

EXAMINING THE DEPENDENCE OF EXPENDITURES ON WAGE AND POVERTY RATES IN REGIONS OF THE SLOVAK REPUBLIC

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Abstract

Paper investigates existence of economic and social disparities in the Slovak Republic caused by regional disparities. The subject of survey are households' expenditures and factors affecting them. The regions of Slovakia are understood as municipalities and are investigated during analyzed period of 2005-2015. The concept of research is concerning with review of scientific articles describing development of households' expenditures as well as with practical conclusions and scientific results. Paper reveals differences between Slovakia's regions in expenditures responses to changes in poverty rates and nominal gross monthly wage. Regression and correlation analysis was applied. Expenditure deviations are explained separately in each region by independent variables changes. The results of analysis confirmed the dependence of expenditures on the poverty risk rate and the nominal gross monthly wage. Results represents quantification of changes in region's expenditures for the single unit change of the independent model variables. Research also shown in which regions are expenditures influenced the strongest and in which the weakest by selected factors.

Keywords: net cash expenditures, nominal wage, households, regions, poverty rate

JEL classification: D1, D12, D31

1 Introduction

The explanation for isolated monitoring of individual regions of Slovakia and further comparison results from the different development of these areas, mainly due to the specific climatic conditions, the disposing of natural resources, resulting character of territory settlement and, last but not least, different industrial processes. Differences formed in this way have caused diverse conditions in the individual territorial areas of Slovakia to form the quality of inhabitants' life. Resulting effect are different level of wages, expenses, or poverty.

According to Holková et al., 2003, wages, salaries and other compensations are possible forms of rewards for the production factor - labor. Nominal wage represents the amount of money that was assigned to the employee for his labor and effort. Reducing this amount by the purchasing power of money changes creates a real wage corresponding to the volume of goods employee can buy for his nominal wage. Thus, real wage determines employee's consumption and also allows comparison of living standards from a period and regional point of view.

When examining differentiation of household spending patterns in EU countries for the era of the years 1995-2011 found out Dudek – Koszela – Krawiec, 2013 that category in the expenditure on alcoholic beverages, tobacco and narcotics, expenditure on health there is neither convergence, nor divergence. Categories clothing and footwear and communication showed divergence, which means that there are significantly different expenditures in these categories in the EU countries. For other categories, such as food and non-alcoholic beverages, transport, education, housing, recreation and culture, furniture is confirmed that differences in households' expenditure on mentioned categories between the EU member states diminish.

A study by Michálek - Podolák, 2016 points to emphasis the socio-spatial dimension of poverty in Slovakia. Most of the districts with a high level of poverty lie in the east of the countryside, with the most western regions of Zlaté Moravce and Žarnovica. The districts with the lowest synthetic indicator of poverty came from Bratislava I and Bratislava II districts and contrariwise region with the highest indicator is Kežmarok.

Comparison of food and non-alcoholic beverages consumption of the Slovakian population has been considering by Nagyová-Stávková-Kádeková 2013. After the EU membership changes in household income and wealth were reflected in final consumption and food expenditures. The first income quartile of households spent 609.9 Euro per person per year on the food and non-alcoholic beverages in the period 2004-2011, while the fourth income quartile spent 1013.53 Euro per person per year. The lowest income quartile had the lowest consumption of meat

and meat products (44.03 kg per person per year), price elasticity has shown that if the meat price increases by 1%, demand will fall by 0.275 kg. They are characterized by both price and revenue inelasticity. By contrast, households in the fourth income quartile show price elasticity.

2 Data and Methodology

In order to explain changes in net cash expenditures throughout analysed period, methodology of regression and correlation analysis is applied. The power model is used to describe the dependency. The general form of the model is:

$$x_2^{b_2} y = a * x_1^{b_1} * \quad (1)$$

where: y is dependent variable - net cash expenditure (NCE)

a is constant

b_1, b_2 are regression coefficients

x_1 is independent variable – nominal gross monthly wage of the employee (NGMWE)

x_2 is independent variable – risk of poverty rate (RPR)

Modified form is as follows:

$$NCE = a * NGMWE^{b_1} * RPR^{b_2} \quad (2)$$

The following form of equation after the necessary logarithm transformation can be written:

$$\ln NCE = \ln a + b_1 \ln NGMWE + b_2 \ln RPR$$

Analysed period presents years 2005-2015 and data were obtained from regional database of the Statistical Office of the Slovak Republic.

The MS Excel is applied, output from regression consists of correlation analysis, model verification and regression analysis.

3 Results and discussion

The amount of money that households allocate as their expenditures is influenced by many factors. In addition to the qualitative ones represented in particular by the attitudes, the quantitative factors determining the amount of resources generating income of the household budget are more relevant. Due to the fact that there should be dependency between household expenditures and household incomes, we have decided through a regression and correlation analysis confirm the

tightness between net cash expenditure ($NCE = y$) and nominal gross monthly wage of employees ($NGMWE = x_1$) and risk of poverty rate ($RPR = x_2$) in each self-governing region individually. Following tables show the most important data from power regression models, as they presented the most significant results.

3.1 Correlation analysis

Estimated coefficients defining the dependence of studied variables and the share of explained variability of the dependent variable are represented in table 1.

Table 1 **Correlation coefficient, coefficient of determination and adjusted coefficient of determination**

	BA	TT	TN	NR	ZA	BB	PO	KE
Multiple R	0,8982	0,9599	0,9072	0,9236	0,9165	0,8711	0,8663	0,9575
R Square	0,8067	0,9214	0,8231	0,8531	0,8399	0,7589	0,7505	0,9168
Adjusted R Square	0,7583	0,9018	0,7788	0,8163	0,7999	0,6986	0,6881	0,8960

Source: Own processing.

The correlation coefficient representing correlation between analyzed variables reveals that in each of the regions is a strong dependence of net monetary expenditures on the nominal gross monthly wage and the risk of poverty. The strongest dependence was observed in the Trnava (TT) and Košice (KE) regions and the weakest in the Prešov (PO), Banská Bystrica (BB) and Bratislava (BA) regions.

The adjusted R-squared compares the descriptive power of regression models that include diverse numbers of predictors and it takes into account the number of observations. Based on this coefficient, we quantify the percentage variability of the dependent variable explained by the model. In the Trnava (TT) region selected model explained variability the most, 90.18% of net cash expenditures changes in the time series. In Košice (KE) it was less than 90% and the lowest adjusted R-squared was recorded by the Prešov (PO) and Banská Bystrica (BB), where model was not able to explain even the 70% variation of net cash expenditure.

3.2 Verification of the model

In our research we examined the dependence of net monetary expenditures on the nominal gross monthly wage and the risk of poverty. We used the F test and formulated following hypotheses:

H0: *The chosen model is not suitable for describing the dependence of net cash expenditure on the nominal gross monthly wage and the risk of poverty.*

H1: *The chosen model is suitable for describing the dependence of net cash expenditure on the nominal gross monthly wage and the risk of poverty.*

The F test results are the same for each analysed region as we examined the same time series period.

Table 2 F test values

	95%	99%						
F value	4.46	8.65						
	BA	TT	TN	NR	ZA	BB	PO	KE
F value	16.69	46.89	18.61	23.22	20.99	12.59	12.03	44.10

Source: own processing

Based on the F test values, an alternative hypothesis H1 is confirmed and we rejected zero hypotheses H0. We confirm that the model is suitable for describing the dependence of net cash expenditures on gross monthly wages and the risk of poverty. The selected model and independent variables explain changes of dependent variable with 99% reliability for each analysed region. The highest calculated F values are in Trnava (TT) and Košice (KE), where the reliability of the model is the highest.

3.3 Regression analysis

The T test verify the hypothesis H0: *the selected regression coefficient is insignificant, equal to zero.* The alternative H1 hypothesis states that the regression coefficient is different from zero and statistically significant. The T test values are the same for each analysed region as we examined he same time series period.

Table 3 T test values

	95%	99%						
T value	2.23	3.17						
	BA	TT	TN	NR	ZA	BB	PO	KE

T value	In NGMWE	5.73	9.11	4.67	6.67	6.37	2.33	4.64	8.26
	In RPR	-0.43	-1.46	-0.77	-2.51	-1.63	-0.04	-1.42	-6.14

Source: own processing

Based on the calculated T statistics it can be said that the regression coefficient for the nominal gross monthly wage of the employee is significant at significance level of 0.01 for all regions except Banská Bystrica (BB). In this region was the significance of parameter validated only for the level of 0.05. Thus, the alternative hypothesis of the nominal gross monthly wage parameter significance was confirmed in each region. With 99% confidence net monetary expenditures will change when the nominal gross monthly wage changes. The independent variable risk of poverty has become significant only in the Nitra (NR) and Košice (KE) regions, at a significance level of 0.05 for Nitra and 0.01 for the Košice region. In other regions alternative hypothesis H1 was rejected. Thus, in these regions can not be stated that net cash expenditures would change statistically significantly when changing the risk of poverty. However in the Nitra region net cash expenditures change with 95% confidence by changes in the risk of poverty and in the Košice region is these confidence at 99% level.

Regression parameters estimation can be written to the following equations:

$$NCE = 2.59 * NGMWE^{0.73} * BA RPR^{-0.05} \quad (4)$$

$$NCE = 1.77 * NGMWE^{0.82} * TT RPR^{-0.12} \quad (5)$$

$$NCE = 2.96 * NGMWE^{0.74} * TN RPR^{-0.12} \quad (6)$$

$$NCE = 19.35 * NGMWE * NR RPR^{-0.27} \quad (7)$$

$$NCE = 8.62 * NGMWE^{0.6} * ZA RPR^{-0.16} \quad (8)$$

$$NCE = 6.11 * NGMWE^{0.6} * BB RPR^{-0.01} \quad (9)$$

$$NCE = 16.39 * NGMWE^{0.51} * PO RPR^{-0.17} \quad (10)$$

$$NCE = 71.71 * NGMWE^{0.42} * KE RPR^{-0.57} \quad (11)$$

Source: Own processing.

Exponents' values express directly elasticity parameters. The first regression coefficient represents elasticity of net cash expenditure in consideration of the nominal gross monthly wage and the second regression coefficient characterize elasticity of net monetary expenditure relative to the risk poverty rate. If the gross wage of employees' increases by 1%, the net cash expenditure may increase in each region, but it will increase most in the Trnava (TT) region by 0.82%, while in the Košice (KE) region it will rise only by 0.42%. The elasticity with regard to the second regression coefficient is only relevant in the regions where the coefficient has been shown as statistically significant, ie in the Nitra (NR) and Košice regions. If the risk of poverty rises by 1% in the Nitra region, its inhabitant may spent as net monetary expense a value reduced by 0.27%. In case of Košice region net monetary expenditures will decline by 0.57%.

4 Conclusion

The regression and correlation analysis examining the dependence of net cash expenditures on the nominal gross monthly wage and the poverty risk rate applying the power regression model confirmed the strong dependence between the variables in all regions in Slovakia. The strongest dependency was observed in the Trnava (TT) and Košice (KE) regions. In each of analysed self-governing regions in Slovakia chosen model explained changes in the dependent variable with 99% reliability. The individual variable nominal gross monthly wage is statistically significant for all regions and shows a positive correlation with net cash expenditures. Poverty risk rate has become statistically insignificant for all regions except Nitra (NR) and Košice, which suggests that, with the exception of the above-mentioned regions, net cash expenditure will not change with statistical significance due to risk rate of poverty changes. In the Nitra and Košice regions, the dependence of net cash expenditures and the risk of poverty was found to be negative. With a one-percentage change in the nominal gross monthly wage the net cash expenditures will change by 0.42-0.82% in regions of the Slovak Republic. The net cash expenditures may decrease by 0.57% in Košice and by 0.27% in the Nitra region due to a one-percentage increase in the level of risk poverty rate.

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