



Struktura spotřebního koše v České republice a Slovenské republice

The Structure of Consumer Basket in the Czech Republic and Slovak Republic

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Abstract:

Purpose of the article: Nowadays, consumer behaviour is still at the centre of attention of many researchers. The consumer basket belongs among important economic characteristics, which determine the economic level of each country. The contribution of the article consists in identification of changes in the structure of consumer basket related to two chosen countries.

Methodology/methods: The development of the structure of consumer basket of average household in two countries during the period from 2004 to 2014 is analysed. The structure is expressed by means of expenditure shares, while the development by means of trend models. Coefficient of determination and correlation coefficient are used within choosing the appropriate trend function.

Scientific aim: The aim of this article is to assess the development of the structure of consumer basket of average household in the Czech Republic and Slovak Republic during the period from 2004 to 2014 by each country including mutual comparison. In detail, the development of consumer expenditure groups of consumer basket is assessed.

Findings: Expenditure shares are found to be enough volatile in time. The highest coefficients of determination are found just in case of quadratic function. Mostly, the found correlation in trend model is strong. Incomes and expenditures mostly increase in time. Based on the 2004 and 2012 comparison, the percentage rates expressing, how much incomes exceed expenditures increase about 11% by the household in the Slovak Republic, however the ones increase only about 3% by the household in the Czech Republic.

Conclusions: The structure of consumer basket of household and the structure of household expenditures in the Slovak Republic differs from the ones in the Czech Republic. Both differences and common features are found within the development of indicators. Common features could be caused by the fact, that these two countries constituted only one country till 1. 1. 1993.

Keywords: Consumer basket, consumer behaviour, consumer expenditures, expenditure shares, incomes of households, expenditures of households

JEL Classification: D12, E21

Introduction

The consumer basket belongs among important economic characteristics, which determine the economic level of each country. This fixed list of various items is used specifically to track the progress of inflation in an economy. The variations in the prices of these items from year to year give an indication of the overall development of price trends. The structure of consumer basket is changing because of changes in purchase behaviour of households. Such changes in case of two chosen Central European countries within last 11 years are analysed.

1. Literary Survey

Based on many published empirical studies, the consumer behaviour and its specifics in individual countries has become the subject of interest of many researchers. So, analysing the structure of consumer basket in various countries is still one of the topical economic themes. Author considers this theme to be contributive for research area because of following facts. It is necessary to observe the progress of inflation in an economy and the economic level of a country. Specific features of each consumer basket determine certain level mentioned before. The consumption also indicates such a level.

Jílek, Hronová and Moravová (2000) present, that the consumption can be expressed by indicators of planned final consumption and real final consumption based on the system of national accounts. Final consumption expenditure on the goods and services can be divided into individual consumption expenditure and collective consumption expenditure. The relation between the consumption and income is described by Jurečka (2009). The consumption of items of consumer basket increases when the income increases in time, but the consumption growth is lower than the income growth, in general. Krebs (1997) mentions Engel's law. According to this law, income rises, the proportion of income spent on food (in general necessity good) falls, even if actual expenditure on food rises. As this proportion decreases, the country is by nature richer and it indicates a higher standard of living.

Popov and Semenov (2013) analyse the formation of a consumer basket under conditions of uncertain inflation. They consider the risks of ingredients of the consumer choice as a component of a common consumer basket. The inflation persistence in the Czech Republic using 412 detailed product-level consumer price indexes underlying the consumer

basket during 1994–2005 is analysed by Babecký, Coricelli and Horvath (2007). The Czech Statistical Office included 1 022 narrowly defined products in the consumer basket on a monthly frequency. Ferrari, Laureti and Mostacci (2005) describe time-space harmonization of consumer price indexes in 12 Euro-zone countries. In general, each country has its own consumer basket with different kind and number of the goods and services, used both for the national CPI and for the HICP. They discuss the features of the different baskets and suggest a way of harmonizing them. So that, the harmonized methodology of consumer basket construction is suggested. The quantity of consumer purchases and the consumer price index are analysed by Griffith, Leibtag, Leicester and Nevo (2008). They use data of United Kingdom households in 2006 and study implications of the consumers' timing and quantity decisions on standard practices of computing of computing a price index. Household-level data on quantities purchased and prices paid are used to construct a measure of the savings made by consumers' optimizing behaviour in the purchase of food.

Some researchers use less than 12 expenditure groups within empirical analysis. Celen, Erdogan and Taymaz (2005) analyze competitive conditions prevailing in the retail trade sector in the Turkey during the period 1997–2001. They use 7 expenditure groups and calculate relative prices for goods and services paid by different groups of costumers and also standard deviation of these prices. Based on the calculations, they describe how the structure of the market is being transformed, in detail. The data of 28 member countries of the OECD and Slovenia, Russian Federation, Israel and Slovak Republic in 1993 and 1996 are analyzed by Vachris and Thomas (1999). They use 8 expenditure groups and compare individual expenditures in each country. The list for the comparison contains around 4 000 items. Methodology is based on the purchasing power parity. Their results are generally consistent with findings from previous purchasing power parity studies.

On the other hand, some researchers use just 12 expenditure groups. The price setting behaviour of 423 products and identify the factors that affect this behaviour is studied by Coricelli and Horvath (2010). The frequency of price changes in Slovakia, Belgium, Austria, Italy, France, Luxembourg, Portugal, Netherlands and USA during the period 1997–2001 are calculated. Eurostat (2014) focuses on the data of 27 member countries of the EU. Annual average inflation rates is calculated. Interesting finding is that the highest price increases in 2012 were recorded for housing, water, fuel, alcohol and

tobacco. The investigation, how much consumer price index reflects longer-term trends in consumer spending patterns is described by Gooding (2014). He analyzes baskets of goods and services in the United Kingdom in 2013 and 2014 and finally he explain why and how the various items in the consumer price inflation baskets are chosen.

2. Objective and Methodology

The aim of the article is to assess the development of the structure of consumer basket of average household in the Czech Republic and Slovak Republic during the period from 2004 to 2014 by each country including mutual comparison. In detail, the development of groups of consumer basket is assessed. Author uses consumer expenditure groups. The structure of consumer expenditures is expressed by means of expenditure shares. According to Minařík (2009), the expenditure share is calculated as follows:

$$w_{it} = \frac{e_{it}}{\sum_{i=1}^5 e_{it}}, \quad (1)$$

whereas:

w_{it} expenditure share related to expenditure group i in year t ,
 e_{it} expenditure related to expenditure group i in year t ,
 i expenditure group ($i = 1, 2, 3, 4, 5$),
 t year ($t = 2004-2014$).

Regression analysis is applied in order to assess the development of the structure of consumer basket. Expenditure shares w_{it} are analysed. Coefficient of determination is calculated within choosing the appropriate trend function. It indicates how well data points fit some statistical model. This coefficient is

the square of the correlation coefficient, which is also calculated. Correlation coefficient measure the degree of dependence between two variables, giving a value between -1 and $+1$. The highest coefficients of determination are found for each expenditure group in case of quadratic function, so that quadratic trend model of the following form is used:

$$w_{it} = a_i t^2 + b_i t + c_i, \quad (2)$$

whereas:

w_{it} expenditure share related to expenditure group i in year t ,
 a_i, b_i, c_i coefficients,
 t year ($t = 2004-2014$).

This form expresses the dependence of expenditure shares in percents on time horizon.

Author presents the development of the structure of Czech and Slovak household expenditures according to consumer expenditure groups. Overall incomes and expenditures of these households in each year are presented together with the percentage rates expressing, how much incomes exceed expenditures. The changes in used indicators in time are analysed.

Data are collected from the Czech Statistical Office (2014) and the Statistical Office of the Slovak Republic (2014). Data related to the structure of consumer basket of average household, incomes and expenditures of households are available at the databases of these offices. Author analyses the period from 2004 to 2014, in general. All necessary data related to the structure of consumer basket of average household from this period are found. However, incomes and expenditures of households are analysed only over the period from 2004 to 2012, because values in 2013 and 2014 are not yet available.

Author uses the Classification of Individual Consumption according to Purpose (COICOP), which

Tab. 1 Used Expenditure Groups and COICOP Expenditure Groups.

Used expenditure groups		COICOP expenditure groups
Group 1	01	Food and non-alcoholic beverages
	02	Alcoholic beverages, tobacco and narcotics
	11	Restaurants and hotels
Group 2	03	Clothing and footwear
Group 3	06	Health
Group 4	04	Housing, water, electricity, gas and other fuels
	05	Furnishings, household equipment and routine household maintenance
Group 5	09	Recreation and culture
	10	Education

Source: Czech Statistical Office, 2014 and own processing.

divides the purpose of individual consumption expenditures. This reference classification consists of 12 individual consumption expenditure groups of households. Some expenditure groups are united in this article. Similar COICOP expenditure groups are contained in each united expenditure group. Table 1 reports used expenditure groups and COICOP expenditure groups.

3. Results

3.1 The Structure of Consumer Basket and the Trend Model

Expenditure shares are calculated for each expenditure group and year. The development of expenditure shares w_{it} for each expenditure group is analysed. Table 2 presents the structure of consumer basket of household in the Czech Republic over the period from 2004 to 2014.

The highest expenditure shares during the period 2004–2008 are found by the Group 1, while during the period 2009–2014 by the Group 4. The differences between the expenditure shares of the Group 1 and 4 are always relatively low. The highest expenditure share ever, 42.83%, is found by the Group 4 in 2010. The lowest expenditure shares are found by the Group 3 and the lowest of them is 2.53% in 2011.

Expenditure shares by the Group 2 mostly decrease in time, while development of other groups is more volatile. The maximums of the Groups 1, 2 and 5 are found in 2004, the maximum of the Group 3 in 2008 and the one of the Group 4 in 2010. The minimum of the Group 1 is found in 2009, the minimums of the Groups 2 and 5 in 2010, the minimum of the Group 3 in 2011 and the one of the Group 4 in 2004. Based on the 2004 and 2014 comparison, expenditure shares of the Groups 3 and 4 increase in time, while the ones of the Groups 1, 2 and 5 decrease.

Expenditure shares are volatile in time. Many local extremes could be found in the development of each expenditure share. Trend changes from increasing trend into decreasing trend and vice versa imply, that the highest coefficients of determination are found just in case of quadratic function. The development of expenditure shares for each expenditure group is expressed by means of regression characteristics. Table 3 reports these characteristics for household in the Czech Republic, specifically coefficients of determination, correlation coefficients and regression coefficients over the period from 2004 to 2014.

Trend model measures how well the regression line approximates the real data points. The highest approximation, 73%, is found by the Group 1, while the lowest one, 27%, by the Group 3. The same order

Table 2 The Structure of Consumer Basket of Household in the Czech Republic.

Year	Group 1	Group 2	Group 3	Group 4	Group 5
2004	39.50%	7.89%	2.57%	34.72%	15.32%
2005	38.65%	7.46%	2.67%	36.37%	14.86%
2006	38.08%	7.33%	2.76%	37.31%	14.53%
2007	38.01%	7.28%	3.08%	36.63%	15.00%
2008	38.06%	7.02%	3.71%	36.11%	15.10%
2009	36.85%	6.80%	3.66%	37.99%	14.70%
2010	37.27%	4.54%	2.92%	42.83%	12.43%
2011	37.97%	6.33%	2.53%	39.24%	13.92%
2012	38.40%	6.03%	3.19%	39.42%	12.96%
2013	38.40%	6.03%	3.19%	39.42%	12.96%
2014	38.40%	6.03%	3.19%	39.42%	12.96%

Source: Czech Statistical Office, 2014 and own calculations.

Table 3 Regression Characteristics for Household in the Czech Republic.

	Group 1	Group 2	Group 3	Group 4	Group 5
Coefficient of determination	0.73	0.62	0.27	0.60	0.69
Correlation coefficient	0.86	0.79	0.52	0.77	0.83
a_i	0.06	0.03	-0.02	-0.06	-0.01
b_i	-0.78	-0.53	0.24	1.27	-0.20
c_i	40.06	8.57	2.36	33.50	15.50

Source: Czech Statistical Office, 2014 and own calculations.

Table 4 The Structure of Consumer Basket of Household in the Slovak Republic.

Year	Group 1	Group 2	Group 3	Group 4	Group 5
2004	43.42%	7.37%	3.50%	36.32%	9.40%
2005	43.92%	7.71%	3.84%	35.15%	9.38%
2006	42.18%	7.50%	3.63%	36.74%	9.96%
2007	42.46%	8.01%	3.52%	35.47%	10.55%
2008	42.23%	8.40%	3.83%	34.76%	10.78%
2009	42.06%	7.90%	3.96%	35.71%	10.38%
2010	36.93%	5.75%	4.62%	40.36%	12.34%
2011	35.34%	5.41%	5.31%	41.49%	12.45%
2012	34.19%	5.46%	5.39%	42.56%	12.40%
2013	34.27%	5.32%	5.57%	42.37%	12.47%
2014	34.31%	5.65%	4.42%	43.10%	12.53%

Source: Statistical Office of the Slovak Republic, 2014 and own calculations.

Table 5 Regression Characteristics for Household in the Slovak Republic.

	Group 1	Group 2	Group 3	Group 4	Group 5
Coefficient of determination	0.88	0.67	0.66	0.83	0.89
Correlation coefficient	0.94	0.82	0.81	0.91	0.95
a_i	-0.05	-0.03	-0.01	0.10	-0.01
b_i	-0.58	0.08	0.22	-0.26	0.54
c_i	44.92	7.72	3.10	35.69	8.56

Source: Statistical Office of the Slovak Republic, 2014 and own calculations.

of expenditure groups will be in order according to correlation coefficient. Mostly, the found correlation is strong. Table 4 presents the structure of consumer basket of household in the Slovak Republic over the period from 2004 to 2014.

The highest expenditure shares during the period 2004–2009 are found by the Group 1, while during the period 2010–2014 by the Group 4. The highest expenditure share ever, 43.92%, is found by the Group 1 in 2005. The lowest expenditure shares are found by the Group 3 and the lowest of them is 3.50% in 2004. The development of all groups is volatile in time. The maximums of the Groups 4 and 5 are found in 2014, the maximum of the Group 3 in 2013, the one of the Group 1 in 2005 and the one of the Group 2 in 2008. The minimum of the Group 1 is found in 2012, the one of the Group 2 in 2013, the one of the Group 3 in 2004, the one of the Group 4 in 2008 and the one of the Group 5 in 2005. Based on the 2004 and 2014 comparison, expenditure shares of the Groups 3, 4 and 5 increase in time, while the ones of the Groups 1 and 2 decrease. The structure of consumer basket of household in the Slovak Republic differs from the structure of consumer basket of household in the Czech Republic. Interesting differences can be identified. Especially higher expenditure shares by the Group 1 of household in the Slovak Republic than

the ones in the Czech Republic during the period 2004–2009 are interesting. Higher expenditure shares by the Group 5 of household in the Czech Republic than the ones in the Slovak Republic are found during the whole period 2004–2014.

Also in case of household in the Slovak Republic, highest coefficients of determination are found just in case of quadratic function. Table 5 reports regression characteristics for household in the Slovak Republic, specifically coefficients of determination, correlation coefficients and regression coefficients over the period from 2004 to 2014.

The highest approximation, 89%, is found by the Group 5, while the lowest one, 66%, by the Group 3. The same order of expenditure groups will be in order according to correlation coefficient. The found correlation is strong or very strong.

3.2 The Structure of Expenditures

Table 6 presents the structure of household expenditures in the Czech Republic over the period from 2004 to 2012. Net monthly money expenditures per capita are analysed.

It is clear from the Table 6, what part of income is used by household to buy the goods and services. The differences between the structure of household expenditures in the Czech and Slovak Republic

Table 6 The Structure of Household Expenditures in the Czech Republic.

Year	Group 1	Group 2	Group 3	Group 4	Group 5
2004	39.51%	7.89%	2.58%	34.71%	15.32%
2005	38.60%	7.56%	2.70%	36.17%	14.98%
2006	37.99%	7.33%	2.71%	37.45%	14.52%
2007	38.11%	7.30%	3.11%	36.49%	15.00%
2008	37.99%	7.06%	3.66%	36.23%	15.06%
2009	36.89%	6.76%	3.65%	37.97%	14.73%
2010	36.82%	6.79%	3.67%	37.91%	14.81%
2011	36.87%	6.53%	3.67%	38.78%	14.15%
2012	38.13%	6.38%	3.80%	37.86%	13.84%

Source: Czech Statistical Office, 2014 and own calculations.

Table 7 The Structure of Household Expenditures in the Slovak Republic.

Year	Group 1	Group 2	Group 3	Group 4	Group 5
2004	43.60%	7.56%	3.49%	36.05%	9.30%
2005	44.25%	7.47%	4.02%	35.06%	9.20%
2006	41.92%	7.58%	3.54%	36.87%	10.10%
2007	42.65%	8.06%	3.32%	35.55%	10.43%
2008	42.29%	8.37%	3.96%	34.80%	10.57%
2009	42.18%	8.06%	3.79%	35.55%	10.43%
2010	43.32%	7.37%	4.15%	34.56%	10.60%
2011	43.05%	7.62%	4.04%	34.53%	10.76%
2012	43.36%	7.08%	4.42%	34.51%	10.62%

Source: Statistical Office of the Slovak Republic, 2014 and own calculations.

are clear from the Table 2 and 6. Table 7 reports the structure of household expenditures in the Slovak Republic over the period from 2004 to 2012. Net monthly money expenditures per capita are analysed.

The structure of household expenditures in the Slovak Republic differs from the structure of household expenditures in the Czech Republic. Great differences are by the Group 5 during the period 2004–2008 and by the Group 1 during the period 2009–2014.

3.3 Overall Incomes and Expenditures

Expenditures are such a part of disposable income, which is used to buy the goods and services.

Table 8 presents overall incomes and expenditures of household in the Czech Republic over the period from 2004 to 2012 and percentage rates expressing, how much incomes exceed expenditures. Net monthly money incomes and expenditures per capita in CZK are analysed.

It is clear from the Table 8, that incomes and expenditures increase in time. Based on the 2004 and 2012 comparison, the incomes increase about 44.72% and the expenditures increase about

40.71%. Interesting differences can be identified. The difference between the percentage rates in 2007 and 2008 is caused by the income growth, which is higher than the expenditure growth. Percentage rates relate to financial reserves of household, essentially its savings. Household spends 93.72% of its income in 2004. So that, it saves only 6.28% of its income. However, household spends 91.13% of its income in 2012. It means, that it saves more than in 2004. Table 9 reports overall incomes and expenditures of household in the Slovak Republic over the period from 2004 to 2012 and percentage rates expressing, how much incomes exceed expenditures. Net monthly money incomes and expenditures per capita in EUR are analysed.

It is clear from the Table 9, that incomes and expenditures mostly increase in time. Based on the 2004 and 2012 comparison, the incomes increase about 51.62% and the expenditures increase about 37.43%. There is an interesting difference between the percentage rates in 2008 and 2009. Household spends 97.16% of its income in 2004. So that, it saves only 2.84% of its income. However, household spends 88.06% of its income in 2012. It means, that it saves more than in 2004.

Table 8 Overall Incomes and Expenditures of Household in the Czech Republic.

Year	Income	Expenditure	Percentage rate
2004	8 491	7 958	6.70%
2005	9 020	8 264	9.15%
2006	9 713	8 965	8.34%
2007	10 482	10 017	4.64%
2008	11 453	10 330	10.87%
2009	11 862	10 719	10.66%
2010	11 927	10 835	10.08%
2011	12 050	11 018	9.37%
2012	12 288	11 198	9.73%

Source: Czech Statistical Office, 2014 and own calculations.

It is evident, that percentage rates expressing, how much incomes exceed expenditures, are in the cases of the household in the Slovak Republic different from the household in the Czech Republic. Based on the 2004 and 2012 comparison, the percentage rates increase about 11% by the household in the Slovak Republic, however the ones increase only about 3% by the household in the Czech Republic.

4. Discussion

Many factors including the financial crisis of 2008 have an impact on the development of the structure of consumer basket of average household. These factors influence shopping preference of household. Consumer behaviour theory could be applied. Necessity good and luxury good are defined according to this theory. The increase for a necessity good is less than proportional to the rise in income. It means, that the proportion of expenditure on necessity good falls as income rises. On the contrary, luxury good is such good, for which demand increases more than proportionally as income rises. The decrease in expenditure shares by the Group 1 and 2 can relate to the Engel's law. According to this law, decreasing proportion of income spent on food leads to higher standard of living. The lower is the expenditure share, the higher is the standard. Czech household is saturated with such goods more and more and it want to buy rather different goods. In general, the household is more saturated with necessity goods as income rises. Household use more financial resources to buy luxury goods, like longer and more expensive holiday or foreign language courses. Based on these changes, shopping preference of household is variable in time and expenditure share by

Table 9 Overall Incomes and Expenditures of Household in the Slovak Republic.

Year	Income	Expenditure	Percentage rate
2004	241.62	234.75	2.93%
2005	251.18	244.57	2.70%
2006	285.97	280.61	1.91%
2007	320.43	304.16	5.35%
2008	352.22	324.69	8.48%
2009	350.61	306.62	14.35%
2010	348.95	307.76	13.38%
2011	361.77	320.80	12.77%
2012	366.34	322.61	13.56%

Source: Statistical Office of the Slovak Republic, 2014 and own calculations.

the Group 5 increases. The increase in expenditure share by the Group 3 can relate to the implementation of specific fees for the health care delivery. Such fees were implemented in 2008 in the Czech Republic and in 2003 in the Slovak Republic. So that, health care became more expensive. The increase in expenditure share by the Group 4 can relate to the increase in energy prices.

Both differences and common features are found within the development of indicators between the Czech and Slovak households. Common features could be caused by the fact, that these two countries constituted only one country till 1. 1. 1993. The changes in development of the structure of consumer basket of average household in two neighbouring Central European countries are identified in this article. The relation between the incomes and expenditures of relevant households from these countries in time is also analysed. Based on these facts, the contribution of the article is clear.

Used methodology and found results can be compared with the results of previous empirical studies cited in this paper. Author uses 5 expenditure groups. Other authors use less than 12 or just 12 expenditure groups. Two countries during 11 years are compared by author. Other authors compare mostly more countries during shorter period. Author's findings are more current. Similarly to other authors, author identifies the changes in the structure of consumer basket. These changes can be expressed by means of the expenditure shares. Author also calculates coefficient of determination and correlation coefficient. In order to express changes mentioned, other authors use relative prices for goods and services and they calculate standard deviations of these relative prices and annual average inflation rates. The comparison of individual expenditures in each country presented

by author is possibly more sophisticated. The cause of the fact is the use of trend models and various coefficients. Factors affecting the consumer behaviour which are presented by author are similar to factors presented by other authors.

The research could go on in several directions. Used characteristics of households or other characteristics could be analysed during different periods. Other countries and other indicators could be used. The number of expenditure groups and the choice what expenditure groups will be united to one group could be also different.

Conclusion

The development of the structure of consumer basket of average Czech and Slovak households during the period from 2004 to 2014 was analysed in the article. The development of groups of consumer basket was assessed. Based on realized regression analysis, coefficients of determination and correlation coefficients were calculated within choosing the appropriate trend function. The development of the

structure of Czech and Slovak household expenditures was analysed according to consumer expenditure groups. Overall incomes and expenditures of these households in each year were presented together with percentage rates expressing, how much incomes exceed expenditures. Author analysed the changes in used indicators in time. Based on results, interesting findings were found. The highest expenditure shares of Czech household during the period 2004–2008 were found by the Group 1, while during the period 2009–2014 by the Group 4. Similar results were found in case of Slovak household, but during the period 2004–2009 and 2010–2014. Based on the 2004 and 2014 comparison, the increase of expenditure shares of the Groups 3 and 4 and the decrease of the expenditure shares of the Groups 1 and 2 were presented. Expenditure shares by the Group 1 of Slovak household were found higher than the ones of Czech household during the period 2004–2009. Expenditure shares by the Group 5 of Czech household were found higher than the ones of Slovak household during the whole period 2004–2014. Mostly, the found correlation was strong.

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