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## EMPIRICAL ANALYSIS OF INCOME CHANGES IMPACT ON FOOD CONSUMPTION EXPENDITURE

### SUMMARY

This paper analyzes the impact of income and its changes on the structure of consumption by certain groups of products and in different areas in Montenegro, in the period from 2005 to 2013. The analysis of the available data on income and of its use for certain products shows how changes in income affect the structure of consumption of the population of Montenegro in the analyzed period. The results showed that the structure of food consumption population of Montenegro improved partially. Currently, the food consumption of urban residents, the share of basic food, such as meat and fruit decreases, while the percentage of nutrient foods, such as vegetables, milk, cheese and eggs is increasing. Predictably, food consumption structure of urban residents still has room for improvement.

**Keywords:** Empirical analysis, Engel's coefficient, consumption, per capita, income, urban residents.

### INTRODUCTION

The interest in consumption patterns of households in developed and developing countries is not new and has been studied by a huge number of researchers. Some researchers differed not only in the period, scope, source and methodology but also in the finding and suggestion they forwarded to address the issue. Numerous studies used either the time series or cross section data reported in the Household Income and Expenditure Surveys (HIES). But, others were based on the area observations and memory based interviews from the residents. Irrespective of the methodology and source of data, the major question addressed by those studies was to estimate and test the validity of the relationship between income and expenditure on different commodities.

Wu at al. (1995) concluded that the results from their study provides rationale and basis for additional research into Chinese food consumption, especially processed food. Burney and Khan, (1991) while comparing the urban-rural consumption structures in Pakistan found that expenditure elasticity for different commodity groups vary with income and, in general, exhibit a cyclical pattern in terms of quantitative as well as qualitative changes in the households' consumption basket. Food consumption is a dynamic process and is greatly

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influenced by size and composition of household, number of earning hands, prices of food items, educational level, geographical, cultural and climatic conditions in the region, etc. So, economic change in the lower-income and transitional economies of the world appears to coincide with increasing, rapid social change (Guo, Xuguang, et al., 2000). Low-income countries spend a greater portion of their budget on food and are more responsive to income and food price changes than middle and high-income countries (Regmi, Anita, et al., 2001). For example, people in USA, Canada, and Netherlands spent 10.4, 13.7 and 14.4 percent of their income on food, respectively; however, in less developed countries like Sudan, India, Philippines, more than 50 percent of a household budget is spent on food commodities (Begum, Safia et al., 2010). Mmakola et al, (1997) conducted a study on food consumption patterns in South Africa and found that quality and price were both important considerations for consumer food purchases particularly for rural consumers. They also concluded that higher incomes people consumed more meat and could afford more fruit and ready-made foods. Jovanović et al, (1997, 1998, 2001, 2016) conducted that rural citizens were allocated the large part of income for food and beverages and urban citizens least.

Tozanli (1996) reported that low income population has a traditional Mediterranean consumption pattern, whereas wealthy dwellers were inclined to western behavior which had a negative effect on food industries in Turkey.

Since the 2006 Montenegro gained independence and continued with the reforms and open policy, the pace of economic growth has accelerated, the level of per capita income has improved and the average disposable income of urban residents has increased from 2,303 EUR to 4,806 EUR per capita during 2005-2013 year.

Income is the dominant variable in consumer behavior and income growth necessarily brings changes of consumption structure and consumption level. Therefore, studies on the relationship between income and food consumption structure have important guidance-giving significance for food industry policies making and speeding up the shift of the economic development model of our country. The food consumption structure in the study is such that it points to the proportion of the food expenditure such as bread, meat, milk, vegetables and fruit in the general food costs. Researches on the food consumption above show that income is an important factor in influencing food consumption structure of urban residents and most scholars focus researches on a region (country or provinces and cities, etc), lacking the comparison of areas. Numerous studies of the impact of income on food consumption were carried out in China on a significant number of samples (Dezhang, W. and W. Jialiang, 2010; Enhu, W. and L. Lutang, 2007., Jiang, L., 2010., Xinhua, G. and X. Ruihao, 2009., Zhen, Z. and L. Shuquan, 2011).

Therefore, the goal of the paper was to present the evolution characteristics of income and food consumption structure and compare the influence degree of

income on the food consumption structure in different regions- national, urban, rural and capital.

### MATERIAL AND METHODS

The data were provided by the MONSTAT for Montenegro's income on private food consumption expenditure and food personal consumption by product groups in the period 2005-2013 (MONSTAT, 2014). For distribution of residents' disposable income we used data from Poverty & Equity Databank. World Bank, Development Research Group. Data are based on primary household survey data obtained from government statistical agencies and World Bank country departments. The methodology used in order to process the data was represented mainly by the index, share and comparison methods. The following indicators were used to characterize the influence of income on food consumption structure of urban residents: per capita income, standard deviation, variation, regression and Engel's coefficient.

### RESULTS AND DISCUSSION

#### Analysis of the tendencies of income structure in Montenegro.

With the constant increase of per capita disposable income in Montenegro, per capita consumption expenditure level has gone up notably, as well as per capita food consumption level, composition of consumption and consumption concept have changed greatly, especially in the following aspects.

#### Food consumption level rose and Engel's coefficient declined:

Since 2005, the improvement of Montenegro's resident's income level has contributed to the growth of consumption level, especially food consumption level. In 2013, the per capita food spending is 4,366 EUR, or it is 2.11 times more than the expense 2,064 EUR in 2005. In 2013, the Engel's coefficient of Montenegro's households in Montenegro is 32.7, thus changing from well-off level to rich, as specified in Table 1<sup>2</sup>.

Table 1: Per capita income, expenditure and Engel's coefficient unit: €%

Year	Per capita disposable income	Per capita consumption Expenditure	Per capita food expenditure	Engel's coefficient
2005	2,303	2,064	665	32.2
2006	3,056	2,701	930	34.4
2007	4,235	3,847	914	23.7
2008	5,037	4,562	1,213	26.5
2009	4,529	4,049	1,362	33.6
2010	4,658	4,118	1,392	33.8
2011	4,792	4,302	1,458	33.8
2012	4,738	4,241	1,405	33.1
2013	4,865	4,366	1,431	32.7

Source: MONSTAT, own calculation

<sup>2</sup> According to the United Nations Food and Agriculture Organization (FAO) proposed standards, Engel's coefficient more than 59% is poverty, 50-59% for food and clothing, 40-50% for a well-off, 30-40% for rich and less than 30 percent for the most affluent.

However, because income growth rate is faster than food spending, Engel's coefficient - food consumption expense accounts for the proportion of the total amount of personal consumption expenditure is still falling.

**Food consumption expenditure structure upgrade:** In longitudinal perspective, food consumption expenditure structure has shown a diversified trend and food spending has changed. On average, in eleven food expenditures, the proportion in the top five are: bread and cereals, meat, milk, cheese and eggs, vegetables and fruits. In lateral perspective, all kinds of food in the proportion of total expenditures have changed over time. In the reporting period, the most increased consumption is that of wine (40%), bread and cereals (14%) and oil and fats (9%), while it was reduced in meat (11%) and fruit (6%). The proportion of bread and cereals and wine rose from 15.17 and 2.16 in 2005 to 17.04 and 2.98 in 2013 respectively, which indicates that residents generally have not paid more attention to the balance of nutrition with increasing awareness of food safety and they have reduced the consumption of meat and fruit. The proportion of bread and cereals, fat and oils, meat, milk, cheese and eggs are basic stability in food consumption structure of urban residents, which shows that the influence of income on food consumption basic structure is unchanged and is still under the influence of the traditional way (Table 2).

Table 2: The changes of food personal consumption per capita by product groups in 2005-2013, EUR

Year	Bread and cereals	Meat	Fish	Milk, cheese and eggs	Oils and fats	Fruit	Vegetable	Other food prod	Wine	Beer
2005	105	192	20	156	22	46	68	31	15	22
2006	96	184	21	150	21	43	68	33	14	17
2007	105	214	25	161	23	44	82	33	16	24
2008	126	230	28	197	33	55	94	36	17	26
2009	107	214	22	181	22	47	87	34	16	24
2010	114	227	21	182	22	47	84	36	17	25
2011	120	203	22	164	26	44	81	35	18	24
2012	123	194	22	178	25	42	75	35	30	23
2013	120	171	21	158	24	43	73	33	21	23
2013/05	114	89	105	102	109	94	107	106	140	104

Source: MONSTAT, own calculation

### The distribution of residents' disposable income.

Following the quinque section method, the residents are divided into five equal groups, as follows: the lowest income households (20%), lower-income households (20%), middle-income households (20%), higher income households (20%), and the highest income households (20%). We then calculate the income proportion for each group (Table 3). Thus we can analyse the distribution of residents' income.

Table 3: The major food consumption structure of urban residents in different income groups unit: €

Classifications	Average	Income share held by highest 20%	Income share held by the fourth 20%	Income share held by the third 20%	Income share held by the second 20%	Income share held by lowest 20%
Bread and cereals	112.88	43.5071	25.6076	19.5121	7.1892	9.5302
Meat	203.22	78.3267	46.1019	35.1280	26.5637	17.1575
Milk, cheese and eggs	169.66	65.3918	38.4885	29.3269	22.1769	14.3241
Fruit	45.66	17.5986	10.3582	7.8926	5.9684	3.8550
Vegetable	79.11	30.4912	17.9466	13.6747	10.3408	6.6791

**Source:** poverty & equity databank. World bank, development research group. Data are based on primary household survey data obtained from government statistical agencies and world bank country departments. Own calculation

The food consumption demands are far apart in different income groups of urban residents in montenegro: the income gap between urban residents will lead to the change of food consumption expenditure. From table 3 we can see that the food consumption structure in different income groups of urban residents is different. The 20% lowest income households are spending most on meat and milk, cheese and eggs, with the expenditure of 17.15 eur and 14.32 eur per capita, respectively. However, the 20% highest income households are spending most on meat and milk, cheese and eggs, with expenditure of 78.32 eur and 65.39 eur per capita, respectively. For example, in 2013, the milk, cheese and eggs expenditure of the supreme income households is 158 eur per capita; it is 11.03 times more than the lowest income households spending of 14.324 eur and bread and cereals is the 12.5 times of the lowest income households. To sum up, with the development of economy and urbanization, the “food revolution” of urban residents has quietly spread and engel’s coefficient has declined. The bread and cereals and vegetable consumption gradually rose, reversely, the consumption of meat and fruit gradually fell and milk, cheese and eggs and fish were basically unchanged. The food consumption of urban residents has moved from staple food towards nutritious and healthy food structure.

Table 4: the influence of income on the per capita on food consumption structure

	Montenegro	Urban area	Rural area	Podgorica
Bread and cereals	0.66276	0.45152	0.10291	0.30766
Meat	0.20702	0.49989	0.23659	0.47861
Milk, cheese and eggs	0.64671	0.77220	0.01370	0.79125
Fruit	0.25424	0.26183	0.00392	0.25661
Vegetable	0.61380	0.82599	0.03548	0.74295
Wine	0.19410	0.08201	0.07019	0.05412

**Source:** Own calculation

### **Empirical analysis on the influence of income on food consumption structure of montenegrin residents.**

In order to further analyze the influence of income on food consumption structure and explain the changes of food consumption structure of residents in montenegro from time and space dimensions, the study will analyze the food consumption structure of different regions in 2005-2013. The data cover per capita disposable income and all kinds of food expenditure of all residents, urban residents, rural residents and residents in the capital of montenegro. In the analyzed model, per capita disposable income is the independent variable and the dependent variables are per capita total food spending, bread and cereals, meat, milk, cheese and eggs, fruit, vegetables and wine. Using excel software, the study makes regression analysis of the available data and all the regression results concerning meat, milk, cheese and eggs, fruit are significant at 1% significance level, indicating that income has very significant influence on food consumption structure. Table 4 shows the influence of income on the per capita food consumption structure of urban residents, rural residents and capital residents.

The minimum influence coefficient of three foods are meat, fruit and wine in 2005-13 year. The phenomenon above shows that the overall food consumption is declining with improvement of per capita income level of urban residents and people's living standard is improving, food consumption tend to convenient and nutrient food.

The influence coefficient of wine (urban area), milk, cheese and eggs and fruit (rural area) are minimal the coefficients being 0.19410, 0.01370 and 0.00392 respectively, meaning that urban and rural residents have stable expenditure for these three foods. In addition, the food consumption structure is different in the urban and rural area and podgorica. In urban area, the income demand elasticity coefficients of eleven foods rank first three are vegetable, milk, cheese and eggs and meat. In rural area, the food with higher influence degree of income on food consumption structure are meat, bread and cereals and vegetable. In podgorica, the main foods ranked as the first three are vegetable, milk, cheese and eggs and meat.

in 2005-2013, bread and cereals, milk, cheese and eggs and vegetable are still the main food for residents in montenegro, people consumption habits are basically stable, but the income demand elasticity has changed greatly in eastern, central and western regions.

Through comparison of food consumption structure in time and space dimensions, we can see that dining out plays an important role in food expenditure of urban residents and its influence coefficient has been growing, while the income demand elasticity of other food has reduced under the price system influence. Bread and cereals and vegetable have replaced meat and vegetables and become the main food spending in the montenegro. This phenomenon indicates that the influence of regional income disparity on food consumption structure in different regions is great. With the improvement of income level, the food consumption structure has changed for healthy, nutrient

food and residents have paid more attention to balanced staple and non-staple food, while food consumption of the midwest is changing from “eating good” to “eating nutritious”.

### CONCLUSIONS

With the improvement of income level, the trend of Engel’s coefficient has continued to fall, which indicates that urban residents living standard has improved and income has significant influence on food consumption structure. Therefore, raising the income level of residents and enhancing the purchasing power of safe food are the effective measures to stimulate the economic development of Montenegro.

The structure of food consumption population of Montenegro was partially improved. Currently, the food consumption of urban residents, the share of basic food, such as meat and fruit decreases, while the percentage of nutrient foods, such as vegetables, milk, cheese and eggs is increasing. Predictably, food consumption structure of urban residents still has room for improvement. Therefore, the change of regime development of traditional food industry and industrial structure adjustment of the direction of development of the food industry is needed.

There is still certain difference in structure in different income groups and different regions in Montenegro. Therefore, the government should speed up the economic development in the rural area, improve the people’s income level and reduce the gap of food consumption structure between different regions and different income groups so as to improve the food quality.

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