrabi	5,46	0,31	necessary good	0,11	0,308	5,12	0,27	necessary good	0,10	0,346
melons	3,55	1,33	luxury good	0,54	0,010	3,36	1,22	luxury good	0,48	0,017
Other vegetables, including mushrooms	4,12	0,74	necessary good	0,44	0,026	3,79	0,72	necessary good	0,44	0,025

Source: Own calculations, data obtained from VUEPP and the Statistical Office.

After seeing the table elasticities for households of employees we found that all types of fruit are for this type of domestic goods deemed necessary, in addition to grapefruits, which are regarded as inferior beasts. This means that all the food groups with a value between $0 \leq \beta \leq 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

A similar situation occurred in the households of self-employment. In households of pensioners introduced some changes. There were more in the results elasticities inferior goods: cherries, grapefruit and kiwi. We even identified one luxury goods: peaches. Other households may be considered in terms of socio-economic group most sensitive households. Basically it follows the demand-driven behaviour of households of pensioners, in addition to the added downgraded farmhouse and currants.

When inferior holdings of demand falls with increasing income. Is not necessarily of inferior homestead, crucial to consumer preferences (so benefits which it brings farmhouse).

From Table 2, we can identify that most of the calculated elasticities are significantly significant. Some vegetables have variability explained about 0 certain types of it are up to 77%. (Indicator R2) In this item, we can observe a high variability values. Sign elasticities take the positive and negative values. An interesting finding is that the value of elasticity for the vegetables together with all groups of households characterized as luxury goods.

After seeing the table elasticities for households of employees we found that tomatoes, melons and carrots can be characterized as luxury goods. Inferior goods

are garlic, cabbages. Other types of vegetables are for this type of domestic goods deemed necessary. This means that all the food groups with a value between $0 \leq \beta \leq 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

A similar situation occurred in the households of self-employment. In households of pensioners introduced some changes. Tomatoes have changed the status of a luxury farmhouse for self-employment are essential goods. In the results elasticities inferior goods also changes occurred: garlic, cabbage and parsley.

Pensioner households have more luxury goods: tomatoes, carrots, peppers and melons. The farmhouse is inferior cabbage and garlic. It can be deduced that those types of vegetables, consumers are able to grow, eventually buy from the nearest farmer. Other households may considered in terms of socio-economic group most sensitive households. Basically follows the demand-driven behaviour of households of pensioners, in addition to a downgraded farmhouse he joined the games.

4 Conclusion

When inferior holdings of demand falls with increasing income. Is not necessarily of inferior homestead, crucial to consumer preferences (so benefits which it brings farmhouse).

Fruit and vegetables consumption increases and the composition of products consumed changes as nations become wealthier. Higher incomes provide consumers with freedom to make purchasing decisions based on factors other than meeting basic caloric needs.

Many studies show a correlation between the level of income and consumption of fruits and vegetables - low-income groups generally consume less fruit and vegetables than higher income groups. We will try to describe causes of this situation.

High costs likely negatively affect the level of consumption of fruit and vegetables. But not the only low-income groups. Also, people with higher incomes perceive price as a barrier to consumption of these foods. However, it seems that there is a problem more for people with low incomes. Accessibility is therefore likely to be only one of several factors that mitigate the impact of income levels on fruit and vegetable consumption.

Adults with higher education consume more vegetables evaluated in the survey EUFIC Council (2012). In addition to the financial aspect just mentioned - higher education generally means higher income - this may be associated with better knowledge and awareness of healthy eating habits in people with higher

levels of education. It is likely that our eating habits, including the consumption of fruit and vegetables were affected by certain values, ideals and social impact, which is linked to education and income levels.

The reason the low-power state experts low income families. The survey confirmed that low-earning people eat less fruit than those more solvent. Therefore Slovak families cannot afford to buy fruit that is less energy value. They vote more meat, bread. It confirmed to us that the fruit is necessary for Slovaks and in some cases inferior, but on the other vegetables are considered luxury goods. That´s the very interesting paradox of the aggregated data. New knowledge is fact that we cannot confirmed that the Slovaks have a really low income levels. More sensible group are pensioners and other type households.

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