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INCOME DISPARITIES AND THEIR IMPACT ON THE LEVEL AND DEVELOPMENT OF FOOD EXPENDITURES OF HOUSEHOLDS IN SLOVAKIA

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Abstract

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Paper evaluates development and changes in the level of households food expenditures in Slovakia, which occurred after the accession of Slovakia to the European Union in 2004 and began to apply the rules of the Common Agricultural Policy and using of means of support. Free movement of goods, labor and capital has contributed to the increase of goods and services supply and living standards as well as to the increase in households income differentiation. Until 2012, households in the lowest income quartile possess on average with only 34.1% per year of the revenue compared with income in the highest fourth quartile of income category. The results of the analysis show a different behavior in the food market. Most sensitive to the change in income and price levels of food expenditures for food responded in families with the lowest incomes (EI = 0.28). With the increase in prices of cereals (bread) by one percentage unit-demand declined by an average by 0.49% (Epi = –0.49), the demand for cheese by 0.65% (Epi = –0.654) and the demand for meat by 0.275% (Epi = –0.275).

income and expenditures by income groups, income elasticity of expenditure for food, saturation of demand, price elasticity

Analysis of demand relationship in the food markets is still relevant and important for different types of market participants. From the knowledge of the functional structure of consumer demand for food, marketing may be primarily oriented to different segments of the food market. Similarly, in the mediated condition, can be identified the final consumer demand for food and be beneficial even for entities operating on the food chain. To these groups of market subjects belongs warehouses and food distributors, food processors as well as the agricultural primary producers. Analysis of demand for food markets are beneficial to the competent national authorities and institutions to guide and ensure balanced relationship of agri-food markets and its dynamics and quality control sales of food commodities. Evaluation and analysis of consumer demand in food markets is also relevant from a societal terms. Quantity, quality and range of food significantly involves in shaping the level and quality of life of inhabitants, which by membership of Slovakia in the European Union has acquired a new dimension and expanded the market. Quantity and price level of food and services that people cater, depends primarily on the amount of their disposable income. Prices of food and services to be paid by households along with other expenses are the initial basis of their potential standard of living. Disposable income currently does not allow full satisfaction of demand for food and other essential holdings. At is known, despite the fact that household consumption expenditures are composed of various product groups, food expenditures represent an important part of them (Sahinli, M. A., Fidan, H., 2012). A lot of studies realized in the different countries (Japan, Great Britain, South Korea, solve a problem of food expenditures of households from the several points of view (Fukuda, Hiyoshi, 2012; Ng, Ni Mhurchu, Jebb, Popkin, 2012; Imhoff-Kunsch, Flores, Dary, Martorell, 2012; Youn, Lim, Jin, 2012).

METHODOLOGICAL APPROACH

Aim of the paper is to perform basic quantitative analysis of price and income dependings on the final consumer demand for food in Slovakia with the view to its time development which includes the period of time since Slovakia has become a member of the European Union. The paper laid the basis for the quantitative analysis of determinants which drive consumer demand for food with special regard to the level and evolution of disposable income of households in Slovakia.

The present contribution deals with the deeper analysis of household income differentiation, by measuring the volume and its reflection on the food expenditure and the level of saturation of demand. In Slovakia, to matters of human nutrition and the food chain is devoted attention from the government and manufacturing sectors, as well as from the intellectual level queue. Previous studies and numerous works (Kubicová, 2008), (Nagyová, Stávková, Tonkovičová, 2008), (Holková, 2011), (Sekavová, 2012) and further suggest that the nutrition and overall food consumption in Slovakia, but also in Czech households do not fully meet the recommended rations.

The transformation process of the economy and the financial crisis necessitated the creation of profiling of relatively stable groups of households and official statistics provide information and report on revenues and expenditures of private households by quartile classification of net cash income per person. In the first group of twenty-five percent of households are located in the lowest level of income and pensions social funds are the predominant source of revenue and expenditure structure is typical for poor households reaching a low threshold of saturation. Research of revenue bonds, food expenditures and food price development was based on a database of the Statistical Office of the Slovak Republic, from which were taken the data from household budget survey (COICOP–HBS): the net household income and expenditures for food and non-alcoholic beverages by quartiles and net cash income per capita in the years 2004–2011. Obtained data were processed by the MS Office Excel. Recalculation of the total expenditure for selected food commodities and their purchased quantities were obtained the unit consumer prices of purchased food for households. This methodology allows us to estimate the coefficients of direct price and income elasticity of demand and their comparison in terms of quartile classification of households by net cash income. In addressing this issue were used methods of descriptive analysis, basic and chain indexes and the average rate of growth.

Analysis of food expenditures, level of saturation of demand for food, coefficients of direct price and income elasticity were obtained by using regression analysis with formal entry regression model:

$$VP_{ik} = f(NMI_k) + e_{ik}$$
$$g_{ik} = f(P_{ik}, NMI_k) + e_{ik}, \quad (1)$$

VP_{ik}.....household expenditure for food in the k-th's income quartile (k = 1, 2, 3, 4) representing $Q_{ik} * P_{ik}$

NMI_k..net money income in k-th's income k-th income quartile

g_{ik} .....purchased amount of the ith food in the k-th income quartile

P_{ik}.....the average price of the ith food in the k-th income interval

e_{ik} .....random variable.

Analysis and comparison of expenditure on food was based on log – hyperbolic function:

$$VP_{ik} = \exp\left(b_0 + b_1 \frac{1}{NMI_k}\right) \quad b_0 > 0, b_1 > 0. \quad (2)$$

Income elasticity $Ei = \frac{-b_1}{NMI_k}$.

Saturation $VP_k = e^{b_0}$,

through which we can estimate the income elasticity coefficients and the saturation demand limit for food. Estimation of parameters of demand function (1) after the previous transformation to the linear shape was conducted by using the method of least squares. Found regression parameters of the models and their suitability were statistically verified by the index of determination (R^2).

Development Trends and the Level of Disposable Income and Consumer Spendings

Household income is in the economic analysis studied mainly in relation to the political, economic and social situations in society that affect income inequality and vice versa scalding which affects state income situation of households and the overall standard of living of the population. Amount of cash income of households, its resources and structure are primarily determined by their position in the labor market and employment. It can be observed that in Slovakia is gradually growing gap in achievement disposable income and as the EU SILC 2011, 25% of families with two or more dependent children have a monthly income in the range from € 201 to € 600 and exhibit asymmetric distribution with right skew. Outweighs the number of households with lower incomes.

In the period from 2004 to 2011, the household's income in the first quartile was located between the lower quartile and median reached the highest 6.3 % average annual increase in net cash inflows (k' = 1.063), but their average income was only € 2,222.52 per person per year. Household income in the fourth income quartile increased the average

cash income per year by only 4.9% (k' = 1.049) but its level on average € 6,513.04 per person was 2.93 times higher than the family income in the first quartile of the revenue. (Tab. I). Higher differentiation and accelerating increase in net cash income and also deepening disparities can be observed especially in 2008 and subsequently in 2011.Transformation process, growing unemployment and adaptive mechanisms exhibited abnormally features and so the scale of the household income zone found itself in the low-income zone with rapid lowered available income and on the other hand, increased earnings were noticed particularly in families without dependent children and families with one dependent child, whose monthly equivalent income exceeds the revenue interval € 1001 and more. The share of such households in 2011 was from 6.3 to 7.6% (EU SILC 2011).

Unequal development and level of disposable income is also differentially expressed in household consumption expenditures. Consumption expenditures of households located in the fourth income quartile were on average level € 5,692.82 per year and exceeded two and a half times household expenditures from the first quartile. Consumption expenditures of households in the second and third income quartile category were less differentiated and reduced by 1.62 to 1.48 times compared with households in the fourth quartile.

Household food expenditures unlike the development of consumer expenditures in the observed period, developed evenly and were marked and less differentiated between quartiles. In the fourth income quartile, expenditures for food exceeded 1.662 times the food expenditures of the households with the lowest incomes and 1.276, respectively 1.133 times the household expenses in the second, resp. the third income quartile. Total food expenditures spent in the observed period were in average from € 609.9 to € 1,013.53 per person per year.

On the basis of calculations in Tab. II it can be seen that the highest expenditures in the structure of consumption expenditures represented the expenses for food, beverages and catering, which, although slightly decreased and in 2011 were accounted for 34.24% in the households with the lowest incomes, and only in the third and fourth income quartile decreased below 30%. Nevertheless, it is possible to observe the acceleration of convergence payment structures in Slovakia to structures of EU member states, particularly in the area of the housing, transport services as well as food expenses, but food expenses remains in Slovakia, particularly in comparison with the countries of EU-15, still very high.

Considerably higher disposable income of households located in the third and especially in the fourth income quartile showed in the higher spending of funds for services including health care, transportation, recreation and culture, education, telecommunications and payments for other various goods and services. These households spend considerable resources (from 10.1% to 13.6%) to cover other net expenses and ensure their higher standard of living.

Income Elasticity and Possibilities of the Saturation Level of Demand for Foodand Non-alcoholic Beverages

Consumption expenditures of households are conditioned by several factors, which includes age composition of the families, socio-economic situation of families, especially participation on labor market, traditions, culture and lifestyle. The findings confirm the poorer the family is, the higher are relative expenditures to meet basic needs for food, housing, medicaments and lower are expenditures for culture, education and recreation. Kubicová, Ľ., Dobák, D. (2012) alleged that while households in the fourth income quartile in the year 2000 spent on services 29.08% and on other net expenditures 9.13%, in the households in the first income were the expenditures on services 24.16% and on other net expenditures only 4.42%. Income level provides a different room for maneuver to meet the daily needs of the households. The problem of a high proportion of the food expenditures in Slovakia persists and can be said that this is the result of pension restrictions that makes consumer

I: *Net Cash Income and Consumption Expenditures of Private Households in Slovakia by Quartile Classification in € per Person in the Years 2004–2011*

Indicator		1st quartile	2nd quartile	3rd quartile	4th quartile
Net Income	Average in €	2 222.52	3 306.5	4 133.7	6 513.04
	Index 2011/04	1.536	1.528	1.576	1.401
	Coefficient of Growth Rate k'	1.063	1.063	1.067	1.049
Consumption Expenditures	Average in €	2 259.8	3 152.3	3 856.2	5 692.8
	Index 2011/04	1.317	1.330	1.371	1.232
	Coefficient of Growth Rate k'	1.040	1.042	1.046	1.030
Expenditure on Food and Non-alcoholic Beverages	Average in €	609.9	794.1	894.89	1 013.53
	Index 2011/04	1.124	1.038	1.147	1.154
	Coefficient of Growth Rate k'	1.017	1.005	1.019	1.021

Source: SO SR, COICOP-HBS, own calculations

II: *Changes in the Structure of Household Consumption Expenditures in %*

	Consumption Expenditures (= 100)	2008	2011
1st quartile	Food, beverages, public catering	35.11	34.24
	Non-food goods (clothing, energy)	31.02	29.58
	Services (health, education, transport)	26.67	27.78
	Other net expenses	7.19	8.43
2nd quartile	Food, beverages, public catering	31.83	31.66
	Non-food goods (clothing, energy)	31.02	29.58
	Services (health, education, transport)	26.67	27.78
	Other net expenses	7.19	8.43
3rd quartile	Food, beverages, public catering	29.59	27.70
	Non-food goods (clothing, energy)	30.74	29.92
	Services (health, education, transport)	28.09	30.25
	Other net expenses	11.57	10.10
4th quartile	Food, beverages, public catering	24.61	26.15
	Non-food goods (clothing, energy)	28.75	28.57
	Services (health, education, transport)	30.13	31.68
	Other net expenses	12.50	13.60

Source: SO SR, COICOP-HBS, own calculations

III: *Share of Selected Aggregated Expenditures for Food Groups in Total Expenditures for Food and Non-alcoholic Beverages per Person in % in 2011*

	1st quartile	2nd quartile	3rd quartile	4th quartile
Bread and Bakery Products	21.93	20.51	20.10	18.64
Meat and Meat Products	25.96	26.41	25.95	26.09
Milk, Cheese, Eggs	18.67	18.00	17.64	17.78
Vegetable, Potatoes and Weed Plants	7.71	7.92	8.38	8.93
Fruit	5.29	6.26	6.49	7.09

Source: SO SR, COICOP-HBS, own calculations

behavior flexibly responds to changes in prices of goods and services. A large part of families, especially in the first and the second income quartile, reduces their expenses and thus consumption of food also in physical units when major changes in prices, which documented the findings from the statistical summary of the year 2011.

The results (Tab. III) show, that the food basket of households in the first income category quarter of the food products predominate in high proportion mainly the meat products, bread and bakery products. Relatively higher proportion are represented by food such as milk, cheese and eggs, while the family's income in the fourth income quartile in the food basket reported a higher proportion of the consumption of meat and meat products, vegetable and fruit.

Size of the available funds spent for food and non-alcoholic beverages and selected aggregated food groups were examined by simple and multiple regression analysis. We analyzed the total food expenditure with regard to the available net cash income from whatever individual household income groups and in this context was quantified the income elasticity of demand and the level of saturation for food. For this purpose was chosen as an appropriate log-hyperbolic regression function.

The estimated parameters of regression expenditure functions for food and non-alcoholic beverages (Tab. IV) show statistical evidence supporting variability and the share of food expenditure in relation to net cash inflows to the regression explained by model from 33.8% to 81.5%. The highest impact of net cash income to food expenditures (81.5%) in the reporting period reflected in families with the lowest incomes. Households in the lowest-income category-first quartile, reported the highest income elasticity. To increase the cash income by one percent in average, the households responded by increasing demand for food and expenses by 0.28% and the saturation of demand ranged annually at € 811.43.

Demand for food and non-alcoholic beverages responded relatively flexible in the families with the highest incomes cash-in the fourth quartile, whereas to increase the income by one percent in average, these households increased their spending on food and drink in average by 0.266% and the level of saturation at € 1 323.50.

IV: *Development of Expenditure Depending for Food and Non-alcoholic Beverages in Relation to Cash Income, Income Elasticity and Saturation of Demand in Terms of Household Income Quartiles*

Income Group	Regression Parameters	Income Elasticity E_i	Saturation in €	R^2
1st quartile	$VP = \exp\left(6.698 - 622.12\frac{1}{NMI_k}\right)$	0.280	811.43	0.815**
2nd quartile	$VP = \exp\left(6.825 - 482.93\frac{1}{NMI_k}\right)$	0.146	921.13	0.338*
3rd quartile	$VP = \exp\left(7.018 - 900.38\frac{1}{NMI_k}\right)$	0.218	1116.99	0.624**
4th quartile	$VP = \exp\left(7.19 - 1735.52\frac{1}{NMI_k}\right)$	0.266	1323.50	0.470*

Source: SO SR, COICOP-HBS, own calculations
Note: * – model statistically significant at level < 0.05
** – model statistically significant at level < 0.01

Price and Income Elasticities of Selected Aggregated Foods

For the empirical assessment and response of consumer demand for the selected aggregate food in relation to the unit price of food and disposable net cash income was used linear model of demand functions.

From the results of the analysis of consumer demand for meat and meat products can be concluded that meat and meat food products represent a standard food with around 26.0% share in the pattern of food expenditures per year.

Cash expenditures for the aggregated group of meat and meat products in Slovak households represent the highest percentage difference from expenditures spent on food. In the period from 2004 to 2011, the lowest consumption of meat and meat products was showed in the households located in the lowest income quartile, in average of 44.03 kilograms per person per year, and was purchased for an average unit consumer price € 3.395 per kilogram.

With the increase in consumer prices by one percent responded the households income in the first income quartile by reducing their demand for meat in an average by 0.275 kg per person (E_{Pi} = –0.275). Demand reflected in prices and incomes as inelastic and increasing the income by one percent was noticed a decrease in demand for meat by 0.012 (E_I = –0.012). Similarly responded the households when buying meat and meat products in the highest income quartile, while increasing their cash income has not resulted in increased demand for meat and income elasticity has a negative value (E_I = –0.310) (Tab. V).

Households in this income quartile unlike other evaluated income groups reacted according to the law of supply and demand and showed the positive values of price elasticity (E_{Pi} = 0.309) and thus the increase in meat prices by one percent responded to increasing demand by 0.309%. In another study by Kubicová, Ľ. (2009) meat and its consuption participate with the greatest share (23–26%) in the structure of expenditures for foodstuffs and in the majority of countries it is appraised as a measure for the maintenance level. In Slovakia we can observe a negative development in the maintenance of the inhabitants especially in the material consumption of beef meat and also partially of pork meat but also of other foodstuffs sucha s milk for drinking, vegetables.

It can be concluded that the demand for an aggregate group of foods such as bread and cereals reflected in prices and incomes as inelastic, which is also confirmed by recent analyzes by other authors (Syrovatka & Blažková, 2002), who found an average coefficient of direct price elasticity of consumer demand for bread was on level of –0.7085 and the average coefficient of indirect price (cross) elasticity was 0.6388. Demand for cereals in addition to the

V: *Estimation of Price and Income Elasticities of Demand for Meat and Meat Products*

Income group	$g_{ik} = b_0 + b_1$ price $+ b_2$ income	Elasticity		R^2
		E_{Pi}	E_I	
1st quartile	$g_{i,1} = 56.649 - 3.565\ P_{i1} - 0{,}00023\ NMI_1$	–0.275	–0.012	0.338-
2nd quartile	$g_{i,2} = 80.994 - 4.249\ P_{i2} - 0.00278\ NMI_2$	–0.259	–0.161	0.467*
3rd quartile	$g_{i,3} = 133.189 - 20.858\ P_{i3\ i} + 0.0008\ NMI_3$	–1.168	0.053	0.666*
4th quartile	$g_{i,4} = 66.046 + 27.912\ P_{i4} - 0.0031\ NMI_4$	0.309	–0.310	0.496-

Source: SO SR, COICOP-HBS, own calculations
Note: - model statistically significant at the 10% significance level (α < 0.10)
* model statistically significant at the 5% significance level (α < 0.05)

VI: *Estimation of Price and Income Elasticities of Demand for Bread, Bakery Products and Cereals*

Income group	$g_{ik} = b_0 + b_1$ price $+ b_2$ income	Elasticity		R^2
		E_{Pi}	E_I	
1st quartile	$g_{i,1} = 155.06 - 36.474\ P_{i1} - 0.00589\ NMI_1$	–0.490	–0.137	0.937**
2nd quartile	$g_{i,2} = 185.32 + 2.069\ P_{i2} - 0.00278\ NMI_2$	0.252	–0.952	0.956**
3rd quartile	$g_{i,3} = 179.36 - 46.785\ P_{i3} - 0.00053\ NMI_3$	–0.573	–0.019	0.908**
4th quartile	$g_{i,4} = 178.24 - 20.25\ P_{i4} - 0.005675\ NMI_4$	–0.275	–0.339	0.869**

Source: SO SR, COICOP-HBS, own calculations
Note: ** model statistically significant at the significance level ($\alpha < 0.01$)
* model statistically significant at the significance level ($\alpha < 0.05$)

households income in the second income quartile was carried out according to the law of demand, so that households with the lowest income responded to higher prices of bread and other cereals by one percentage by decreasing their purchase by 0.490% (E_{Pi} = –0.490) (Tab. VI).

The average consumption of bread and cereals in the observed period showed a slight variation and ranged in average from 44.03 kg per year (in the first income quartile) to 65.99 kg per person in the households in the fourth income quartile. Households bought bakery products in average consumer prices ranging from € 3.395 (in the first income quartile) to € 3.711(in the fourth income quartile). Income elasticities suggested that households in evaluated income groups by increasing their disposable cash incomes did not increases consumer demand for these foods.

CONCLUSION

In the process of humanitarian development of population nutrition is the food supply one of the key factors. Experience from previous development shows that even self regulation of the market in terms of transition to a market economy will not solve the problems of nutrition of our population. The aim of the paper was the comparative analysis of the consumption of food and non-alcoholic beverages in monetary terms of the population of the Slovak Republic after its accession to the EU. During the transition period, in Slovakia there appeared the income and wealth differentiation, which was also reflected in the total consumption and expenditures on food.

Households located in the first income quartile represented only 60.2% of spent funds and in the observed period were amounted to an average € 609.9 per person per year. Compared with the families in the fourth income quartile, where was their food saturation at € 1,326.50 and their expenditures were annually in average amounted to € 1,013.53, per person was saturation only 61.2%, it means the level of € 811.43.

The lowest consumption of meat and meat products in the period under review showed households located in the lowest income quartile. Average consumption was 44.03 kg per person per year, and bought meat for the consumer price unit on average € 3.395. With the increase in consumer prices by one percent, households in the first income quartile responded by reduction in demand for meat in average by 0.275 kg per person (E_{Pi} = –0.275). Demand showed as inelastic (both price and income) and increasing of income by one percent caused decreased demand for meat by 0.012 (E_I = –0.012). Households in the fourth income quartile, unlike other income groups reacted according to the law of supply and demand and showed the positive values of price elasticity (E_{Pi} = 0.309) and the increase in meat prices by one percent responded in increased demand by 0.309%.

Demand for cereals in the households with the lowest income responded to higher prices of bread and other cereals by one percentage by decreasing their purchase by 0.490% (E_{Pi} = –0.490). The average consumption of bread and cereals showed moderate variability and ranged in average from 44.03 kg per year (in the first income quartile) to 65.99 kg per person in the households in the fourth income quartile. Households purchased bakery products in average consumer prices ranging from € 3.395 (in the first income quartile) to € 3.711(in the fourth income quartile).

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