

Analysis of the Households' Expenditures Structure in the Regions of the Slovak Republic

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Abstract: *The climate conditions, subsequent population density, natural resources and following developing industry cause significant differences in the territorial division of Slovakia. The resulting differences have led to a different level of living standards in individual areas, and this fact is transformed into a different range of household expenditures. The main aim of paper is to determine which regions in Slovakia are characterized by similar expenditures' structure and vice versa, which regions differ with the structure of expenditures the most. To achieve defined aim we applied the Gatev's coefficient of dissimilarity of structures, which allows us to compare couples of regions. During the research 28 pairs of regions will be created and for each pair will be calculated coefficient in range between 0 and 1. Based on this coefficient we will be able to identify the pair of regions with the most similar expenditure structure and a pair of regions with a least similar expenditure pattern. Once this goal will be achieved, determined pairs of regions will be undertaking advanced analysis to determine with which types of expenditure are regions most comparable, respectively not.*

Key words: Expenditures · Gatev's Coefficient · Household · Regional Analysis

JEL Classification: R19 · R20 · D19

1 Introduction

The net cash expenses consist of expenditures on consumption and other net expenses. According to the Statistical Office of the SR (2016), the group of consumption expenditures is divided based to the spending into following 12 groups: food and non-alcoholic beverages, alcoholic beverages and tobacco, clothing and footwear, housing, water, electricity, gas and other fuels, home furnishings and home maintenance, healthcare, transport, post and telecommunications, recreation and culture, education, hotels, cafes and restaurants, various goods and services.

Households' consumption expenditures by Lisý a kol. (2016) represents more than a half of aggregate demand. Part of the income that households do not spend creates their savings. The low level of households' savings impacts the whole economy performance, its growth and yet again consumption.

Vojtková, & Labudová (2010), detailed examined the living standards in Slovakia, using statistical analysis of the expenditures structure, which was based on the differentiation of regional membership according to the regions of Slovakia. They have shown that spending on food and non-alcoholic beverages, as well as housing and transportation expenditures have fallen slightly as well as expenditures on education. On the other hand, expenditure on post and telecommunications, expenditures on hotel accommodation, cafes, restaurants, cultural expenditures, and healthcare expenditures recorded growth and other net expenditures (loan repayments) increased sharply.

Comparison of food and non-alcoholic beverages consumption of the Slovakian population has been considering by Nagyova, 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

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income quartile show price elasticity. In 2011, the lowest income quartile was characterized by the highest consumption of bread and bakery products, milk, cheese and eggs and the lowest consumption of vegetables and fruits.

Based on household data in the Philippines where is high incidence of malnutrition Schmeer's (2015) survey revealed that if women have higher incomes and greater control over their redistribution, the more household will spend on food. If women earn less, but they are a member of a richer household, they will also use their partner's earnings to increase their food expenses. The study also confirmed the opinion that if the developing country improves the economic status of women in terms of controlling the domestic budget and earning more money, they will spend incomes on goods that are beneficial for children.

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.

2 Methods

The main goal of paper is to reveal a pair of regions with similar structure of expenditures and the pair of regions, where the structure of expenditures is the most distorted with applying the coefficient of similarity.

The methodology for analysing the structure of household spending will be implemented through a measurement of similarity in the contribution of individual items of expenditure in total expenditure. The Gatev coefficient of structural similarity is used, which is defined as:

$$Gk(p_1, p_2) = \left[1 - \frac{2 \sum_{k=1}^m p_{1k} p_{2k}}{\sum_{k=1}^m (p_{1k}^2 + p_{2k}^2)} \right]^{\frac{1}{2}} \quad (1)$$

where: Gk is the Gatev coefficient of structures similarity

p_{1k} is share of the k - category of expenditure on total expenditure of the first region

p_{2k} is share of the j - category of expenditure on the total expenditure of second region

m is number of expenditures categories ($k=1, 2, \dots, m$, where $m=13$).

The Gatev Coefficient form is only applicable for pairs of regions, so it is necessary to quantify the coefficient separately for each pair. Thus will be created 28 pairs of regions. The Gatev coefficient of similarity takes values from 0 to 1. Zero means complete equality of structures and vice versa 1 their non-uniformity. (Vojtková. & Labudová, 2010)

3 Research results

Although the structure of expenditures is in each region unique, there is certain similarity in dividing expenditures of inhabitants in different regions into individual categories of consumption. It can be said that residents of regions with a similar structure allocate the same percentage of net cash expenditures for an identical area of consumption, food, transport or education. The similarity of structures thus reveals the similarity of consumer behaviour and decision-making about the use of available funds by the population of different regions.

For requirements to find similarities we have quantified Gatev's coefficient of structures similarity based on the structure of net cash expenditures of all regions in Slovakia for the year 2015. As values of coefficient are closer to 0, the more they indicate similarity and contrariwise the higher they are, the regional spending structures differ more each other.

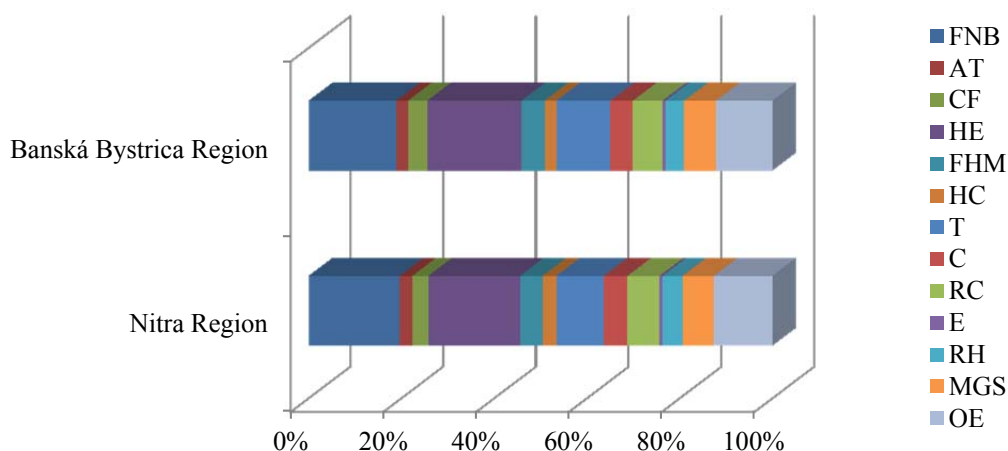
In 2015 structure of net cash expenses of Nitra and Banská Bystrica regions appears to be the most similar structures. The second most similar structures were in Trenčín and Žilina regions. We can state that inhabitants of these regions equally share their earnings to meet their needs.

Table 1 Gatev's coefficient of similarity of net cash expenses structure in the year 2015

| | BA | TT | TN | NR | ZA | BB | PO | KE |
|----|---------|---------|---------|---------|---------|---------|---------|---------|
| BA | | 0.08164 | 0.11784 | 0.09407 | 0.14322 | 0.09436 | 0.10168 | 0.15960 |
| TT | 0,08164 | | 0.13514 | 0.11359 | 0.15086 | 0.11306 | 0.10243 | 0.17093 |
| TN | 0.11784 | 0.13514 | | 0.09786 | 0.05068 | 0.09260 | 0.06866 | 0.13628 |
| NR | 0.09407 | 0.11359 | 0.09786 | | 0.10395 | 0.04181 | 0.08449 | 0.07455 |
| ZA | 0.14322 | 0.15086 | 0.05068 | 0.10395 | | 0.09395 | 0.06852 | 0.12586 |
| BB | 0.09436 | 0.11306 | 0.09260 | 0.04181 | 0.09395 | | 0.06856 | 0.08473 |
| PO | 0.10168 | 0.10243 | 0.06866 | 0.08449 | 0.06852 | 0.06856 | | 0.12035 |
| KE | 0.15960 | 0.17093 | 0.13628 | 0.07455 | 0.12586 | 0.08473 | 0.12035 | |

Source: Own processing

The greatest similarity for residents of Nitra and Banská Bystrica regions was in spending on education, on various goods and services, and on alcoholic beverages and tobacco. The difference in the share of education spending was the smallest in Nitra and Banská Bystrica regions and represented only 0.03%. In expenditures on various goods and services was difference 0.11%, while the population of Banská Bystrica region spent by 0.11% more of its net cash expenditures on that category than the population of the Nitra region. On the contrary these regions were at least similar in percentage shares in expenditure groups such as transport, food and non-alcoholic beverages and clothing and footwear. For transportation an inhabitant of Banská Bystrica region will spend 11.64% of his net cash expenses, while an inhabitant of the Nitra region will spend only 10.25%. For food and non-alcoholic beverages an inhabitant of the Nitra region will spend by 0.83% more of the net cash expenditures than an inhabitant of Banská Bystrica region and of the category of clothing and footwear he spends more by 0.72%.

Figure 1 Net expenditures structure of Nitra and Banská Bystrica regions in the year 2015

Source: Own processing

Note: FNB - Food and non-alcoholic beverages, AT - Alcohol and tobacco, CF - Clothing and footwear, HE - Housing and energy, FHM - Furnishing, house maintenance, HC - Health care, T - Transport, C - Communication, RC - Recreation and culture, E - Education, RH - Restaurants and hotels, MGS - Miscellaneous goods and services, OE - Other net cash expenses

For the purpose of examining the similarity of the expenditure structure between Nitra and Banská Bystrica regions, we quantified the Gatev coefficient values for analysed period 2005-2015.

Table 2 Gatev coefficient of expenditures structure similarity in Nitra and Banská Bystrica regions for period 2005 - 2015

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Gatev coefficient of similarity | 0.1034 | 0.0826 | 0.1008 | 0.0646 | 0.0657 | 0.0333 | 0.0544 | 0.0616 | 0.0602 | 0.0798 | 0.0418 |

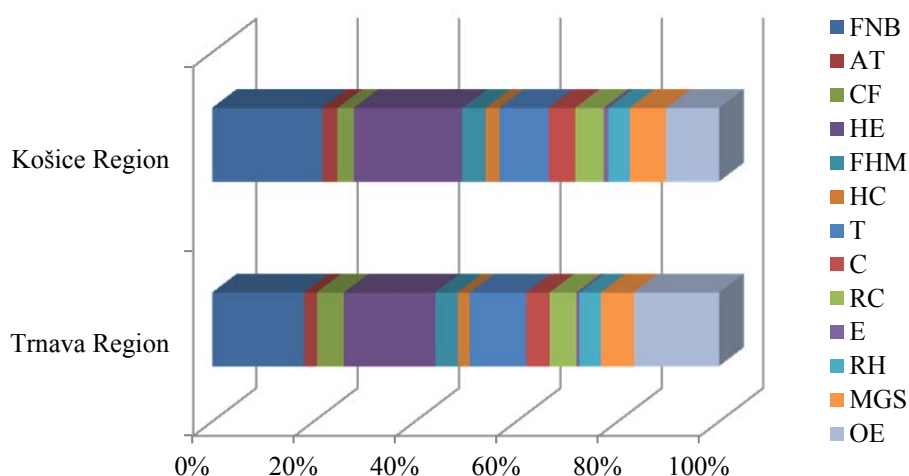
Source: Own processing

Quantification of the coefficient of expenditure structures similarity of the region Nitra and Banská Bystrica for the entire analysed period showed that in 2005 the value of the coefficient of similarity was up to 0.1034 and after the year 2010, at which reached a minimum, had declining trend. At the lowest value of the coefficient of similarity in the 2010 inhabitants in the Nitra and Banská Bystrica regions had the most similar representation of spending on their total expenditures among the 11 analysed years. From the year 2010 to the year 2014 was coefficient increasing, so the similarity of the structures has been weaker and in the last year has increased and had the second-lowest value in the analysed period. Nitra and Banská Bystrica are neighbouring regions. The similarity of spending structures is primarily due to income levels of inhabitants. Nitra and Banská Bystrica reached among the regions similar values of Gini's coefficient of income inequality. Residents of both regions receive monthly similar amount of gross nominal wages, and they have almost the same net monetary income, similarly high average disposable income. Very similar climatic conditions, relief and available land fund are also factors influencing the distribution of household spending. Both regions are based on agricultural production. The Nitra region, covered by the Danube Lowland with fertile soils, is a producer of cereals, oilseeds and oysters. Similar orientation is in agricultural production in the southern part of the Banská Bystrica region. Grape-growing and wine production are common to these regions. Banská Bystrica region also significantly focuses on forestry and timber production. Industry in both of these regions has relied on the natural resources they dispose. For both regions is food industry particularly important, but production is also oriented on the engineering industry as well. A common feature of these regions is the level of industrial development. Last but not least, the similarity of expenditures distribution among inhabitants of these regions is caused by small differences in prices of purchased goods and services, namely prices for housing, transport, and culture. The above-mentioned factors indirectly influence the decision-making of the inhabitants in redistribution their incomes to surveyed categories of consumption.

We can state that regions with the least similar expenditure structure, thus the most different, in the year 2015 were Košice and Trnava. Regions with a lower coefficient of similarity were Košice and Bratislava regions. The most significant values were recorded by the percentage share of expenditures in the form of other net expenses, food and non-alcoholic beverages, housing, water, electricity, gas and other fuels. From this difference can be also concluded that there are significant differences in the amount of expenditures for acquiring the basic needs of inhabitants of Košice and Trnava regions.

The share of food expenditures on total expenditures is for an inhabitant of Košice region higher by 3.55% than for the inhabitants of Trnava region and for housing, water, electricity, gas and other expenditures is higher by 3.44%. Other net expenses, mainly including taxes, but also purchases of securities and repayments of loans, reach up to 10.40% in the Košice region, while in the Trnava region up to 16.82%. The inhabitants of Košice and Trnava spent a similar share of their total spending on hotels, cafes and restaurants, as well on furniture, furnishings and routine apartment maintenance and education. The proportion of expenditures for furniture, furnishings and ordinary maintenance of the flat differed at least, only by 0.08%, as well as an inhabitant of Košice region spend on hotels, cafes and restaurants by only 0.09% more than an inhabitant of Trnava region. The share of education expenditures in total net cash expenditures was 0.63% in the Trnava region and 0.89% in Košice region.

Figure 2 Net expenditures structure of Trnava and Košice region in the year 2015



Source: Own processing

Note: FNB - Food and non-alcoholic beverages, AT - Alcohol and tobacco, CF - Clothing and footwear, HE - Housing and energy, FHM - Furnishing, house maintenance, HC - Health care, T - Transport, C - Communication, RC - Recreation and culture, E - Education, RH - Restaurants and hotels, MGS - Miscellaneous goods and services, OE - Other net cash expenses

The following table shows the development of the coefficient of structure similarity between the Trnava and Košice regions throughout the analysed period 2005-2015.

Table 3 Gatev coefficient of expenditures structure similarity in Trnava and Košice regions for period 2005 - 2015

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Gatev coefficient of similarity | 0.1458 | 0.0616 | 0.0700 | 0.0935 | 0.1683 | 0.0768 | 0.0479 | 0.0269 | 0.0386 | 0.0541 | 0.1709 |

Source: Own processing

The similarity of the expenditures structure in Trnava and Košice regions varied over analysed 11 years. The coefficient of similarity reached highest value in 2015 when the share of money value allocated to individual expenditures categories by inhabitants of Trnava region was not comparable with spending of Košice region inhabitants. The significant difference in the structure of expenditures was also evident in years 2005 and 2009. The fact is also worthwhile in 2012, when the coefficient of similarity was the lowest and therefore the expenditures structure of the mentioned regions was very closely related. The overall period 2011-2014 was characterized by a high level of similarity.

The Trnava region is a region of western Slovakia and the Košice region is located in eastern Slovakia. Significant difference in Slovakia between the developed West and the less developed East was the source of confirmed differences in the inhabitants' behaviour of these regions concerning consumption decisions. The main reason for differences we consider level of incomes as either net cash income, the average disposable equivalent household income, as well as the average gross equivalent income of households are obviously diverse between these regions. The expenses for analysed consumption categories, whether expenditure on housing, clothing and food are different and present different share on household budget. This is exactly why households of these regions allocate a different percentage of their total expenditures for mentioned categories. Climate conditions, mineral wealth and natural resources have created different facilities for development of industry and establishing companies in Trnava and Košice regions. The Trnava region is located in the vicinity of the capital city, gave space for labour market in companies dealing mainly with the automotive, engineering, metallurgical, textile and chemical industries and is higher developed as Košice region. The lifestyle of inhabitants in Trnava and Košice regions is also very different.

4 Conclusions

The most similar expenditures structures in the year 2015 were in Nitra and Banská Bystrica region, and the second most similar pair was Trenčín and Žilina region. It is also worth mentioning the neighbouring location of these regions and resulting similar situation of social life or natural conditions. The inhabitants of Nitra and Banská Bystrica region spend a similar amount of their available incomes for education, alcoholic beverages and tobacco and various goods and services. Based on the estimation of the Gatev coefficient of similarity for these regions for the period 2005-2015, we can determine the year 2010 as the year when expenditures structures of these regions were the most similar and on the other hand year 2005 was the year of the weakest similarity. The reasons for the similarity of expenditure structures between Banská Bystrica and Nitra region are very similar income values of inhabitants, also similar level of industrial development and small differences in the price level of particular expenditures categories. The districts with the most diverse expenditures structure in the year 2015 can be considered Košice and Trnava and with a lower coefficient of similarity also Košice and Bratislava regions. In this case these are differently localized regions of Slovakia, which may be the cause of divergence. The Košice and Trnava regions show the largest differences in the spending on food and non-alcoholic beverages, housing, water, electricity, gas and other fuels and other net expenses. Based on the analysed period 2005-2015 it can be confirmed that in the first and the last analysed year and also in the year 2009 structures of mentioned regions were very different and on the contrary almost identical were in years 2011-2014. The expenditure structures of Košice and Trnava regions' inhabitants differed which was due to the difference in the industrial development of eastern and western part of Slovakia in combination with the income disparities of the population, accompanying with different spending, consumption and lifestyle.

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